Construction Project Safety-Management
Best-Practices Handbook

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CONSTRUCTION PROJECT SAFETY MANAGEMENT BEST PRACTICES HANDBOOK

Sathyanarayanan Rajendran
and
Mandi Kime

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- **Safety and Health Investment Projects (SHIP), Department of Labor and Industries, State of Washington**

- **Associated General Contractors of Washington (AGC of WA)**
  - Mandi Kime, Director of Safety; Coauthor and Grant Project Manager for AGC of WA
  - Andrew Ledbetter, Safety Specialist
  - Penny Schmitt, Administrative Support

- **Central Washington University**
  - Dr. Sathyanarayanan (Sathy) Rajendran, Ph.D. CSP; Author and Grant Project Manager for CWU
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Handbook Development Committee Members

- Drew Rosenfelt, LEED AP; PSF Mechanical, Inc.
- Jamie Stuart; Valley Electric Co.
- John L. Burdick, PCL Construction Services, Inc.
- Jon Andersen, CSP, CHST, CET; Centennial Contractors Enterprises, Inc.
- Mandi Kime; Associated General Contractors of Washington
- Mark Gauger; G.L.Y. Construction
- Pete Campbell; BNBuilders

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Peer Reviewers

- Cole Davis, NOVA Group Inc.
- Chris Grover, CSP, CRIS, RRE; CNA Insurance
- Donna Emmert, CPDM; Zurich Services Corporation
- Drew Rosenfelt, LEED AP; PSF Mechanical, Inc.
- Gavin Banks, Turner Construction Company
- Jamie Stuart; Valley Electric Co.
- Jerry Shupe, CSP; Hensel Phelps Construction Co.
- John Gambatese, Ph.D., P.E., Oregon State University
- John L. Burdick, PCL Construction Services, Inc.
- Jon Andersen, CSP, CHST, CET; Centennial Contractors Enterprises, Inc.
- Keith Dyer, CSP; Walsh Pacific
- Kerry Soileau; Ferguson Construction, Inc.
- Kimberley Gamble, CHST; Andersen Construction
- Mandi Kime; Associated General Contractors of Washington
- Mark Gauger; G.L.Y. Construction
- Melanie Preusser; Zurich Services Corporation
- Mike Andler, CRIS; Central Washington University
- Pete Campbell; BNBuilders
- Rick Zellen, CSP, ARM, CRIS, STS-C; Zurich Services Corporation

Construction Contractors

- Andersen Construction Co., Inc.
- Andgar Corporation
- Balfour Beatty Construction
- BNBuilders
- Exxel Pacific Inc.
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1
INTRODUCTION

Construction worker safety and health continues to be an important concern for the Washington construction industry. The industry has consistently experienced higher injury and illness rates compared to other states. In fact, the 2011 WA construction total recordable case rate per 100 full-time workers was the highest in the nation (8.7).[1] Not only are construction injuries a significant cause of humanitarian concern, but the high cost associated with these injuries and deaths is also a motivation for an improved safety performance in the construction industry.

The "technical" causes of injuries and illnesses (e.g. falls) in construction have long been recognized, and their persistence continues to frustrate construction safety and health practitioners. Improvement in project safety management practices is needed to lower the level of risk and improve worker safety and health performance. There is a great deal of knowledge of specific successful management practices, from pioneering safe companies, which can be used to enhance construction safety and health of the overall industry.

To prevent injuries, illnesses, and fatalities, many construction contractors have implemented successful strategies ("best practices"), which are "above and beyond" regulatory compliance that have helped them improve worker safety and health performance. Even though the construction industry shares a common goal of creating an injury and incident free work environment on its jobsites, there is no common medium to share these best practices that will benefit other contractors and the industry as a whole. These best practices, if shared, can benefit the industry to fulfill its goals of creating an injury-free work environment on construction sites. Instead of re-inventing the wheel, contractors, who are interested in improving their safety performance, can implement proven best practices during different project phases (e.g. Design or Construction) within their projects, thereby improving their project safety and health performance.

1.1 PURPOSE

The purpose of the *Construction Project Safety Management Best Practices Handbook* is to provide comprehensive coverage of best practices from contractors of all phases of a construction project from project planning, design, project start-up, construction, commissioning, and closeout, in separate chapters. The handbook also provides various templates of safety planning forms and checklists (e.g. Pre-construction safety meeting checklist). They can be easily replicated by medium or smaller companies who otherwise cannot afford to create these tools from scratch. Each chapter has an "additional resources" section at the end for those who wish to explore more deeply into the topic area. The handbook's scope is limited to safety management, administration, and programs in construction. The handbook's primary focus is on project safety administration/management programs.

1 BLS (2013). State Occupational Injuries, Illnesses, and Fatalities, available at http://www.bls.gov/iif/oshstate.htm#WA (accessed 7 October 2013).

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1.2 SCOPE

The handbook is written to meet the needs of project owners, and small and medium-sized contractors as a ready reference guide for project site safety management. It will also be helpful as a safety management training manual for entry-level safety, and construction professionals. University and college instructors can use this handbook as a construction safety management course textbook for students who are pursuing safety management or construction management degrees.

1.3 REGULATORY JURISDICTION

All regulatory requirements referenced in this handbook are based on Washington Division of Occupational Safety and Health (DOSH) regulations. However, the handbook contains several safety management best practices from various contractors in the form of safety forms, checklists, programs, etc., as exhibits in most chapters. These best practice tools are only included as an example, and the readers should be aware that these contractors may reference safety regulations depending on their regulatory jurisdictions. It is the reader's responsibility to ensure that they adapt the best practices provided in this handbook for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace. In addition, please note the materials available in this handbook are intended to provide general information about the subject matter covered. They are not meant to provide legal advice. Readers should contact their attorney to obtain advice with respect to any particular issue or problem.

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2
OVERVIEW OF THE CONSTRUCTION INDUSTRY AND SAFETY

Construction worker safety continues to be a major concern for the U.S. construction industry. It is one of the most hazardous industries in the United States, historically employing about five percent of the country's workforce, yet has accounted for a disproportionate number of on-the-job injuries. It is important that readers understand the characteristics of the industry, before reviewing the safety management best practices that will help them improve worker safety and health performance. Hence, this handbook included this opening chapter to provide a basic overview of the construction industry for readers who are unfamiliar with the industry including:

- Nature of the construction industry
- Industry classification
- The construction team
- The project life cycle
- The project team
- Influence of project factors on safety
- Safety in the construction industry

2.1 NATURE OF THE CONSTRUCTION INDUSTRY

The construction industry serves the human needs by building new structures and adding to, altering, repairing, and maintaining existing structures. These structures include but not limited to buildings, highways, bridges, dams, power plants, refineries, airports, railroads, docks, canals, levees, sewage treatment plants, and many others. The construction sector is one of the largest of all U.S. industries, with its total expenditures accounting for typically 6 to 12 percent of the Gross National Product (GNP). The total annual volume of new construction in the U.S. was $930 billion in 2013.

According to the U.S. Census Bureau, there were 729,345 U.S. establishments that can be classified as construction firms in 2007, with an average of ten employees per establishment. However, not all businesses are similar. Some establishments are gigantic, generating revenues in billions of dollars, and few generate revenues in millions, and a majority generate tens of thousands of dollars. Some firms engage in international work, but most do business close to their primary office location. Remember there are very stringent requirements to run a construction business, mainly in the form of contracting licenses, to ensure public health and safety.

The construction establishments have one of the highest failure rates in the U.S. due to the high risk involved. Smaller firms have a high failure rate, compared to larger ones. The industry has a very low-profit margin mainly due to the competitive nature of the industry. During the 2008 recession, some companies were doing work for less than 1% profit. In addition, the construction industry is cyclic,

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responds quickly to changes in the nation's economy. The amount of construction work taking place at any given time is dependent on several factors including government expenditures, business needs, tax laws, seasonal changes, and others.

A construction firm's work on each structure is commonly referred to as a "project." Construction projects are very complex, especially because each project is unique, and custom-built on the site by, to some degree, by an entirely different construction team. The workforce engaged in the building of these projects are classified based on their association with the union as a closed shop or open shop. A construction firm having a contract with one or more trade unions to employ only union members is called a closed shop firm. On the other hand, a company that employs workers without regard to union membership is called an open shop firm. There are companies that use a combination of these both arrangements.

2.2 INDUSTRY CLASSIFICATION

The construction industry is commonly divided into four broad categories such as residential, building, engineering, and industrial construction (Table 2-1). While few construction firms specialize in all these four areas, many companies limit their scope to one or two.

Table 2-1: Four Common Construction Industry Divisions and Example Projects[1]

Type	Residential	Building	Engineering	Industrial
Examples	Single-family house	Healthcare	Bridges	Refineries
	Multifamily house	Offices	Tunnels	Steel mills
	Condominiums	Educational	Dams	Power plants
	Low-rise apartments	Religious	Levees	Smelters
	High-rise apartments	Public safety	Sewage treatment	Chemical plants
		Amusement	Water treatment	Nuclear
		Recreation	Railroads	Aviation
		Government	Pipelines	
Market Share	40-45 percent	25-30 percent	20-25 percent	5-10 percent
Ownership	Mostly private	Mostly private	Public	Private

2.3 THE CONSTRUCTION TEAM

The construction team includes the owner, general contractors, specialty contractors, architects, engineers, workers, consultants, unions, vendors, suppliers, sureties, lending agencies, regulatory agencies, other government agencies, insurance companies, attorneys, consultants, and others. The major stakeholders are the owner, designer (Architect/Engineers (A/E)), general contractor, subcontractors, and the craft workers.

1 Clough, R.H, Sears, G.A., and Sears, SK. (2005). *Construction Contracting – A Practical Guide to Company Management.* Seventh Edition. John Wiley & Sons Inc. New Jersey.

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2.3.1 Owner

The owner is an individual or entity who initiates, funds and enjoys the benefits of the completed project. Construction projects are typically classified as privately funded or publicly funded (local, state, or federal). In 2013, approximately 72% ($664 billion) of construction was privately financed, and various public agencies funded 28% ($266 billion) of construction. In this handbook, the term owner is used to designate this role.

2.3.2 Architect / Engineer (A/E)

The A/E, commonly referred to as a designer, performs the design of the construction project. The architect's services are predominantly used when designing residential or building projects, and engineers are commonly used to design industrial and heavy civil projects. Upon the owner's request, the designers also provide construction phase services such as, oversee change order management, perform site inspections, review and approve progress payments and many other functions. In this handbook, the term designer is used to designate the A/E.

2.3.3 General Contractor (GC)

The general contractor (GC), also known as the prime or controlling contractor, is the construction firm that is in "contract" with the owner to construct the project, according to the designer's plans and specifications. In this handbook, the term general contractor will be used to designate the prime contractor. While some GC firms will have tradespeople to perform a part of the project scope (e.g., concrete scope) called self-performed work, they mostly hire specialized contractors to perform significant portions of the construction work.

The GC is responsible for completing a successful project by controlling the four crucial project elements: safety, quality, cost, and schedule. The GC frequently interacts with the designer to implement the project design, gather and evaluate subcontractor bids, obtain necessary government permits, and coordinate all subcontractors. The GC can be held liable for the negligence of subcontractors.

2.3.4 Subcontractor

The subcontractor or specialty contractor is also a construction firm that contracts with the GC to perform a portion of the project scope (e.g., site preparation, structural, mechanical work, and electrical work), but are not responsible for the entire project. Subcontractors may also give part of their contract to other contractors, who are commonly known as "sub-tier" subcontractors. For example, a mechanical subcontractor sometimes will subcontract insulation of pipes and HVAC system to specialized insulation contractors.

2.3.5 Craft workers

The specialty contractor, depending on their trade, will hire construction crafts from diverse trades. Common tradespeople one can see on a typical construction site include:

- Construction laborers and helpers
- Construction equipment operators/Operating engineers
- Truck driver
- Boilermaker

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- Welder
- Carpenters
- Cement finishers
- Structural iron and steel workers
- Masons – brick, block, and stone
- Electricians
- Drywall and ceiling tile installers, and tapers
- Elevator installers
- Glaziers
- Painters
- Plumbers, pipefitters, and steamfitters
- Sheet metal workers
- Insulation workers
- Tile and marble setters
- Roofers
- Hazardous materials removal workers

Please refer the occupational outlook handbook by the U.S. Bureau of Labor Statistics, which provides a detailed description of these occupations and commonly performed tasks on the construction site.[2]

The construction workforce is very diverse, with about 2 million construction workers in 2010 were born in foreign countries, with 24% Hispanic workers in the industry. Construction had the highest percentage of Hispanic workers in 2010, only second to agriculture.[3] Union members in construction have advantages in educational attainment, wage and fringe benefits, training, and longer employment tenure, compared with non-union workers.[4] In 2011, more than 1 million construction workers were union members accounting for 15.2% of the 6.7 million wage-and-salary workers in construction. In 2010, the average age of a construction worker was 41.5.

2.4 THE PROJECT LIFE CYCLE

The project lifecycle starts with the conceptual planning phase and continues through design, procurement, construction, startup and commissioning, operations, and maintenance.

2.4.1 Planning Phase

During the planning phase the owner expresses the need for a new structure, identifies project needs and scope, hires consultants to perform project feasibility study (i.e., in terms of finance, schedule, risks), and makes the decision whether to proceed with the project. This phase also involves the selection of the project designer.

2 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook, 2013-14 Edition. http://www.bls.gov/ooh/construction-and-extraction/ (Accessed December 2014)

3 The Center for Construction Research and Training (CPWR). The Construction Chart Book, 5th Edition. http://www.cpwr.com/sites/default/files/publications/5th%20Edition%20Chart%20Book%20Final.pdf (Accessed December 2014)

4 The Center for Construction Research and Training (CPWR). The Construction Chart Book, 5th Edition. http://www.cpwr.com/sites/default/files/publications/5th%20Edition%20Chart%20Book%20Final.pdf (Accessed December 2014)

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2.4.2 Design Phase

The project designer starts the design phase with a preliminary design concept that meets the owner's specifications regarding the project's use, appearance, and cost. Once the owner reviews the preliminary design and approves it, the designer will then develop detailed drawings and specifications for the construction of the project. The owner also obtains any land use approvals and any appropriate permits, and sometimes even orders long-lead equipment that will be part of the final facility.

2.4.3 Contract Phase

The project is now ready for construction. Thus, the owner will begin the general contractor (GC) selection process. The construction drawings and specifications are given to the prospective GCs for bidding, which will allow them to prepare an accurate estimate of the project cost. Readers should have some basic understanding of the most common contracting methods and project delivery methods. A brief overview is provided in this chapter. There are three common ways of delivering a construction project:

- Design-bid-build (DBB) – The DBB is the traditional and most common project delivery method to deliver projects. It involves three distinct phases: the design phase, the bid phase, and the build phase. There is no overlap between the three phases, and each phase is finished before the next one begins. The owner contracts separately with the design firm to design the project and develop construction plans and specifications, and the GC to construct the project.

- Design-build (DB) – The DB method also called as fast-tracking method, overlaps the project design and construction phase. The DB method has gained popularity in the last two decades, and might overtake DBB as the most common method of project delivery. There are several variations, but in all cases the owner maintains a single contract:
    1. The owner contracts with a "single entity" (integrated design-builder) to provide both design and construction services.
    2. The owner contracts with a "joint-venture" between design and construction firms to provide design-build services.
    3. The owner contracts with a "GC" as the design-builder, and then the GC subcontracts the design to an A/E firm.
    4. The owner contracts with a "design firm" as the design-builder, and then the design firm subcontracts the construction scope to a GC.

  Though many variations exist, compensation for the DB firm is usually based on a fixed price or a guaranteed maximum price (GMP). The owner is essentially asking the DB firm to finish their scope of work within a certain dollar amount.

- Construction Manager/General Contractor (CM/GC) – The CM/GC is a modified DB process in which the owner enters into a contract with a design firm and a CM/GC firm separately. The CM/GC is selected at an early point in the design phase, typically using a competitive selection process. The construction input during the design by the CM/GC firm is one of the major advantages of this method. The CM/GC firm can collaborate with the designer on the development of the design and preparation of design documents. Once the design has progressed to an acceptable level, the CM/GC firm submits a guaranteed maximum price (GMP) for the project to the owner. After reaching a GMP agreement, the construction begins.

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There are two major types of contracting methods used by construction owners to select a contract with the GC. They are competitive bidding and negotiated contract.

- Competitive Bidding – A majority of the public owners obtain competitive bids or hard-bid, from multiple GCs, and awards the project to the lowest responsible bidder using a "lump-sum" contract. Many state statutes require hard-bids. Any change in scope or price needs a change order to be approved by the owner or designee. Hard-bid contracts can create adversarial relationship between owner, A/E, and GCs; since most times the A/E acts as the owner's representative during the construction phase by reviewing change orders approvals and progress payments approvals.

- Negotiated Contract – Without going through the competitive bidding process, most private owners negotiate a contract for a project with a preselected construction firm, based on experience on similar projects, qualifications, reputation, and other reasons. This method is gaining popularity in recent years. With many state legislations allowing for negotiated contracts, even public agencies are using this approach over the past few years. The negotiated contract typically involves a cost plus an agreed upon percentage of the GC's overhead and profit. Since this method does not require bid, it saves some time for the owner.

2.4.4 Construction Phase

Once the owner gives the approval to proceed with construction, the GC procures the services of several subcontractors to complete the project using either competitive bidding or negotiated contract. The primary objective of the GC is to build the project per the drawings and specifications. There are four main aspects of construction that the contractor will control. They include safety, cost, schedule, and quality. At substantial completion, a punch list is prepared which identifies items that must be completed before the project can be accepted by the owner. Final completion occurs when all of the punch list items have been taken care by the GC.

2.4.5 Turnover Phase

Commissioning, closeout, and turnover is the next stage of the construction project life cycle. Commissioning is done to ensure the building systems, equipment, and the overall facility functions correctly. During this phase, the contractor typically moves out of the project.

2.4.6 Operations and Maintenance

The final stage is the operations and maintenance phase, which includes all the services required to ensure a facility or equipment functions as designed.

2.5 THE PROJECT TEAM (CONTRACTOR HIERARCHY)

Construction projects are complex and need a team with a variety of professionals. A sample contractor hierarchy is shown in Figure 2-1 that will help readers understand the construction site hierarchy. Figure 2-1 is an example, remember the hierarchy will vary from project to project, depending on project size, and complexity. But, the critical thing is to understand is that these are the members who are responsible and accountable for safety. The primary focus should be on the supervision and craft workers:

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- Project Manager
- Superintendent
- General Foreman – assigned when there are 3 to 5 foremen
- Foreman – typically 10 or fewer craft workers are assigned to a foreman, called the crew.
- Craft Workers

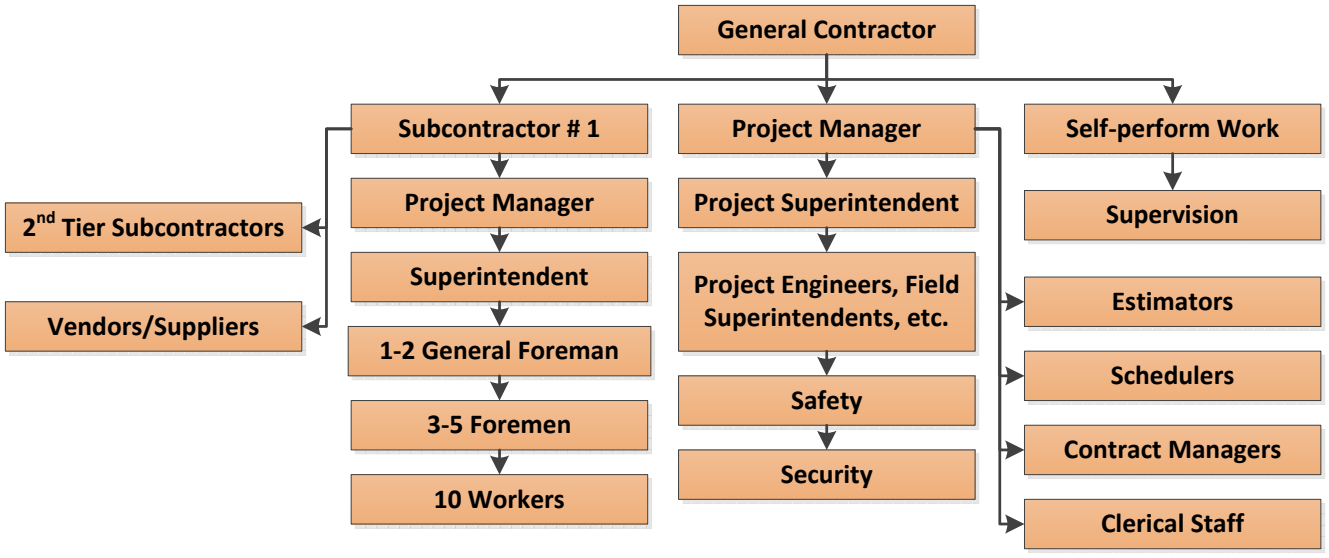

Figure 2-1: Example General Contractor, Subcontractor, and Supervision Hierarchy

2.6 INFLUENCE OF PROJECT FACTORS ON SAFETY

This chapter discusses the influence of various project factors and on project safety such as:

- Project life cycle
- The construction team
- Project delivery methods

2.6.1 Project Life Cycle vs. Safety

When should a project consider construction worker safety? In order to have a high influence on project safety performance, construction safety should be a primary consideration during the conceptual and preliminary design phases of the project development process as shown in the time-safety influence curve in Figure 2-2.

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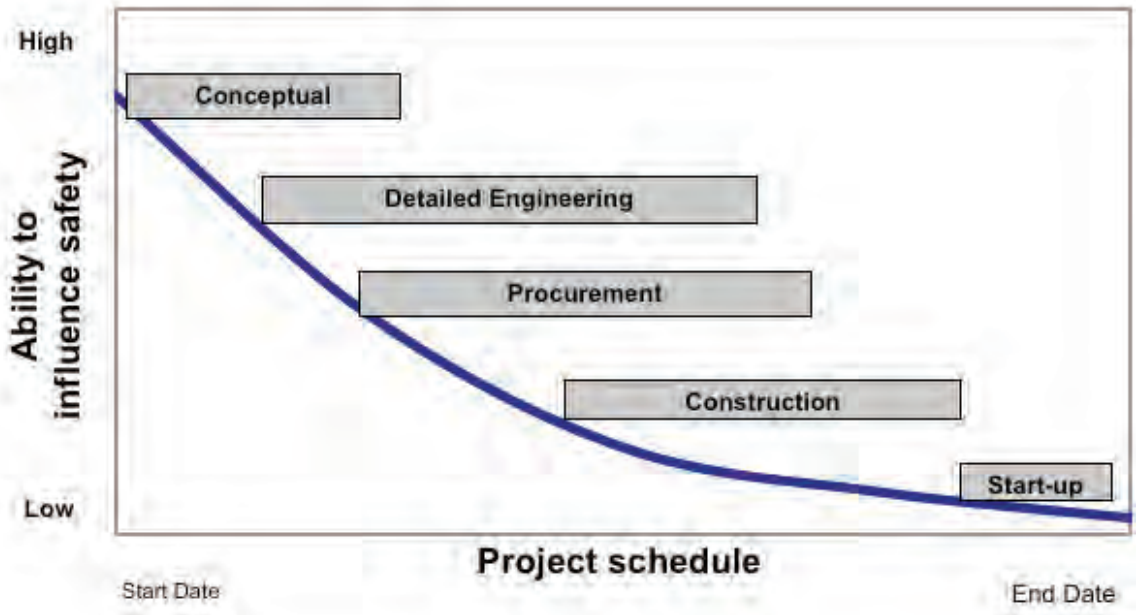

Figure 2-2: Time / Safety Influence Curve[5]

2.6.2 Construction Team Players vs. Safety

The parties who have significant control of and/or influence on the construction worker safety and health are the owner, general contractor, subcontractor, and designer. Just as each party influences and contributes to the completed project in its own way, each affects the construction site safety differently. A wealth of literature exists in the area of construction safety that has identified the roles and influence of the four major parties (owner, constructors, subcontractors, and designers) that are summarized below:

- Owners – Safety elements that should be implemented by owners to improve safety are:
  - Owner safety commitment
  - Selection of GCs based on safety (injury rates, qualifications of safety and project management staff, quality of contractor safety program)
  - Safety requirements in contracts (safety representative, resume of safety personnel, site specific safety plan, CEO safety commitment letter, and minimum training)
  - Owner involvement in safety activities during pre-planning, design, and construction phases

- General Contractors - There seems to be a consensus among the safety researchers and professionals that the major elements that will help achieve better safety performance mostly revolve around the nine zero accident techniques:[6]
  - Demonstrated management commitment
  - Staffing for safety

5 Szymberski, R. (1997). Construction Project Safety Planning. *TAPPI Journal*, 80(11), 69-74.

6 Hinze, J., Mathis, J., Frey, P.D., Wilson, G., DeForge, P., Cobb, M., and Marconnet, G. (2001). "Making Zero Accidents a Reality," Annual Conference of the Construction Industry Institute, San Francisco, CA.

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- Safety planning
- Safety training and education
- Worker participation and involvement
- Recognition and rewards
- Subcontractor management
- Accident/incident reporting and investigations
- Drug and alcohol testing

- Subcontractors – Research on a subcontractor's role in construction safety has been minimal. Some of the significant subcontractor safety elements include:
  - Task coordination by analyzing project schedule
  - Have fewer contractors on the project
  - Hiring known subcontractors by the GCs
  - GC or CM provided a full-time project safety representative
  - GC discussed safety at coordination meetings and pre-job meetings
  - GC monitored project safety performance
  - GC required full compliance with the safety regulations from subs
  - Top management commitment/involvement in project safety
  - Minimizing worker turnover
  - Implementing employee drug testing
  - Training with the assistance of contractor associations

- Designers – Some of the significant designer elements include:[7]
  - Safety during conceptual planning stages of the project
  - Safety in design concept
  - Safety during constructibility reviews
  - Life cycle safety review
  - Safety training for designers
  - Inclusion of hazard symbols in project plans
  - Involvement of foremen (GC) in constructibility review/design process
  - Use of the Design for Construction Safety Toolbox

After examining the list above, the readers will understand that the best practices of the owner, general contractor, and subcontractors are similar in nature.

2.6.3 Project Delivery vs. Safety

Construction project delivery method is the one of the most important factors that impact the project safety performance. Three questions to consider when choosing a project delivery method:

- Which method allows the complete coordination of the entire project team (owners, designers, and GCs)?
- Which method permits the incorporation of safety during the early phases of the project lifecycle?
- Which method provides significant limitations to worker safety and health?

7 Rajendran, S. (2006). "Sustainable Construction Safety and Health Rating System." *Doctor of Philosophy Dissertation*, Oregon State University, Corvallis, Oregon, December 2006.

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Table 2-2 summarizes the advantages and disadvantages of the construction worker safety with respect to the delivery and contracting methods.

Table 2-2: Impact of project delivery methods on construction safety

Method	Advantages	Disadvantages
DBB	o Fully designed scope of work minimizes surprises	o Selection of GC/subs based on past safety performance is not possible o No GC involvement in the design to incorporate safety o No constructibility review o Potential to ignore safety to save costs
DB	o Selection of GC/subs based on past safety performance o GC provides input into project design improving constructibility o Designer can incorporate safety into project design o GMP given earlier in the process allows negotiation of safety budget upfront	o Difficult to incorporate safety in design if the designer is unfamiliar with design for safety concepts o Difficult to incorporate safety in design if the designers is reluctant to consider safety during design due to liability concerns
CM/GC	o Selection of GC/subs based on past safety performance o GC provides input into project design improving constructibility o Designer can incorporate safety into project design o GMP given earlier in the process allows negotiation of safety budget upfront	o Difficult to incorporate safety in design if the designer is unfamiliar with design for safety concepts o Difficult to incorporate safety in design if the designers is reluctant to consider safety during design due to liability concerns

2.7 SAFETY IN THE CONSTRUCTION INDUSTRY

Construction is a hazardous industry. The fatal and non-fatal injury rates have considerably declined since the early 1990s, but the rate is among the highest of all U.S. industries. The following chapters presents the industry accident statistics, cost of accidents, common accident causes, and common hazards, to provide the readers a better understanding of the safety issues faced by the industry.

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2.7.1 Construction Safety Management Risks

The typical hazards found on construction sites are discussed later in this chapter. Readers should understand the common risks associated with safety management so that it can be eliminated, minimized, or transferred. A non-exhaustive list of typical construction risks include:

1. Worker injuries and illnesses
2. Damage to GC and subcontractors equipment, vehicle, material, and property on the site
3. Injuries to the members of the public due to negligence of contractors
4. Damage to equipment, vehicle, material, and property of the general public due to negligence of contractors
5. Negligence of one contractor resulting in an injury to another contractor or property damage
6. Environmental damages
7. Business interruptions due to any of the items 1 through 7

Care should be taken to eliminate or minimize these risks, in addition to purchasing proper insurance coverage.

2.7.2 Accident Statistics

Out of 3,929 worker fatalities in private industry in calendar year 2013, 796 or 20.3% were in construction; that is, one in five worker deaths were in construction. Table 2-3 presents some of the most important safety statistics. The data presented in this paragraph are from two sources: the U.S. Bureau of Labor Statistics[8] and the Construction Chart Book, the Center for Construction Research and Training, 5th edition.[9]

Table 2-3: U.S. Construction Industry Injury and Illnesses Statistics

Description	Statistics
2013 Total Recordable Injury Rate (TRIR)	3.8
2013 Days away, restricted, transfer rate (DART)	2.2
2012 Median days away from work due to injury	11
2012 Number of construction fatalities (most of all industries)	806
2012 Number of fatalities per 100,000 full-time equivalent workers	9.9
2012 Age group with highest number of nonfatal injuries and illnesses	25-34
2012 Percentage of injuries involving employees with service <3 months	16%

2.7.3 Accident Costs

Construction accidents are very expensive, accounting for billions of dollars in direct and indirect costs. Direct costs are workers' compensation claims that pay for medical, loss of wages, and rehabilitation for an injured worker. Many employers do not realize the indirect costs associated with accidents such as:

8 The Bureau of Labor Statistics. Injuries, Illnesses, and Fatalities (IIF) program. www.bls.gov/iif/ (Accessed December 2014)

9 The Center for Construction Research and Training (CPWR). The Construction Chart Book, 5th Edition. http://www.cpwr.com/sites/default/files/publications/5th%20Edition%20Chart%20Book%20Final.pdf (Accessed December 2014)

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- Increase in workers' compensation insurance premiums
- Lost reputation or damage to public image
- Loss of contracts due to poor safety records
- Work stoppage associated with accidents
- DOSH citations and other regulatory agency citations
- Damaged or spoiled materials
- Replacement of damaged tools or equipment
- Investigation time
- Lower worker morale
- Loss of valuable workers
- Hardship to worker family

There are estimates that the indirect cost is anywhere between 1 to 20 times the direct cost depending on the accident.

2.7.4 Accident Causes

According to the Bureau of Labor Statistics (BLS)[8], the leading causes of worker deaths on construction sites were falls, followed by struck by object, electrocution, and caught-in/between. These "Fatal Four" were responsible for more than half (58.7%) the construction worker deaths in 2013. Eliminating the Fatal Four would save 468 workers' lives in America every year. Based on the author's experience, the other common causes of accidents on a construction site include but not limited to:

- Trips and slips
- Improper use or failure to use, Personal Protective Equipment (PPE)
- Defective PPE
- Improper material storage
- Lack of warning system
- Use of defective tools, equipment, or materials
- Failure to follow safety procedures or policies
- Failure to identify and control hazards using pre-task plans
- Failure to maintain focus on the work at-hand
- No management accountability and responsibility system
- Act of violence or horseplay
- Improper lifting and hoisting
- Inadequate guards or barriers
- Insufficient safety training for workers
- Mechanical failure of equipment
- Noise exposure
- Chemical exposure
- Fire or explosions
- Inadequate illumination
- Inadequate ventilation
- Reduced visibility
- Poor housekeeping
- Poor communication
- Language barrier

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- Temperature extremes
- Under influence of alcohol and/or other drugs
- using defective equipment
- Weather Conditions
- Fatigue due to workload

2.7.5 Construction Site Hazards

Hazard and risk identification is perhaps the most crucial part of the construction site safety management process because an exposure that is not identified cannot be properly managed. Some of the most common health hazards are listed in Table 2-4. Other hazards on construction sites include:

- Caught In/Between
- Compressed Gases
- Confined Spaces
- Crane
- Electrical Shock
- Elevated Work
- Explosion
- Falls from Elevations/Same level
- Fire
- Inadequate Access
- Ladders
- Lockout/Tagout
- Mobile Equipment
- Particles in Eyes
- Poor Housekeeping
- Rigging
- Scaffolding
- Sharp Objects
- Struck By
- Slips and trips
- Thermal Burns

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Table 2-4: Common Hazards on Construction Sites

Chemical	Physical	Biological	Ergonomic
Gases Vapors Fumes Dusts Fibers Mists	Temperature Noise Vibration Ionizing Radiation Non-Radiation	Fungi Bloodborne Pathogens Bacteria Poisonous Plants Poisonous Animals Infectious Animals	Repetitive Motion Awkward Postures Excessive force Static loading Contact stress
Examples: Acids Alkalis Asbestos Bleaches Cadmium Carbon monoxide Cutting oil mists Epoxy resins Formaldehyde Hexavalent chromium Lead Oils Silica Solvents Spray paints Welding fumes	**Examples:** Hand-held power tools Equipment Heat illnesses Cold illnesses X-rays UV light Infrared radiation Lasers	**Examples:** West Nile virus Lyme disease Histoplasmosis Hantavirus Poison oak Sumac Bee Yellow jacket Bird droppings Sewage	**Examples:** Strains Sprains Tendonitis CTS Back pain

2.7.6 Workplace Safety and Health in Washington and Enforcement[10]

Regulatory agencies play a crucial role in creating a safe and healthy workplaces in Washington. Some of the common names you might have heard are OSHA, WISHA, and DOSH? What are OSHA, WISHA, and DOSH and how do they Relate? With the Occupational Safety and Health Act of 1970, Congress created the Occupational Safety and Health Administration (OSHA) to develop and enforce workplace safety and health rules throughout the country. OSHA allows states to run their own safety and health programs as long as they are at least as effective as OSHA. OSHA accepted Washington as a state plan state.

WISHA is the Washington Industrial Safety and Health Act, Chapter 49.17 RCW, enacted in 1973 by the Washington State Legislature. The purpose of this law is to ensure that Washington's employers provide their workers with safe and healthy workplaces. The Department of Labor & Industries (L&I) administers WISHA through its Division of Occupational Safety and Health (DOSH). Washington is one of 27 states that administers its own workplace safety and health program. The OSHA enforces safety and health requirements in the remaining states. OSHA monitors and partially funds DOSH. DOSH (the Division of Occupational Safety and Health) is part of the L & I that:

10 Division of Occupational Safety and Health (DOSH). http://www.lni.wa.gov/SAFETY/TOPICS/ATOZ/ABOUT/DEFAULT.ASP (Accessed January 2015)

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- develops safety and health rules;
- enforces safety and health rules by inspecting worksites for unsafe working conditions;
- provides free on-site consultations to help employers create safe and healthy workplaces;
- provides free training, safety and health programs, and other resources to help prevent, find, and fix hazards; and
- was called WISHA Services (Washington Industrial Safety and Health Administration) until 2006.

What about RCWs and WACs? RCW/RCWs stands for the "Revised Code of Washington" and:

- is the collection of all state laws (the RCW) or a single statute (WISHA is an RCW, Chapter 49.17)
- is maintained by the Office of the Code Reviser (not by DOSH);
- gives "teeth" to regulations by giving them the force of law.

WAC/WACs (pronounced "wack/wacks") stands for "Washington Administrative Code" and:

- is the body of rules (the WAC) or individual rules (WACs) created to implement an RCW;
- spells out, in Chapter 296, L&I's safety and health requirements for employers.

Creating and maintaining a safe workplace begins with Washington State's "safety and health core rules" contained in Chapter 296-800 WAC. These rules explain the minimum requirements for safe workplaces that employers must follow. These core rules include requirements for your Accident Prevention Program, personal protective equipment, first aid, and hazard communication program. In addition to the core rules, other rules apply to specific industries – for example, noise control, confined space, forklift safety and respiratory protection. For example, the new rule regarding the Globally Harmonized System (GHS) for hazard communication is contained in Chapter 296-901, WAC. The rules for Safety Standards for construction work is part of Chapters 296-155, WAC.

By law, DOSH conducts workplace compliance inspections. The terms "compliance," "enforcement," and "inspections" all describe the inspection process, found in WAC 296-900. A workplace inspection helps an employer discover any potential hazards within the workplace and determines if applicable minimum workplace safety and health rules have been followed. DOSH's Compliance Safety and Health Officers (CSHOs) conduct inspections. It should be noted that sometimes the acronym CSHO is also used to refer Consultation Safety and Health Officers. DOSH conducts inspections without advance notice, except in rare circumstances (e.g. Imminent Danger). If they find any violation, they may issue citations.

Under the WISHA employers also sometimes have a responsibility for the safety and health of other employees as a creating, correcting or controlling employer. On March 29, 1990, the Washington Supreme Court held in Stute v. PBMC[11] that a general contractor could be held liable for an injury to a subcontractor's employee that occurred as a result of a Washington Industrial Safety and Health Act (WISHA) violation. The *Stute* decision and subsequent rulings have established that general contractors may be liable for WISHA violations committed by subcontractors under their control. Because the general contractor has authority to influence working conditions on a construction site, the general contractor has

11 114 Wb,2d 454, 788 p.2D 545 (1990)

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ultimate responsibility under WISHA for job safety and health at the job site in all common work areas, including work areas defined in all contracts under the scope of work to be performed at the jobsite. Please refer WISHA Regional Directive 27.00, "Contractor Responsibility Under Stute v. PBMC," for more information.

The most common construction safety & health rules cited during L&I inspections for federal fiscal year 2013 are:[12]

- Accident Prevention Program (APP)
- Fall Protection
- First-Aid Training and Certification
- Ladder Use
- Tools – Hand and Power
- Personal Protective Equipment (PPE)
- Guardrails, Handrails and Covers
- Excavation, Trenching and Shoring
- Scaffolding – General Requirements
- Stairways

This information can help strengthen your workplace safety program and prevent costly injuries and illnesses.

2.8 SUMMARY

The intent of this chapter was to make the readers familiar with the construction industry and a typical construction project, to best use the information provided in the upcoming chapters.

Additional Resources, Reading, and References

- Clough, R.H, Sears, G.A., and Sears, SK. (2005). *Construction Contracting – A Practical Guide to Company Management.* Seventh Edition. John Wiley & Sons Inc. New Jersey.

12 Division of Occupational Safety and Health (DOSH). http://www.lni.wa.gov/Safety/Topics/AToZ/SafetyTopTens/?F=HDI (Accessed January 2015)

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3
PROJECT TEAM SELECTION

3.1 PURPOSE

The parties who have significant control of and influence on the construction worker safety and health are the owner, general contractor, subcontractor, and the designer. An owner can impact worker safety and health by selecting safe contractors and designers. An owner can further improve safety by requiring general contractors to select safe sub-contractors by including safe contractor selection requirements in the contracts. The purpose of this chapter is to present contractor and designer selection guidelines for use by Owners and Contractors. The guidelines presented in this chapter are best practices that can be implemented by project owners when selecting designers and general contractors, or by general contractors when selecting subcontractors for upcoming bids or selecting subcontractors for a specific project.

3.2 DESIGNER SELECTION

Eliminating or engineering as many hazards as possible by safe design is the number one control method to protect workers, and should be a primary objective of the project team. In order to achieve this objective, a project team should consist of designers who are willing to incorporate worker safety and health into the project design phase. The owner should choose a project designer in part based on experience, knowledge, and willingness to incorporate worker safety and health in the project design. Selection should include: checking past records on designer experience, knowledge of safety and health in design concepts, and personal interviews/knowledge. An owner can objectively evaluate each designer's safety qualification using the criteria listed in Table 3-1. Multiple designers can be compared using the total rating that will help the owner to select a designer who will incorporate worker safety and health in the project design.

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Table 3-1: Designer Selection Criteria

Criteria used in designer selection	**Rating (1 to 5)***
Past safety experience	
Knowledge of construction safety and health	
Willingness to design for safety	
Personal interviews/knowledge	
Total Rating	
Evaluator Comments: Why the above ratings were awarded?	

****Rate each criteria on a scale from 1 to 5, 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high***

3.3 CONTRACTOR SELECTION

Contractors in this chapter refer to general contractors, subcontractors, and sub-tier contractors. The selection of contractors should be based in part on past safety performance. This is typically done using a well-established safety management best practice called contractor safety pre-qualification. The primary rationale behind this practice is to establish and use a pre-qualification process to select contractors who are likely to complete a construction project safely.

3.3.1 Assessment Metrics

The first step in the pre-qualification process involves identifying the metrics that will be used to assess the past safety performance of the contractors. A common mistake made by this step is just to use lagging indicators such as incident rates, etc., which sometimes does not paint an accurate picture of a contractor's safety performance. Hence, the past safety performance assessment metrics should include both leading safety indicators and lagging safety indicators. A contractor pre-qualification assessment should include all or a combination of the following metrics:

- Experience Modification Rating (EMR)
- Insurance Loss runs for Workers' Compensation, General Liability, and Auto
- Fatality History
- OSHA Total Recordable Incident Rate (TRIR)
- OSHA Days Away, Restricted, and Transfer Case Rate (DART)
- Regulatory Government Agency (i.e. DOSH, EPA, DOT) Citations (RGAC)
- Personal knowledge of the contractor's safety performance from prior jobs
- Reference from former owners or contractors
- Review of the contractor's safety program (RCSP)
- Review of contractor's safety team qualifications (i.e. experience, education, and professional certifications)

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- Accredited safety training above regulatory government agency requirements (e.g., employees trained on OSHA 500, OSHA 10-hour or OSHA 30-hour training)
- Top Management involvement/commitment to worker safety and health

3.3.2 Questionnaire

The second step in the pre-qualification process is to obtain the safety performance information from contractors with the help of a form typically called "Pre-qualification Safety Questionnaire." It is critical to make this questionnaire as simple and straightforward as possible. A sample pre-qualification safety questionnaire template is presented in this chapter as Exhibit 3-1, to assist contractors looking to develop or improve their pre-qualification process. Even though the majority of the construction firms still collect this information using manual forms, few companies have started to use online forms with provisions to upload supporting documentation. Both formats are acceptable business practices; the company should decide what format to use for their pre-qualification questionnaire.

3.3.3 Supporting Documentation

In order to avoid any errors, omission, or misrepresentation about safety performance metrics, it is always best practice to verify the information provided by the contractors by requiring them to submit support documentation. Typically the following documentation, for each of the last three calendar years, is requested from the contractors as part of the pre-qualification process:

- Experience Modification Rate (EMR)
  - Certified letter from insurance carriers listing the EMR
  - Letter of explanation with corrective action plan if EMR shows a negative trend over the three years
- Incident Rates (IR)
  - Signed copies of OSHA 300 Logs and OSHA 300A summaries for each of the past three calendar years
- Claims
  - Copies of loss runs for the three previous years workers' compensation, general liability, and auto claims
- Fatality
  - Detailed description of each fatality that the firm has experienced
- Regulatory Government Agency Citations (RGAC)
  - Copies of all citations received from local, state, or federal government agencies
  - Letter of explanation with corrective action plan implemented in response to the citations
- Safety Program
  - Copy of the firm's written safety program
  - Information about any recent safety initiatives that were beyond regulatory compliance
- Construction Quality Program
  - Copy of the firm's written quality control/assurance program (if any)
  - Information about any recent initiatives that were implemented to improve quality

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- Safety Professionals
    - Resumes of the firm's key Safety and Health personnel

3.3.4 Assessment

The assessment of the contractors based on the safety metrics is the most critical step in the selection process. The pre-qualifying firm should define a safe contractor, whom it will allow to bid or perform work on its projects. A safe contractor should be defined in terms of lagging and leading indicators. There is a wide variation in defining a safe contractor across the industry. For example, some pre-qualifying companies have set a "fixed" benchmark for safe contractors such as:

- EMR ratings of 1.0 or lower for the last three years
- OSHA Total Recordable Injury/Illnesses Rate (TRIR) <= 4.0
- Days Away, Transfer, and Restricted Case Rate (DART) <= 2.0
- Zero fatalities in last three years

While other companies instead of setting fixed benchmarks uses a sliding scale for classifying contractors as shown in Table 3-2.

It is always advisable to use both lagging (e.g., EMR, DART, TRIR, Fatality) and leading indicators (e.g., citations and safety program review) during the assessment. The quantitative parameters such as incident rates, number of citations, etc., are simple and easy to evaluate. The qualitative parameters such as a safety program review, safety personnel qualifications, etc., needs qualitative assessment. In order to be consistent between contractors. Table 3-2 presents one way to quantify the qualitative review of the contractor's written safety and health program (WSHP). For example, chapter 5 of the sample pre-qualification safety questionnaire lists multiple questions as a way to determine the quality of the contractor's WSHP. You can quantify this assessment by using a metrics such as the percentage of questions answered "yes" and use it as part of your assessment.

Table 3-2: Contractor Classification based on Safety Performance Metrics

Class	For the three previous calendar years						
	EMR	DART	TRIR	TRIR/EMR Trend	RGAC	Fatality	WSHP Conformance
I	0.75 or less	0.8 or less	4.0 or less	Improving	0	0	More than 90%
II	0.76 to 1.00	0.9 to 2.0	4.1 to 5.5	Improving	1 to 2	0	75% to 90%
III	1.00 to 1.25	2.1 to 2.9	5.6 to 7.9	Declining	3 to 5	1	50% to 74%
IV	1.26 or more	3.0 or more	8.0 or more	Declining	5 or more	> 1	Less than 50%

3.3.5 Action

Based on the assessment the prospective contractors can be classified into one of the four classes: Class I, Class II, Class III, and Class IV, as shown in Table 3-2. The pre-qualifying firm now has to determine the course of action for contractors that fall under different classes. A sample pre-qualification assessment action guideline is provided in Table 3-3. Note that it is up to the individual companies based on factors such as geographic location, availability of skilled contractors, etc., to decide their course of action for their prospective contractors.

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Table 3-3: Final Action of Contractors

Class	Action by the Pre-qualifying company in terms of "Acceptability" to bid or perform work on its projects
I	Perfectly Acceptable – top safety and health performance, no further action required.
II	Slightly Acceptable – average safety and health performance, corrective action plan "may" be required prior to acceptance.
III	Slightly unacceptable – below average safety and health performance, probationary status, only acceptable to bid or perform work with a detailed corrective action plan and concurrence by the project manager and safety director.
IV	Totally unacceptable – poor safety and health performance, ineligible.

The guidelines and the template questionnaire presented in this chapter are based on industry best practices. It is up to the pre-qualifying firm to develop pre-qualification or selection guidelines that suit them. These guidelines can be used as a starting point to establish "acceptable" standards for a contractor or designer selection process as it pertains to safety and health performance.

3.3.6 Preferred Contractor List

Another method of selecting a contractor is by developing a preferred contractor's list. A preferred contractor's list has the ability to make timely and accurate contractor selection for a project that is time sensitive. It can also reduce the repetitive nature, time and expense of collection and evaluation of pre-qualifying information. This list is usually determined by repeated successful submission and acceptance of pre-qualification information from a contractor(s) who perform work on multiple projects during the course of a given calendar year. A single successful submission and acceptance of pre-qualifying information on the first project of the year from the previously approved contractor can verify the continued acceptability for the contractor to bid or perform work in that calendar year.

Additional Resources, Reading, and References

- Rajendran, S. (2006). "Sustainable construction safety and health rating system." Doctoral dissertation, Oregon State University, Corvallis, OR.

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Exhibit 3-1: Contractor Pre-qualification Safety Questionnaire Template

Any contractor interested in working for <<Company Name>> must be pre-qualified to be included on the bid list. Interested contractors should complete this questionnaire with all requested support documentation for <<Company Name's>> review prior to being added to the bid list. Failure to provide support documentation or reporting false information on this questionnaire will deem your submission unacceptable, and your company will be not able to bid on <<Company Name>> projects.

This Chapter is for <<Company Name>> Use Only

Contractor Name _____

Contractor Classification (circle one): I II III IV

Reviewed by: _____ Date: _____

Recommendation:

Company Name:_____

Address: _____

Submitted by (please print): _____

Title: _____

Telephone Number: _____ Email Address: _____

I certify that the information provided in this questionnaire and all accompanying documentation is true and correct.

Signature: _____ Date: _____

1. **Experience Modification Rate (EMR):** List your company's EMR for the last three years. Attach a copy of a letter from your insurance carrier or state fund (on their letterhead) verifying the EMR information. Submit a letter of explanation for the cause and corrective action implemented if any of the EMR is above 1.00 and/or upward trends in EMR.

Year	**EMR**
20 ___	_____
20 ___	_____
20 ___	_____

2. **OSHA Injury/Illness Statistics:** Provide the Total OSHA Recordable Injury/Illness Rate (TRIR) and Days Away, Transfer, and Restricted Case Rate (DART) for this year to date and the previous three years, as defined by the Federal OSHA reporting requirements. Attach a copy of your OSHA

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300 Logs and OSHA 300A Summary sheets. Submit a letter of explanation for the cause and corrective action implemented if the average rates are above national average and/or upward trends in injury/illness rates.

Year	TRIR		DART		Total Work Hours
	Company	State Rate	Company	State Rate	
Current	_____	_____	_____	_____	_____
20 ___	_____	_____	_____	_____	_____
20 ___	_____	_____	_____	_____	_____
20 ___	_____	_____	_____	_____	_____
Average	_____	_____	_____	_____	_____

3. **Regulatory Government Agency Citations (RGAC):** List the number of upheld RGACs (i.e. DOSH, EPA, and DOT) received for this year to date and the previous three years. Submit copies of all citations or fines, and a letter of explanation for the cause and corrective action implemented for all the RGACs.

Year	DOSH Citations	EPA (Federal or State Citations)	DOT (Federal or State Citations)
Current	_____	_____	_____
20 ___	_____	_____	_____
20 ___	_____	_____	_____
20 ___	_____	_____	_____
Total	_____	_____	_____

4. **Fatality History (FH):** Enter the number of work-related fatalities experienced by your firm in the last three years. Provide a detailed description of the fatalities in a separate exhibit.

Year	**20 ___**	**20 ___**	**20 ___**
Fatalities	_____	_____	_____

5. **Written Workplace Safety and Health Program (WSHP):**

Does your company have a written Workplace Safety and Health Program? ☐ Yes ☐ No
If yes, submit a copy of your complete Workplace Safety and Health Program and answer the questions specific to the program. The program's critical elements will be evaluated as part of the pre-qualification process.

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Critical WSHP Elements	Response
Does your company have a substance abuse screening program?	☐ Yes ☐ No
Does your company conduct weekly (minimum) site safety inspections?	☐ Yes ☐ No
Does your company require crews to hold regular toolbox meetings?	☐ Yes ☐ No
Does your company conduct supervisor safety training?	☐ Yes ☐ No
Does your company investigate all accidents including near misses?	☐ Yes ☐ No
Does your company require your employees to complete OSHA 10-hour training?	☐ Yes ☐ No
Does your company hold regular weekly site safety meetings?	☐ Yes ☐ No
Are your company's field supervisors certified in OSHA 30-hour courses?	☐ Yes ☐ No
Does your company require sub-tier contractors to have a written safety program and monitor their workplace safety and health performance?	☐ Yes ☐ No
Does your company audit your workplace safety and health program and continuously improve it?	☐ Yes ☐ No
Do you have a return to work program with a provision of returning workers to modified/light duty?	☐ Yes ☐ No
Does your Company have a disciplinary program in place for safety violations?	☐ Yes ☐ No
Does your company follow a system based partnership programs such as DOSH's Voluntary Protection Program (VPP) or Safety and Health Achievement Recognition Program (SHARP)?	☐ Yes ☐ No
Does your company has a formal construction Quality Assurance (QA) /Quality Control (QC) program and/or a procedure manual?	☐ Yes ☐ No

6. Safety Personnel:

Who is responsible for safety at your company?

Name: _____ Title: _____

Telephone Number: _____ Email Address: _____

We will get back to you within two weeks after receipt of your submission. Please feel free to call our office at <phone number> with any questions on the pre-qualification process.

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4
SAFETY IN CONTRACTS

4.1 PURPOSE

This chapter is intended to provide information and guidelines on the requirements of safety and health in construction contracts. The information will serve as a reference document for contract managers and construction safety professionals when writing the safety section of the contracts, which will not only improve worker safety performance, but will also avoid contract disputes or issues pertaining to safety management.

Note: The guidelines provided in this chapter are not legal advice. When writing contracts, contractors should always seek guidance from its attorneys/legal counsel or seek guidance from an employment law specialist. It will help to ensure compliance with all applicable local, state, and federal laws.

4.2 CONTRACTS

Contracts are essential to the construction process. In the simplest of terms, a contract may be defined as an agreement between two or more parties that is enforceable by law. Contract language that lacks clarity includes significant errors and omissions, or contains excessive, non-essential information may result in considerable ambiguities in the contract.

Inclusion of the safety related contractual language may not only help the contractor avoid safety requirement disputes, but may perhaps also help meet the reasonable care standard by improving the contractor's safety practices, reducing the likelihood of noncompliance, and creating a graduated system of onsite safety enforcement. Hence, the Project Owner should incorporate safety and health requirements in the contract with the prime contractor, and should also require the contractor to include the same requirements in their subcontracts.

Project owners include safety and health requirements in contracts since they:[1] 1) are motivated by their own safety culture to expect safe operations by others they have some control over, 2) are encouraged to mandate safety practices because of the contingent liability they assume, and 3) are driven by a desire to avoid adverse public relations resulting from the aftermath of lapses in safety practices. The general contractor group, on the other hand, is responsible for establishing and administering not only their own safety management programs but often that of the subcontractor group as well.

1 Rajendran, S., Clarke, B., and Whelan, M. (2013). "Contract Issues: Improving Construction Safety Management." *Professional Safety*, Journal of the American Society of Safety Engineers (ASSE), 58(9), 56-61.

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4.3 CONTRACT FORMAT

The format of the contract requirements document varies from company to company, however, it is typical for project owners and construction firms to create a separate document that exclusively focuses on the safety and health contract requirements such as, "Project Safety Requirements," or "Environmental, Health, and Safety (EHS) Requirements." This document will be either be included in the contract as a separate article or maintained as a stand-alone document with a reference in the overall contract.

4.4 CONTRACT REQUIREMENTS

The contract whether between the project owner and the general contractor (or) between the general contractor and their tiers, should clearly specify the safety and health requirements to avoid disputes during construction and also ensure all the parties utilize consistent safety standards. Furthermore, it allows contractors to account for the safety-related expenses in the project budget. Some of the most important safety and health requirements that are recommended to be included in contracts are discussed in this chapter. It should be noted that there might be other project specific safety and health challenges that should be adequately addressed in the contract to avoid surprises.

4.4.1 Prequalification

It is important to include verbiage requiring all contractors and subcontractors to pre-qualify sub-, and sub-tier contractors such as *"….the contractor shall develop appropriate pre-qualification criteria for the selection of subcontractors. All such pre-qualification criteria shall be subject to the prior written approval of <Company Name>."*

4.4.2 Laws and Regulations

Construction contracts, at a minimum, should include verbiage such as *"…the contractor **shall** develop and implement, and be responsible for, a comprehensive safety program that complies with all applicable (environmental, health, and safety) international, national, state, county, local, contractor, and owner requirements while performing work on the project or facility."* This blanket statement communicates the message that the contractors shall abide by all applicable laws and regulations, and also are required to comply with project-specific owner and contractor safety guidelines. The word "shall" is intended to convey the "mandatory" nature of the requirements.

4.4.3 Project Specific Safety Plan

The contract should require all contractors and their tiers to submit a site-specific safety plan prior to commencement of any construction work or with any significant change in activity. It should clearly state the contractors cannot commence until the safety plan is approved.

4.4.4 Safety Hazard Assessment

Job Hazard Analysis (JHA), Pre-task Plans (PTP), and safety inspections/surveys are some of the standard safety planning tools used for site hazard assessment and control. It is recommended to add these requirements in the contract such as frequency of pre-task plan meetings (e.g., daily), frequency of inspections (e.g., weekly), type of inspections (e.g., superintendent), timeline for fixing hazards, documentation requirements, etc. Since these hazard assessment tools costs money, stating them in precise terms will allow contractors to account for these costs in their bids.

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4.4.5 Subcontractor Management

The construction contract should require not only the "direct" contractor to comply with the contract requirements but also all tiers by adding verbiage in the contract such as *"the contractor and the tiers shall comply with the project contract requirement."* The contract should also include verbiage that allows the company to take action when their contractors fail to comply with the contract safety requirements.

4.4.6 Safety Staffing

Staffing of the safety function normally depends on the project size and complexity. The contract should identify the minimum level of safety staffing expected to manage the safety program. The contract should include when (defined in terms of trade headcount) the project will require a "dedicated" safety professional onsite and when it is acceptable to staff a "designated" safety representative with an assignment of a "floater" safety professional to assist the project.

A dedicated safety professional shall not hold other duties while a designated safety representative might hold other duties but present at the site full-time (e.g., Superintendent). A floater is a qualified safety professional to oversee several projects, when it is not financially feasible to assign a full-time on-site professional to a single job or due to the nature of the job in terms of complexity.

The contract should also specify the minimum qualifications of both the designated and dedicated safety professionals. For example, *"When the contractor's trade headcount reaches 30, employ one on-site, full-time dedicated safety professional. The contractor shall also commit one on-site, full-time dedicated safety professional for every additional 50 trade headcount. The dedicated safety professional must hold a safety degree and have a minimum of three years professional safety experience in construction. The designated safety* representative *must hold an OSHA 30-hour Construction Certification and have a minimum of ten year's construction field experience."* Another requirement that can be added is the professional certification such as Certified Safety Professional (CSP) or Construction Health and Safety Technician (CHST).

4.4.7 Safety Meetings

Safety meetings is one of the best ways to share jobsite progress, lessons learned from incidents, safety statistics (incident rates, citations, etc), new safety products, issue safety awards, and much more. Since safety meetings cost a lot of worker time, at a minimum the contract should specify the required safety meetings and their frequency. For example, *"…the contractor shall hold a weekly project-wide safety meeting (also known as "mass safety meetings") and daily tool box meetings. The contractor shall mandate attendance for all persons performing work on the project."*

4.4.8 Site Specific Safety Orientation Training

The contract shall require the contractors to provide new employee orientation safety training to all workers before they are allowed access to their worksite. It should state the duration of the training. The contract should also require contractors to provide a proof of training completion in the form of a badge or a hard hat decal. The new employee orientation safety training must include information regarding all applicable laws and government regulatory requirements, in addition to project-specific safety requirements.

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4.4.9 Safety Training

The contract should require that the contractors should train their workers on all applicable federal, state, local, and project-specific owner mandated training. The project-specific training that are above and beyond regulatory compliance (e.g. OSHA 10-hour) should be spelled out in the contract. This would be a good place to ensure that the contractors maintain clear training documentation readily accessible in case of an audit by owner or regulatory agencies.

4.4.10 Substance Abuse Program

The contract should specify your firm's substance abuse testing requirements such as (1) who will be tested (e.g., all office and field personnel), (2) when will they be tested (e.g., pre-employment, probable cause or suspicion, and post-accident), and (3) what are they being tested (e.g., alcohol, etc.). It is always a good idea to refer to your company's substance abuse policy for more details. When developing programs, policies, or procedures relating to substance abuse programs, contractors should always seek guidance from its attorneys/legal counsel or seek guidance from an employment law specialist. This helps to ensure compliance with all applicable local, state, and federal laws. For example, contractors can use language such as, "*Subcontractor, Subcontractor's sub-tier subcontractors and their respective employees, shall take all reasonable and necessary safety precautions pertaining to work and the conduct thereof, including, but not limited to, compliance with all applicable laws, ordinances, rules, regulations and orders issued by public authority, whether federal, state, local, DOSH or other state or federal regulatory agency, and any safety measure requested in good faith by contractor, including, but not limited to, substance abuse testing, and all laws or regulations that incorporate ASME standards and definitions relating to crane operations.*"

4.4.11 Accident Reporting and Investigation

The contract shall require all contractors and their tiers to report and investigate all incidents regardless of severity, which resulted in personal injury or illness to workers and general public, and property damage. Contract managers should consider specifying the following items when writing this section: (1) timeline for reporting accidents (e.g., DOSH requirements), (2) personnel to be notified of accident, (3) who should conduct the investigation, (4) who should attend accident review meetings (e.g., should owner representative be invited?), (5) when should the investigation be completed (e.g., within 24 hours of accident occurrence), (6) what kind of accident documentation is needed in terms of report and corrective actions and where should it be submitted, and (7) what happens with the lessons learned report (e.g., lessons learned should be shared throughout the company).

4.4.12 Emergency Plan

The contract should require the contractor to develop and implement a site-specific emergency action plan that should specify plan contents, posting and communication requirements, frequency of drills, procurement of equipment (e.g., AED) or services (e.g., on-site nurse station), and collaboration with local emergency personnel (e.g., local fire department or on-site emergency personnel).

4.4.13 Pre-Bid and Pre-Construction Meetings

The contract should require all contractors and their tiers to hold pre-bid meetings. The contractor should present an overview of the project safety contract requirements and unique challenges associated with the project. The information presented at this meeting will allow contractors to include resources

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in their bids to meet the contract requirements. In addition, the contractors and their tiers should be required to participate in a pre-construction meeting to ensure they understand the project safety requirements prior to commencement of work. The contract should clearly state who should attend the meeting. At a minimum, the contract should state *"…pre-bid and pre-construction meetings should be attended by the contractor project management, field management, and safety personnel."*

4.4.14 Special Provisions

New safety requirements such as the use of 3D modeling such as Building Information Modeling (BIM) for safety planning, design for safety reviews to eliminate or minimize hazards during design phase, and use of smartphone Apps for inspections, etc, are relatively new to the industry. If such requirements are part of the project, contract managers should ensure they are clearly specified in the contract.

4.4.15 Progressive Disciplinary and Incentive Programs

Even though disciplinary and incentive programs are common in most safety programs, it is recommended to include these requirements as part of the contract. Some firms contractually require contractors not to reward workers based on lagging indicators.

4.5 Contract Issues Related to Safety Management and Remedial Measures[2]

Contracts if not clear can result in issues that can result in wasted time and money to resolve them. A list of common trade-specific contract issues related to construction safety management is presented in Exhibit 4-1. Even though not exhaustive, the list of issues generated with input from numerous contractors is formatted as a checklist that will help contract managers and safety professionals remember to include appropriate items in the final contract. Using this list may reduce disputes with respect to safety issues during construction operations.

4.6 Example Contract Requirements

An example project safety requirements in contracts document from a large construction firm is presented as Exhibit 4-2. Please note this exhibit is only provided as an example and may not be suitable to use it "as is" by the reader. Contractors should develop their own contract requirements based on their organization's policies, procedures, and regulatory requirements that affect their jobsites.

4.7 Construction Safety Professionals

In addition to the checklist presented in Exhibit 4-1, there are a number of ways that construction safety professionals could be used to greatly reduce the number of contract issues occurring in construction contracts. Some of the primary strategies are.[3]

- Safety professionals should be involved with marketing departments early in the process to avoid the commitment of unrealistic or unnecessary safety resource levels in an attempt to receive the award of the project.

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2 Rajendran, S., Clarke, B., and Whelan, M. (2013). "Contract Issues: Improving Construction Safety Management." *Professional Safety*, Journal of the American Society of Safety Engineers (ASSE), 58(9), 56-61.

3 Rajendran, S., Clarke, B., and Whelan, M. (2013). "Contract Issues: Improving Construction Safety Management." Professional Safety, Journal of the American Society of Safety Engineers (ASSE), 58(9), 56-61.

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- Project Owners should clearly communicate their safety expectations for the project, so contractors can allocate resources appropriately in the bid. Construction safety professionals should make an effort to clearly understand the owner's EHS processes as well as their own.
- Safety professionals should become an active participant in the project procurement process as early as possible, preferably as early as the Request for Proposal (RFP)/Invitation to Bid stage.
- Safety professionals should take an active role in the pre-bid meetings and communications that take place. They should continue their involvement in the early stages of the project by actively participating in pre-award/construction meetings.
- Safety professionals should ensure that appropriate contractual requirements and responsibility assignment clauses are included in the final contract as detailed in the first part of this chapter.
- Review of basic DOSH or other applicable codes and requirements, as well as an explanation of project-specific requirements, should be included in the craft orientation to the project.
- As a part of the ongoing project safety program, safety issues unique to High Hazard, Low-Frequency activities and site specific protocols should be an active part of the pre-task planning effort.
- A safety checklist, such as the one presented in this chapter, would be one of the technique to identify unique safety issues to be considered for inclusion in the contract.
- Safety issues included specifically in the contract should focus on those issues that are in addition to basic DOSH or other applicable requirements. Basic DOSH requirements are generally well covered with existing reference specifications.
- Identification of safety issues that are particularly troublesome and unique to construction should be researched further to better define the checklist.
- Construction Safety Professionals should be involved during the project proposal phase, contract management phase, pre-award & pre-mobilization meetings; to ensure safety management expectations are clearly identified and communicated to help reduce the possibility of safety management related claims.

Additional Resources, Reading, and References

- American Industrial Hygiene Association (AIHA). Health and Safety Requirements in Construction Contract Documents.
- Rajendran, S., Clarke, B., and Whelan, M. (2013). "Contract Issues: Improving Construction Safety Management." *Professional Safety*, Journal of the American Society of Safety Engineers (ASSE), 58(9), 56-61.

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Exhibit 4-1: Trade Specific Contract Issues to be Included in Construction Contracts/Subcontracts[4]

Date: _____ **Location:**_____

Project Name/Location: _____

CHECKLIST ITEMS: Requirements specified? Responsibility identified?	Status
DEMOLITION	
Dust control.	☐ Yes ☐ No ☐ NA
Demolition lighting erection & maintenance.	☐ Yes ☐ No ☐ NA
Cleanup and disposal of demolition debris.	☐ Yes ☐ No ☐ NA
Salvaged materials handling procedures.	☐ Yes ☐ No ☐ NA
Mandated materials salvage.	☐ Yes ☐ No ☐ NA
Comprehensive demolition process safety plan.	☐ Yes ☐ No ☐ NA
Testing of suspected or known hazardous materials.	☐ Yes ☐ No ☐ NA
Open hole barricades &/or covers.	☐ Yes ☐ No ☐ NA
Third party protection during demolition.	☐ Yes ☐ No ☐ NA
Termination & capping or safe-off of electrical, water, gas, & other utilities.	☐ Yes ☐ No ☐ NA
SITEWORK	
Barricades & guardrails around excavation work beyond basic applicable regulatory requirements.	☐ Yes ☐ No ☐ NA
Safety procedures around heavy equipment beyond basic applicable regulatory requirements.	☐ Yes ☐ No ☐ NA
Barricades around trenches regardless of depth.	☐ Yes ☐ No ☐ NA
Notification & follow-up verification of the implementation of utility location service(s).	☐ Yes ☐ No ☐ NA
Utility potholing (physical verification of utility locations).	☐ Yes ☐ No ☐ NA
Street cleanup of spilled material due to rock & soil hauling activities.	☐ Yes ☐ No ☐ NA
Federal Aviation Authority (FAA) permits for tall equipment near airports.	☐ Yes ☐ No ☐ NA
Wheel wash provisions at the site entrance/exit points.	☐ Yes ☐ No ☐ NA
Development of traffic control plan.	☐ Yes ☐ No ☐ NA
Implementation & maintenance of traffic control plan.	☐ Yes ☐ No ☐ NA
Pavement protection near excavations during construction.	☐ Yes ☐ No ☐ NA
STRUCTURAL COMPONENTS	
Concrete pump/truck safety procedures.	☐ Yes ☐ No ☐ NA
Guardrail erection & maintenance during footing construction.	☐ Yes ☐ No ☐ NA
Isolation block out protection at the column - SOG intersections.	☐ Yes ☐ No ☐ NA
Installation & maintenance of access to work areas used by multiple trades.	☐ Yes ☐ No ☐ NA

4 Rajendran, S., Clarke, B., and Whelan, M. (2013). "Contract Issues: Improving Construction Safety Management." Professional Safety, Journal of the American Society of Safety Engineers (ASSE), 58(9), 56-61.

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Crane safety requirements in excess of basic applicable regulatory requirements.	☐ Yes ☐ No ☐ NA
Dry cutting of concrete specifications.	☐ Yes ☐ No ☐ NA
Temporary bracing design, installation, & maintenance for masonry walls.	☐ Yes ☐ No ☐ NA
Protection from overhead masonry operations.	☐ Yes ☐ No ☐ NA
Protection from overhead welding operations.	☐ Yes ☐ No ☐ NA
Decking debris netting installation & maintenance.	☐ Yes ☐ No ☐ NA
Decking cutoff debris cleanup.	☐ Yes ☐ No ☐ NA
Perimeter cable installation & maintenance.	☐ Yes ☐ No ☐ NA
Rebar cap installation & maintenance.	☐ Yes ☐ No ☐ NA
MECHANICAL	
Machine guarding beyond basic applicable regulatory requirements.	☐ Yes ☐ No ☐ NA
Rolling stock (pipes, conduit, etc.) material storage & cut-off cleanup.	☐ Yes ☐ No ☐ NA
Tie-off points for overhead work & tasks near deck edges.	☐ Yes ☐ No ☐ NA
Removal of waste materials left by multiple trades.	☐ Yes ☐ No ☐ NA
Removal, Cleanup, & patching of spray-on structural steel fire-proofing.	☐ Yes ☐ No ☐ NA
Installation & maintenance of access to work areas used by multiple trades.	☐ Yes ☐ No ☐ NA
Protection from welding operations.	☐ Yes ☐ No ☐ NA
Spotters for scissor lift work.	☐ Yes ☐ No ☐ NA
Pressure testing procedures & requirements.	☐ Yes ☐ No ☐ NA
Accessibility to trenches for work purposes.	☐ Yes ☐ No ☐ NA
ELECTRICAL	
Electrical safety procedures beyond applicable regulatory requirements?	☐ Yes ☐ No ☐ NA
Small diameter conduit & ground wire impalement protection.	☐ Yes ☐ No ☐ NA
Weather protection of electrical components.	☐ Yes ☐ No ☐ NA
Temporary lighting installation & maintenance.	☐ Yes ☐ No ☐ NA
Theft security provisions for both installed & stored cuprous materials.	☐ Yes ☐ No ☐ NA
Allowance & procedures for electrical hot work onsite.	☐ Yes ☐ No ☐ NA
Electrical work training & experience in excess of basic applicable regulatory requirements established.	☐ Yes ☐ No ☐ NA
Accessibility to trenches for work purposes.	☐ Yes ☐ No ☐ NA
GENERAL	
Installation & maintenance of access to roof work areas used by multiple trades.	☐ Yes ☐ No ☐ NA
Roof protection after completion.	☐ Yes ☐ No ☐ NA
Perimeter falling objects projection.	☐ Yes ☐ No ☐ NA
Additional safety procedures for stilts used in ceiling work.	☐ Yes ☐ No ☐ NA

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The maximum response time for permits (confined space, hot work, lockout/tag out, etc.) specified.	☐ Yes ☐ No ☐ NA
Coordination of cranes & critical lift procedures.	☐ Yes ☐ No ☐ NA
Erection & maintenance of task & general lighting.	☐ Yes ☐ No ☐ NA
Material storage areas onsite.	☐ Yes ☐ No ☐ NA
Theft security provisions for both installed & stored materials.	☐ Yes ☐ No ☐ NA
Removal of waste materials left by multiple trades.	☐ Yes ☐ No ☐ NA
Multi-trade scaffold erection, inspection, & maintenance.	☐ Yes ☐ No ☐ NA
Onsite fire protection for the project.	☐ Yes ☐ No ☐ NA
Provisions for onsite safety professionals.	☐ Yes ☐ No ☐ NA
Creation, implementation, & maintenance of traffic control plan.	☐ Yes ☐ No ☐ NA
Safety Management Requirements:	
▪ Employee Site Access and Orientation	☐ Yes ☐ No ☐ NA
▪ Safety Training	☐ Yes ☐ No ☐ NA
▪ Safety Meetings	☐ Yes ☐ No ☐ NA
▪ Safety Inspections	☐ Yes ☐ No ☐ NA
▪ Pre-qualification	☐ Yes ☐ No ☐ NA
▪ Pre-bid and Pre-Construction Meetings	☐ Yes ☐ No ☐ NA
▪ Disciplinary Action/Recognition	☐ Yes ☐ No ☐ NA
▪ Pre-task Planning and Job Hazard Analysis	☐ Yes ☐ No ☐ NA
▪ Site Specific Safety Plan	☐ Yes ☐ No ☐ NA
▪ Reporting and Recordkeeping	☐ Yes ☐ No ☐ NA
▪ Solid Waste and Hazardous Waste	☐ Yes ☐ No ☐ NA
▪ Emergency Response Plan	☐ Yes ☐ No ☐ NA
▪ Design for Safety Provisions	☐ Yes ☐ No ☐ NA
▪ Technology Use (e.g., Building Information Modeling (BIM))	☐ Yes ☐ No ☐ NA

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Exhibit 4-2: Example Contract Project Safety Requirements

(Used by Permission from SNC-Lavalin)

Note: This best practice tool is only included as an example, and the users should be aware that the contractor may reference safety regulations depending on their jurisdictions. It is the user's responsibility to ensure that they adapt the best practices provided in this handbook for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

SECTION 01 35 23

PROJECT SAFETY REQUIREMENTS

ARTICLE 1 – CONFIRMATION OF PROJECT HEALTH AND SAFETY GUIDELINES

1.01 It is the goal of the Construction Manager to ensure that employees and the general public are provided with an environment free of hazards during construction activities. This program does not relieve Trade Contractor of responsibility for the health and safety of Trade Contractor's employees, the employees of subcontractors, protection of the general public and the preservation of property.

1.02 The Construction Manager is committed that all construction workers have the best possible working environment while working on this project. It shall be the responsibility of each Trade Contractor/ Subcontractor to abide by MOSH and OSHA health and safety laws and regulations.

ARTICLE 2 – HEALTH AND SAFETY STATEMENT

2.01 Trade Contractor shall develop a written site-specific health and safety plans for the Project. At a minimum, the health and safety plan shall meet the requirements of all applicable OSHA health and safety laws and regulations, and the requirements established in these Project Safety Requirements. Trade Contractor is responsible for protecting the safety of its employees and the employees of each subcontractor while ensuring they have a safe and healthful place to work.

2.02 The health and safety Requirements of these guidelines are a supplementary document to all Government rules, codes and regulations. It does not negate, abrogate, alter or otherwise change any provisions of these rules, codes and/or regulations, and is intended to supplement and enforce the individual program of each contractor and the overall health and safety effort.

2.03 In the event of a conflict between the provisions of these guidelines and applicable local, state, or federal health and safety laws, regulations and/or standards, contract documents or the Construction Manager's health and safety Plan, the more stringent shall apply.

2.04 By reading these guidelines, each individual confirms the understanding of the contents and shall conform to the standards of health and safety outlined in these Guidelines and the Project health and safety program.

ARTICLE 3 – SECTION SPECIFIC DEFINITIONS

Guidelines – Statements or outlines of procedures or policies that shall be followed and enforced.

Critical Lift – Any lifts:

- involving two or more cranes
- within the vicinity of power lines
- over operating facilities/equipment
- where the crane or lifting equipment is 80 percent or above of its rated capacity at the working radius and crane configuration
- that is at or above 50,000 pounds (25 tons)
- Involving special equipment or rigging or nonstandard crane configurations (e.g., multi-level rigging, gin-poles, the use of more than three spreader bars, cargo nets, etc.)

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- involving hoisting of personnel
- of loads that represents significant cost, require significant lead-time to order, are critical to the project, or are replaceable

The General Public – All persons not employed by or under contract, subcontract or sub-subcontract to the Project

Hazardous Material – Any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment.

Government – The body that has the authority to make, amend, administer, and repeal laws, regulations and policies, and has the authority to enforce them.

ARTICLE 4 – RESPONSIBILITIES

4.01 Each participant involved in the construction of the Project is individually responsible for conducting his/her activities to ensure compliance with all applicable health and safety requirements. Construction activities of Trade Contractors and Subcontractors will be monitored for compliance with Federal, State and local health and safety regulations and contract health and safety requirements.

4.02 Trade Contractor shall establish, and submit for review, a written health and safety plan that includes details commensurate with the work to be performed. Trade Contractor's health and safety plan shall clearly describe Trade Contractor's commitments for meeting its obligations to provide a safe and healthful work environment for its employees and Subcontractor employees, to protect vendors, visitors, and members of the general public. Trade Contractor's health and safety plan shall reference Federal or State standards, and local environmental laws, and any other rules or regulations applicable to construction activities.

4.03 Trade Contractor shall designate an on-site health and safety representative who is charged with the responsibility of on-site health and safety management and will be the point of contact for health and safety matters. If Trade Contractor employees 25 or more employees, Trade Contractor will designate a health and safety representative whose only duty shall be health and safety management. When Trade Contractor's manpower on the project reaches 100, an additional acceptable safety supervisor shall be onsite. Additional acceptable safety supervisor(s) shall be provided for each increase in 100 workers at no additional cost to Construction Manager. Trade Contractor's health and safety representative shall be accredited by applicable OSHA requirements as a competent site Safety Supervisor and have heavy construction health and safety experience. A resume shall be provided that outlines such items as: work experience, education, training completed and professional organizations, etc. The health and safety Representative shall remain on the Project until Substantial Completion.

4.04 Trade Contractor shall be responsible for advising all Trade Contractor employees and Subcontractor employees of the projects health and safety goals, policies, requirements, and procedures during Trade Contractor orientation session.

4.05 Trade Contractor shall attend a pre-mobilization safety meeting after contract award and prior to Trade Contractor commencing work on the project. Trade Contractor shall conduct and include Construction Manager Construction Manager and EHS manager in pre-mobilization meetings with all Subcontractors.

4.06 Trade Contractor shall participate in Construction Manager's safety interaction process which includes daily interactions for Trade Contractor field supervision.

4.07 Trade Contractors shall submit to Construction Manager:

- A site-specific health and safety plan within fifteen (15) days after receipt of notice to proceed and prior to start of any construction activities. The site-specific health and safety plan is to include an overview of the job hazards expected to be encountered in the performance of their work activities.
- The name and qualifications (resume) of designated on-site health and safety representative;
- An immediate copy of all citations and/or warning of health and safety violations received from any State or Federal jurisdiction, agency, insurance company, or by any of its Subcontractors.
- A list of any hazardous materials that may be necessary to bring to the project and how each will be handled to prevent contamination of the site and exposure of employees.

4.08 The Contractor shall:

- Investigate, with Construction Manager, all accidents and incidents that result in personal injury or illness to workers, damage to buildings or equipment, impacts to on- and off-site environments, and any incident with the general public.

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- Participate in weekly health and safety management meetings and monthly project safety committee meetings.
- Conduct daily job inspections, generate daily Team StepBack utilizing Construction Manager's Team StepBack form, identify unsafe conditions or work practices and assure they are corrected, and maintain documentation.
- Conduct weekly, documented, health and safety meetings with supervisory personnel.
- Assure that employees acting in a supervisory capacity understand and enforce all safe work practices.
- Assure a competent person is provided at work locations where required by law.
- Assure that all personal protective equipment (PPE) is available and being properly used as required.
- Assure all construction equipment and motor vehicles certification, inspection, repair and controls are in compliance with the health and safety requirements of the project and OSHA requirements. All required equipment inspection certification shall be available for review by Construction Manager.
- Assure detailed lift plans are submitted prior to making Critical Lift,
- Assure that all work areas are kept clear of debris and trash and that adequate trash barrels are placed throughout the work area and emptied frequently. Waste streams will be segregated as directed by project requirements.
- Assure Trade Contractor emergency response team is properly trained and provided with adequate supplies.
- Assure that one hundred percent fall protection equipment is provided and used. Inspections of this equipment shall be documented and on file for review by Construction Manager.
- Assure that all perimeter cables, barricades, or any other safety related items are installed correctly and maintained. If a safety item must be removed, coordinate this activity with the Construction Manager or trade contractor who installed the device and other workers who may be exposed. The party that removes safety devices shall replace safety devices. Warning signs, tags, or barricades shall be installed if other safety devices are removed.
- Assure that all hazardous materials are properly stored. Storage areas shall be designed to be properly ventilated and to prevent releases to the environment and contact with precipitation.
- Supply all materials for the control of hazardous energy including locks, lock boxes, chains, and tags bearing workers name and contact number.
- Assure all monthly inspections include color-coding according to the following table. This shall include, but not limited to, electrical cords, power tools and equipment, portable fire extinguishers, fall protection equipment, and rigging. Wherever possible GFCI is a much safer option and always recommended.

Month/ Quarter	Quarterly Colors	Monthly Colors
January	White	White
February	White	White and Yellow
March	White	White and Blue
April	Green	Green
May	Green	Green and Yellow
June	Green	Green and Blue
July	Red	Red
August	Red	Red and Yellow
September	Red	Red and Blue
October	Orange	Orange
November	Orange	Orange and Yellow
December	Orange	Orange and Blue

4.09 Workplace Substance Abuse Policy

Trade Contractor shall comply with Section 01 35 34 Drug & Alcohol Policy

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ARTICLE 5 – INSTRUCTION AND TRAINING

5.01 Health and Safety Orientation Program

All personnel working on the Project shall receive an orientation regarding the general health, and safety rules and regulations as well as the site-specific policies and hazards prior to starting work on the construction site. All Trade Contractor personnel shall attend Construction Manager's health and safety orientation. Trade Contractor shall be responsible to ensure that its employees and those Subcontractors attend both Construction Manager's and Trade Contractor's orientation. Documentation of this orientation shall be maintained on file for review by Construction Manager.

5.02 Risk Competency Training

All Trade Contractor and Subcontractor field supervisory staff shall attend Construction Manager's 4-hour risk competency training.

ARTICLE 6 – PROTECTION OF THE PUBLIC

6.01 All necessary precautions to prevent injury to the General Public or damage to property of others shall be taken. Installation of temporary barriers and/or fencing designated to protect the General Public shall be reviewed and approved by Construction Manager.

6.02 Work shall not be performed in any area occupied by the General Public unless specifically permitted according to the terms of the Agreement or in writing.

6.03 Site Visitors:

A. It is particularly important that a high degree of protection be afforded to all visitors to the Project.

B. All visitors entering the construction area shall attend a brief safety orientation.

C. All visitors entering the construction area shall be accompanied by individuals knowledgeable of site health and safety until such time that the visitor has been trained or is knowledgeable of all requirements.

D. Visitors shall wear high visibility green hard hats, with the word "visitor" in two inch block letters on the hard had. Visitors shall also wear high visibility green vests.

ARTICLE 7 – REPORTING, ACCIDENT INVESTIGATION, AND RECORDKEEPING

7.01 Reporting:

A. All accidents and incidents resulting in employee injury, property and equipment damage, releases to the environment, or involving the general public shall be reported immediately to Construction Manager's health and safety department and project construction manager. This shall include high potential near miss incidents that could have resulted in significant injury or damage.

B. Trade Contractor and its Subcontractors shall complete a Supervisor's Incident Report Form and submit the report to Construction Manager's health and safety supervisor for all job-related accidents involving any of the following:

1. Any employee injury of Trade Contractor or its Subcontractor.
2. Any injury and/or incident with the general public (including any alleged injuries reported by a member of the general public).
3. Equipment
4. Property
5. Releases of hazardous materials

7.02 All accident/incidents shall be investigated by Construction Manager's health and safety representative and Trade Contractor's and/or its Subcontractor's health and safety designee, if applicable. A written accident investigation report and first report of injury shall be submitted to the Project health and safety representative, within twenty-four (24) hours of the occurrence.

7.03 Pertinent facts that are not available within the above time shall be submitted as soon as available in a supplemental report.

7.04 A drug and alcohol test may be administered to all injured employee(s) that require medical treatment beyond first aid including any employee(s) who contributed to the accident.. Employee(s) involved in an accident that results in damage to equipment or property in excess of $1,500 may also be administered a drug and alcohol test.

7.05 Trade Contractor and Subcontractors shall maintain a master or central file for health and safety related documentation on the jobsite. Files shall be maintained in such a manner that distinguishes Trade Contractor from its Subcontractors.

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A. Trade Contractor shall submit to Construction Manager and have available on site the reports shown in Table 8.02 – Reporting Requirements. Reports shall be submitted on the following schedule: Daily - Daily inspections are required on all equipment / vehicles

B. Weekly - Weekly reports are due the following Tuesday morning

C. Monthly - Monthly reports are due by the 2nd of the following month

Construction Manager shall have the right to review all health and safety documentation at any time upon request. Trade Contractor shall give full cooperation during these reviews.

	ANNUAL	QUARTERLY	MONTHLY	PER OCCURANCE	PER REQUEST
Annual Crane Inspection	X			X	
Chemical Inventory			X	X	
Contractor Weekly Inspection			X		X
Critical Lift Checklist				X	
First Report of Injury				X	
Incident Investigation Using ICAM Methodology				X	
Safety Data Sheets			X	X	X
Injury and Illiness log			X	X	X
Regulatory Agency Inspections					X
H&S Observations				X	
Team Stepback Job Hazard Analysis				X	X
Job Safety Analysis (JSA)				X	X
Risk Register with weekly updates		X		X	
H&S Statistics			X		X
H&S Training	X	X	X	X	X
Supervisor Interaction Reports				X	X
Substance Abuse Policy					X
Toolbox Safety Meetings				X	X
Daily Equipment / Vehicle Inspections				X	X
Hazardous Material Storage Area Inspections			X		
Lifting Equipment	X			X	X
Fall Protection	X			X	
Mobile Elevated Work Platform		X			X
SNC Lavalin Safety Audits		X	X		X
Imminent Danger Records Reports			X	X	X

TABLE 8.02 - REPORTING REQUIREMENTS

ARTICLE 8 – WORK PRACTICE CONTROLS

8.01 In order to provide Trade Contractor employees with a safe workplace, a Job Safety Analysis (JSA) shall be prepared for pre-planning the overall scope of work to be performed. The Trade Contractor shall also prepare a JSA upon request by Construction Manager.

8.02 A Team StepBack shall be required for each task to determine if the process, equipment or procedure indicates potential for serious injury and/or property damage.

ARTICLE 9 – SPECIFIC PROJECT HEALTH AND SAFETY REQUIREMENTS

9.01 Working at Heights

A. One-hundred percent continuous fall protection, for fall hazards at or greater than six (6) feet, shall be implemented on this Project. This shall include, but not be limited to, steel erection and scaffold use, erection and dismantling. Harnesses shall be worn at all times when working at heights even when permanent facility guardrails are installed and completed unless posted signs indicate otherwise.

B. Lifelines shall be tagged to indicate that they have been designed and approved by a competent person. Engineered drawings and inspection schedules are required for all horizontal lifelines prior to use.

C. A written rescue plan must be developed in advance of work that involves the use of a fall arrest system.

D. No person shall work alone while working at heights.

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E. Trade Contractor shall prepare a written auditable training program for all personnel and supervisors to ensure that each employee who might be exposed to fall hazards is knowledgeable of the fall protection plan requirements.

F. Records of all training provided shall be kept on file at the job site and available for review.

G. Personnel who have been trained and violate the established fall protection plan/regulations shall be removed from the project.

H. A Construction Manager Permit shall be required for guardrail and grating removal.

9.02 Scaffolds, Stair Towers and Work Platforms:

A. The Project requires one-hundred percent continuous fall protection during the erection and dismantling of scaffolds where employees may be exposed to a fall at or greater than six (6) feet. A competent person must be present during erection, dismantling or moving of scaffolds. Trade Contractor shall develop and use a scaffold tagging system similar to the following:

1. A tagging system shall be in place that indicates the scaffold is safe for use by designated, trained personnel. Each tag must be made of weatherproof material and have at least the following information and be visible by all employees:
    - Date tag was placed and date of the last inspection.
    - Name of inspecting person. All tags must be weather resistant.

    A **GREEN** tag means the scaffold complies with manufacturer's and safety requirements and can be used by any authorized person.

    A **YELLOW** tag indicates the scaffold is complete but does not meet all specifications. This tag will be used only in special circumstances. Special precautions, such as using a safety harness will be required because an accessory, such as a handrail, could not be installed due to the location of the scaffold.

    A **RED** tag shall be placed on a scaffold that is being erected, dismantled, damaged and/or defective. No employees, except members of the qualified erection/dismantling crew, shall work from a red-tagged scaffold.

B. Employees will be instructed to read tags before using scaffolds. If a tag is not attached to the scaffold, the scaffold shall not be used until inspected by a competent person and the proper tag attached.

C. Scaffolds shall be inspected daily by Trade Contractor's designated qualified competent person.

D. All scaffolds, which are more than twice the height of the base width, shall be secured to a fixed structure or employ outriggers to prevent tipping.

E. Scaffolds will be inspected by the competent person prior to use on each shift and as required throughout the work shift to safely maintain the scaffold.

F. Scaffolds must be thoroughly cleaned prior to dismantling.

G. Scaffolding shall be grounded when in close proximity to, or there is a possibility of contact, with energized high-voltage electrical equipment.

H. Scaffolding must be sufficiently protected (i.e., jersey barriers) when there is a possibility of contact with vehicles or equipment.

I. Stamped engineered drawings shall be available at the worksite during installation, disassembly and use, for outrigger scaffolds, when pole scaffolding is 60' or higher, when supported scaffolding is 125' or higher and where brackets are used to support cantilevered loads.

J. Exterior vertical ladders shall not be used on scaffolding over 45 feet (15.72 meters) high

K. An opening in the railing or perimeter barrier must be provided with a swing gate at each access point, if feasible.

L. End frames shall not be used for access use even when designed as ladder rungs.

M. Guardrail systems or other fall protection methods shall be used on all rolling scaffolds.

9.03 Walking and Working Surfaces:

A. Temporary guardrails shall be erected in all elevated work areas as quickly as possible. Tie-off points in lieu of guardrails are not acceptable where normal work activities are taking place.

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9.04 Barrier Identification Tape:

A. Barrier identification tape is strictly prohibited from being used for any form of personnel fall protection. Barricade tape around excavations can be used for short term (24-hours), after this period physical barriers are required.

B. **YELLOW** barricade tape shall be used for **CAUTION/WARNING**

C. **RED** barricade tape shall not be used. Red rope, issued by Construction Manager, will be used for **DANGER, DO NOT ENTER.** A Construction Manager red rope permit shall be required.
Note: Once the area barricaded is free of the hazard(s) for which it was erected, the tape or rope will be removed and properly discarded.

D. An assessment of the possibility of falling objects must be completed and appropriate controls must be put into place. Controls may include – but are not limited to – barricades, warning signs, tethering tools, debris nets, snow fences and overhead canopies.

9.05 Mobile Elevated Work Platforms:

A. The following controls are required:

1. A signaler/ground guide is utilized while travelling in congested areas.
2. An exclusion zone is set up around the machine to deter unauthorized entry.
3. A harness and lanyard is attached to the manufacturer-installed anchor point at all times when a worker is inside the basket.
4. A spotter shall be provided any time a MEWP is moved to ensure safe movement, identifying potential pinch points, and to lower the platform in the event of an emergency. The Team StepBack shall evaluate and determine if a full-time dedicated spotter is required.

9.06 Confined Space Entry:

A. Construction Manager's confined space permit shall be required prior to any excavation activities.

B. All spaces shall be considered permit-required confined spaces. Trade Contractor shall train all personnel who will enter the confined space. No one shall enter a confined space area until properly instructed.

9.07 Employee Ground Transportation:

A. Trade Contractor is responsible for assuring that all personnel follow the requirements of this section and prohibit improper transportation of employees and visitors. Transporting employees in cargo beds of pick-ups, etc. is prohibited.

B. Mobile cranes, forklifts, winch trucks, front-end loaders, tractors and other materials handling equipment are not permitted to transport passengers.

C. Vehicles must be designed to accommodate passenger transportation or the vehicle shall not be used for that purpose.

9.08 Housekeeping:

A. Trade Contractors shall monitor its work areas daily, or more frequently if needed, to assure that all debris are removed to minimize hazards.

9.09 Project Electrical Requirements:

A. Trade Contractor shall implement an Electrical Safety Program. This program shall include safe installation, work practices, maintenance, and special equipment considerations. All electrical installations, either temporary or permanent, shall be in conformance with the OSHA Electrical Code, NFPA-70, ANSI-C1, and low and high voltage electrical safety orders per OSHA health and safety requirements

9.10 Cranes and Hoisting Equipment:

A. Cranes and hoists shall have a current annual certificate of examination and testing issued by an accredited crane examiner. Annual inspection certificates and operators manual shall be in the cab of each crane prior to crane operation.

B. Only qualified and designated personnel shall operate cranes or hoisting equipment. Crane operators shall be NCCO certified for class of crane operated.

C. Outrigger cribbing shall be used for all crane operations. All cranes shall have have boom angle indicators and anti-two block devices installed and operating properly.

D. Load cells, moment indicators and external rated capacity lighting shall be available in accordance with the table below.

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Crane Type	Load Moment Indicator	Load Cell	External Rated Capacity Lighting
Mobile Rough Terrain	Shall	Shall	Shall
Mobile Truck Mounted	Shall	Shall	Shall
Crawler	Shall	Shall	Shall
Pedestal and Tower	Shall	Shall	Should
Electric Overhead Traveling	Not Applicable	Should	Should
Mobile Pick and Carry >10 Tons	Should	Should	Should
Vehicle Loading Crane/Boom Truck	Shall	Shall	Shall
Portal	Not Applicable	Should	Should

E. The swing radius shall be barricaded or other positive means shall be taken to prevent personnel from entering the area between the counter weight/swing radius and any stationary and/or outside obstructions.

F. A lift evaluation form shall be completed and submitted at least 5 days prior to any Critical Lift activity A detailed lift study shall be completed and shall be reviewed by a registered professional engineer for all Critical Lifts involving two or more cranes, lifts at or above 200,000 pounds (100 tons), lifts where the crane or lifting equipment is 90 percent or more of its rated capacity at the working radius and crane configuration, loads that represents significant cost, require significant lead-time to order, are critical to the project or are irreplaceable, or, lift where additional controls are wanted or necessary. All other lifts shall be documented on the Daily Crane Operation Log.

G. All Critical Lifts shall be under the direct supervision of a master/lead rigger.

H. All rigging used in critical lifts shall be inspected for compliance with all requirements by the master/lead rigger.

I. Notification shall be made to the Commissioner of Labor and Industry forty-eight hours prior to the commencement of any lift involving multiple cranes

J. Taglines shall be used to control all loads

K. All rigging operations shall be planned and supervised by competent personnel to ensure that the best methods and most suitable equipment and tackle are employed.

9.11 Vehicles and Mobile Equipment:

A. All vehicles and mobile equipment shall be maintained in safe working condition and shall be appropriate and adequate for the intended use.

B. Only authorized personnel shall operate equipment. Operators of equipment, machinery or vehicles shall be certified for the operation involved. Equipment shall be operated in a manner that reduces dust emissions.

C. Vehicles and mobile equipment shall be moved with the assistance of a flag person (spotter) in areas with poor visibility, for oversized loads, when operating in tight areas or other high-risk situations. This includes the movement of mobile elevated work platforms in congested areas.

D. Equipment shall not be operated unless all required safety devices are in place and functioning properly.

E. All equipment including forklifts, dozers, front end-loaders, etc. shall have a reverse signal/back-up alarm audible above surrounding background noise.

F. Mobile equipment shall not be left unattended unless parked securely to prevent movement, with all ground engaging tools lowered to the ground, brakes set and the engine off.

G. When fueling equipment or vehicles the engine shall be shut down.

9.12 Welding & Cutting:

A. Flash arrestors shall be installed in both oxygen and acetylene hoses at the regulator connection.

B. Welders shall wear approved eye and head protection when welding. Personnel assisting the welder shall also wear approved eye and head protection.

C. Welding screens and welding fume extractors shall be used when other workers are in the vicinity of the welding activities.

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D. Prior to welding or cutting a 20 lb ABC rated fire extinguisher shall be within easy reach of the worker. A fire watch shall be stationed at all locations where sparks and/or flames may fall to a lower floor/work area or to another side of a wall.

E. Oxygen and acetylene cylinders shall not be stored inside buildings.

9.13 Personal Protective Equipment (PPE):

A. All employees shall wear safety glasses while on the construction site. Minimum eye protection shall include approved safety glasses with side shields that meet the standards specified in ANSI Z87.1-2003

B. Additional eye and face protection in combination shall be worn when required.

C. All construction workers shall wear hard hats that meet ANSI Z89.1-1997, while on the construction site. Cowboy style hard hats are not allowed.

D. Gloves shall be carried by personnel at all times and maintained in good condition. Gloves shall be worn when handling material, performing jobs the present hazards to the hands, moving between elevations, where indicated on the StepBack job hazard analysis, or entering areas where gloves are specifically required PPE.

E. Appropriate hearing protection shall be worn in work areas where noise levels are at 85 dBA or greater.

F. Trade Contractor shall establish and implement a respiratory protection program when work activity warrant that employees wear respiratory protection. The program shall meet the requirements set forth in NIOSH/MSHA recommendations.

G. All personnel on the construction site shall wear sturdy leather, hard-soled work boots. Boots shall measure at least 6" from heal to top of ankle support. No one is permitted to wear sneakers (including ANSI approved), tennis shoes, or athletic shoes of any type, sandals, high heels or thongs on the construction site. Safety toe footwear is required for workers exposed to a crush hazard.

H. Suitable clothing for construction shall be worn on the construction site. Shirts with sleeves (at least 3 in length) and full-length pants, or full coveralls, shall be required. Shorts, sweat pants, or tank tops are not allowed.

I. High-visibility vest or high-visibility clothing meeting the requirements of ANSI Type II or Type III (CSA or EN equivalent) depending on the activity performed.

9.14 Excavations:

A. Construction Manager's excavation permit shall be required prior to any excavation activities.

B. Spotter personnel shall be used whenever mechanical excavation work comes within three (3) feet of a buried utility. The spotter shall make certain by manually excavating or hydro-vacuuming that continuation of mechanical excavation will not contact the buried utility. This requirement shall remain until utility is adequately exposed and mechanical excavation can continue without risk to the utility.

C. All open trenches and excavations greater than three (3) feet (.91 meter) shall be shall be protected by a complete guardrail system or safety fencing (snow fencing). The system shall be erected around the complete perimeter of the excavation.

END OF SECTION 01 35 23

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5
PRE-BID AND PRE-CONSTRUCTION MEETINGS

5.1 PURPOSE

This chapter is intended to provide information and guidelines for conducting the safety portion of the pre-bid and pre-construction meetings. Inclusion and discussion of safety and health in the early stages of a construction project through pre-bid and pre-construction safety meetings will result in better project safety performance.

5.2 PRE-BID MEETINGS

Pre-bid meetings are usually held by the Project Manager or the Contract Manager, in response to a solicitation or request for proposal (RFP). If the company has a safety pre-qualification process in place, the meeting should only be attended by safety pre-qualified bidders. The pre-bid meeting provides an opportunity to the bidders to learn more about the unique challenges or hazards associated with the project and ensure they have a clear understanding of the scope of work requirements including expectations for safety and health performance. The pre-bid meeting will also help clarify any bidder concerns or questions. In order to hold a successful pre-bid meeting the following items should be considered:

- Accept bids only from safety pre-qualified bidders.
- Develop and communicate the meeting agenda, date, time, and the location to the bidders at least a week in advance.
- Coordinate a construction site walk-through, which will help the bidders familiarize themselves with the existing project conditions that may have an impact on project safety performance (e.g., Overhead power line runs across the project site).
- Hold the pre-bid meeting at least two weeks in advance of the contract award which will give the bidders enough time to react to any changes or new information provided at the pre-bid meeting.
- Require mandatory pre-bid meeting as a prerequisite for submitting a bid. Document the meeting attendance with the help of a sign-up sheet.
- Assign either the project manager or contract manager as the chairperson to run the meeting.
- Require at a minimum the bidder's project manager and a safety representative to be in attendance.
- Develop and use a pre-bid meeting safety checklist to review project safety goals and requirements with all prospective bidders. A sample safety requirements checklist template is provided in this chapter as Exhibit 5-1 that covers the key safety topics that should be discussed during the pre-bid meeting.

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- Allow sufficient meeting time to ensure all critical items are covered during the meeting. It is important to know whether there will be a construction site walk-through since it will impact the overall meeting duration.
- Maintain, and publish written pre-bid meeting minutes to all bidders.

5.3 PRE-CONSTRUCTION MEETINGS

Pre-construction meetings provide an opportunity to begin communication about project safety requirements between the contracting parties (e.g., Owner versus General Contractor, General Contractor versus Subcontractors), and address project-specific challenges and hazards. This meeting will provide "detailed" safety direction and guidance to the contractor. The pre-construction meeting is highly recommended for large or complex projects, but will also be beneficial to hold such meetings for smaller projects as well.

The Project Superintendent typically runs the pre-construction meetings, after the contract is awarded, and before the contractor begins work. This meeting is typically included as part of the project mobilization meeting. Consider the following items when planning the pre-construction safety meetings:

- Hold the meeting only after the receipt and review of the contractor's written safety program. Be prepared to discuss your concerns with the contractor's safety program and suggest recommended corrective actions.
- Hold the meeting at the project site and be prepared for a construction site walk-through.
- Strongly encourage attendance by a majority of the contractor representatives from both the project management (project manager, cost engineer, and schedule manager) and field management (project superintendent, field superintendent, and General Foreman) including safety.
- Start the meeting by communicating the project's commitment to worker safety and health.
- Define safety responsibilities.
- Require the contractor to submit all the required safety submittals before mobilizing on site.
- Address all the unique challenges associated with the project and necessary control measures and all the project specific safety requirements.
- Use a pre-construction safety meeting checklist or agenda, to document the safety portion of this meeting as presented in this section as Exhibit 5-2 which covers the key Environmental, Safety, and Health topics to be discussed during the pre-construction meeting. In addition, a best practice example pre-construction/mobilization form from a large construction firm is also presented as Exhibit 5-3.
- Obtain the site safety point of contact and emergency action plan information.
- Receive acknowledgment and commitment to project-specific safety requirements from the contractor by signing the checklist, before commencing work.

Note: The template forms and checklists are long and detailed, but readers are reminded that these are just examples. Contractors can choose to use shorter versions of these forms that can still be very effective.

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Exhibit 5-1: PRE-BID MEETING SAFETY CHECKLIST

****Note typically site safety will be one of the several items discussed during the pre-bid meeting****

Date: _____ Location:_____
Project Name/Location: _____
Contract Package (e.g., Excavation): _____

Introductions	☐ Yes ☐ No ☐ NA
Route Sign-up Sheet	☐ Yes ☐ No ☐ NA
Project Description & Scope of Work	☐ Yes ☐ No ☐ NA
Staging, Access, Parking, and Use of Facilities	☐ Yes ☐ No ☐ NA
Lunch Tent/Sanitary Facilities	☐ Yes ☐ No ☐ NA
Site Work Hours (start time/end time)	☐ Yes ☐ No ☐ NA
Cleanup and Environmental Considerations	☐ Yes ☐ No ☐ NA
Substance Abuse Program	☐ Yes ☐ No ☐ NA
Required Safety Submittals	
▪ Safety Personnel Contact	☐ Yes ☐ No ☐ NA
▪ Written Safety Program	☐ Yes ☐ No ☐ NA
▪ Corrective Action Plan (CAP) (if required)	☐ Yes ☐ No ☐ NA
▪ Insurance Coverage Proof	☐ Yes ☐ No ☐ NA
Unique Project Safety Challenges and Hazards	
▪ Dig Permit	☐ Yes ☐ No ☐ NA
▪ Air Quality (Odors, Fumes, Noise, Dust, etc.)	☐ Yes ☐ No ☐ NA
▪ Fire Alarm System and Bypass Requirements	☐ Yes ☐ No ☐ NA
▪ Lead and Asbestos Abatement/Training	☐ Yes ☐ No ☐ NA
▪ Public Protection	☐ Yes ☐ No ☐ NA
▪ PPE requirements	☐ Yes ☐ No ☐ NA
Questions?	
Construction Site Walk through	☐ Yes ☐ No ☐ NA

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Exhibit 5-2: PRE-CONSTRUCTION MEETING SAFETY CHECKLIST

****Note typically site safety will be one of the several items discussed during the pre-construction meeting****

Date: _____ **Location:**_____

Project Name/Location: _____

Subcontractor Name: _____

The following items were reviewed with the contractor

Introductions	☐ Yes ☐ No ☐ NA
Sign-up Sheet	☐ Yes ☐ No ☐ NA
Project Description & Scope of Work	☐ Yes ☐ No ☐ NA
Project Safety Goals and Commitment	☐ Yes ☐ No ☐ NA
Duties and Responsibilities of Contractors	☐ Yes ☐ No ☐ NA
Staging Area and Job Site Use	☐ Yes ☐ No ☐ NA
▪ Trailer or Connex Placement Request	☐ Yes ☐ No ☐ NA
▪ Site Access – Keys, Passes, hard hat stickers, Badges	☐ Yes ☐ No ☐ NA
▪ Parking (Company vs. personal vehicle)	☐ Yes ☐ No ☐ NA
▪ Deliveries	☐ Yes ☐ No ☐ NA
▪ Material and/or debris storage and disposal	☐ Yes ☐ No ☐ NA
▪ Lunch Tent/Sanitary Facilities	☐ Yes ☐ No ☐ NA
▪ Site Security and Temporary Fencing/Gate Locations	☐ Yes ☐ No ☐ NA
▪ Typical Site Work Hours Limit (start time/end time)	☐ Yes ☐ No ☐ NA
▪ After Hour Work Permission Requirements	☐ Yes ☐ No ☐ NA
▪ Project Supervision Requirements and Notification	☐ Yes ☐ No ☐ NA
▪ Visitor Restrictions/Sign-in Log	☐ Yes ☐ No ☐ NA
▪ Dig Permit	☐ Yes ☐ No ☐ NA
▪ Air Quality (Odors, Fumes, Noise, Dust, etc.)	☐ Yes ☐ No ☐ NA
▪ Fire Alarm System and Bypass Requirements	☐ Yes ☐ No ☐ NA
▪ Camera Pass	☐ Yes ☐ No ☐ NA
Medical	
▪ Drug & Alcohol Testing Requirements	☐ Yes ☐ No ☐ NA
▪ Occupational Clinic Locations/Map/Phone	☐ Yes ☐ No ☐ NA
▪ Emergency Plan posted in trailer (muster points, contact lists)	☐ Yes ☐ No ☐ NA
▪ AED Equipment/First Aid Kit Locations	☐ Yes ☐ No ☐ NA
▪ Medical Services Requirements	☐ Yes ☐ No ☐ NA
▪ Commitment to Light Duty /Return to Work Program	☐ Yes ☐ No ☐ NA

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Safety & Health Management	☐ Yes ☐ No ☐ NA
▪ Compliance with DOSH requirements	☐ Yes ☐ No ☐ NA
▪ Project Safety Staffing	☐ Yes ☐ No ☐ NA
▪ Accident Reporting, Investigation, and Documentation	☐ Yes ☐ No ☐ NA
▪ Approved Written Site-Specific Safety Plan	☐ Yes ☐ No ☐ NA
▪ Project Disciplinary/Inventive Procedures	☐ Yes ☐ No ☐ NA
▪ Job Hazard Analysis	☐ Yes ☐ No ☐ NA
▪ Contractor Safety Representative	☐ Yes ☐ No ☐ NA
▪ New Employee Orientation	☐ Yes ☐ No ☐ NA
▪ Proper Personal Protective Equipment	☐ Yes ☐ No ☐ NA
▪ Safety Meetings (type, schedule, & documentation)	☐ Yes ☐ No ☐ NA
▪ Safety Training & Certification Verification	☐ Yes ☐ No ☐ NA
▪ Safety Inspections (type, schedule, & documentation)	☐ Yes ☐ No ☐ NA
▪ Required Weekly Safety Documentation	☐ Yes ☐ No ☐ NA
▪ Identify DOSH Competent/Qualified Site Supervisor	☐ Yes ☐ No ☐ NA
▪ Daily Housekeeping/Composite Debris Policy	☐ Yes ☐ No ☐ NA
▪ Steel Erection Planning	☐ Yes ☐ No ☐ NA
▪ Crane Inspection/Operator Certification	☐ Yes ☐ No ☐ NA
▪ English Language /Non-English	☐ Yes ☐ No ☐ NA
▪ Stretch and Flex	☐ Yes ☐ No ☐ NA
Environmental Hazards	☐ Yes ☐ No ☐ NA
▪ Runoff Protection	☐ Yes ☐ No ☐ NA
▪ Hazardous or chemical spill procedures	☐ Yes ☐ No ☐ NA
▪ Proper cleaning and fueling of equipment onsite	☐ Yes ☐ No ☐ NA
▪ Concrete Washout Area	☐ Yes ☐ No ☐ NA
▪ Asbestos, Mold, PCB or lead – Suspected procedures	☐ Yes ☐ No ☐ NA
▪ Contaminated Soil – Suspected procedures	☐ Yes ☐ No ☐ NA
Unique Project Safety Challenges and Hazards	☐ Yes ☐ No ☐ NA

Questions

Construction Site Walk through

Additional Notes/Comments:

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PRE-CONSTRUCTION SAFETY MEETING ACKNOWLEDGEMENT

We have discussed and understand the Environmental, Safety, and Health requirements of this project.

Contractor agrees to comply fully with all the Environmental, Safety, and Health laws, rules, regulations, and procedures in effect on the site. Contractor agrees to communicate these requirements to any sub-tier contractor(s) brought onsite to complete its scope of work.

Contractor Management (Name)	Contractor Management (Signature)
<Company Name> Management (Name)	<Company Name> Management (Signature)

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Exhibit 5-3: Example Contractor Pre-Construction/Mobilization Form

(Used with Permission from SNC-Lavalin)

Note: This best practice tool is only included as an example, and the users should be aware that the contractor may reference safety regulations depending on their jurisdictions. It is the user's responsibility to ensure that they adapt the best practices provided in this handbook for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

We have discussed and understand the Health & Safety requirements of SNC-Lavalin.

Company Name _____ Date _____

Subcontractor Representative (Name) _____ Subcontractor Representative (Signature) _____

	A. MOBILIZATION STRATEGY	YES / NO /N/A	COMMENTS
1	Meetings "We Care"/Safety		
2	Daily Tool Box Meetings (all attendees must sign in)		
3	Complete JSA's as appropriate		
4	StepBack (team and personal) conducted (all members must sign in and copies retained)		
5	Weekly safety meetings to be held		
6	Daily work plans to be submitted including type of work planned, manpower, equipment and tools used		
7	Develop a site-specific risk register		
8	Develop a site-specific H&S manual		
9	Dedicated H&S Coordinator(s) appointed		
10	Transportation in / out of site (air / buses) arranged		
11	Identification of company employees (e.g. hard hat sticker, badges, etc.)		
12	Security access card system		
13	First Aid Personnel (number qualified)		
a.	All supervisors must be qualified		
b.	Workers qualified per legislation (e.g. Alberta OHS Code part 11)		
14	First Aid Facility and Supplies		
a.	Any injured employee must be seen by the medical facilities		

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	A. MOBILIZATION STRATEGY	YES / NO /N/A	COMMENTS
b.	Immediately reported verbally		
c.	Preliminary report completed within 24 hours		
d.	Investigation report completed within seven days		
e.	Imminent danger and near misses reported		
15	Vehicles – Proper Safety Equipment and Inspections		
a.	20 lb. ABC fire extinguisher		
b.	First-aid kit		
c.	Back-up alarm (vehicles 1 ton and over)		
d.	Company logo visible on both sides of vehicle (minimum 2" height)		
e.	Vehicle numbers on the rear window		
16	Vehicles – Registration and Insurance		
a.	Proof of registration		
b.	Minimum $3 million liability insurance for each vehicle		
c.	All drivers to have valid a driver's license		
d.	Seat belt mandatory		
e.	Gasoline storage and handling		
f.	Vehicle pass program		
g.	Roll over protection (if applicable)		
17	Site Evacuation		
a.	Contractor has adequate transportation for full site evacuation of employees		
b.	Emergency procedures established and known to all		
c.	Muster point		
d.	Updated contact lists		
e.	Alarm type and procedures		
18	Training		
a.	Orientation		
b.	ID badges, returned for terminated employees		
c.	Site training requirements		
d.	Employee training log submitted		
e.	SNC-Lavalin orientation video shown		
19	Permit Programs in Place		
a.	LOTO/Isolation		
b.	Excavations and earth works		
c.	Hot work		
d.	Work at height		
e.	Confined space		

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A. MOBILIZATION STRATEGY		YES / NO /N/A	COMMENTS
20	Positive Incentive Program		
a.	Requirements		
b.	Ratios and budget		
c.	Participation		
21	Safety Interactions		
22	Audits		
a.	Internal (self-audit)		
b.	External (corporate and regulatory audits)		
B. SAFETY EQUIPMENT TO BE MOBILIZED/PROVIDED BY THE CONTRACTOR			
1	Safety signage		
a.	Caution		
b.	Working above		
c.	Caution construction area		
d.	Danger open excavation		
e.	No smoking		
f.	Yellow / red flagging		
g.	Confined space		
h.	Danger		
i.	Power lines		
j.	X-ray		
k	Welding in progress		
l.	Other		
2	Breathing Apparatus and Fit Testing		
a.	SABA		
b.	SCBA		
3	Fire Fighting Equipment		
a.	Extinguishers – quantity of 20 lb ABC		
b.	Extinguishers – quantity / size of CO_2		
c.	Water trucks		
d.	Water management / dewatering logs		
4	Safety Harnesses / Shock Absorbing Lanyards		
a.	Inspection program		
b.	Training		
c.	Storage		
5	Personal Protective Equipment (as per 6845.3.2.1-EN minimum requirements)		
a.	Hard hats/helmets, high visibility reflective striping		
b.	Safety glasses w/side shields		
c.	Safety footwear		

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B. SAFETY EQUIPMENT TO BE MOBILIZED/PROVIDED BY THE CONTRACTOR			
d.	High visibility attire (Class I, II, or III)		
e.	Hand protection		
f.	Hearing protection		
g.	Long pants and 4" shirt sleeve		
6	Scaffolding including Tag System and Tags		
a.	Inspection		
b.	Color coding		
c.	Certifications		
7	Lockout System in place including Tagging/Sign-out Log Book		
a.	Procedures		
b.	Training		
8	Ladders		
a.	Procedures		
b.	Training		
9	Lunchroom Facilities		
10	Toilets (i.e. Alberta OHS Code, Part 24 and Schedule 7)		
a.	One toilet for 10 persons as a general guide		
b.	Additional toilets for women		
11	List of Tools and Equipment, Inspected on a quarterly basis (color code example)		
a.	Yellow → January – March		
b.	Green → April – June		
c.	Red → July – September		
d.	Blue → October – December		
12	Log for disposal of any Hazardous and Non- Hazardous Material		
13	Duplicate copy of the MSDS manual		
14	Radio, cell phone access		
15	Camera passes required on site		
16	Other safety equipment (specify)		

We have discussed and understand the Health & Safety requirements of SNC-Lavalin. We will be in full compliance to the SNC-Lavalin Critical Risk Control Protocols at all times unless an Approval for Alternate Controls has been completed and approved where necessary.

Subcontractor agrees to identify minimum training requirements and retain records for the duration of the project for all company workers and contractors.

Subcontractor agrees to provide and ensure the proper use thereof, of all required safety equipment including that specified on this checklist.

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Subcontractor Management (Name)	Subcontractor Management (Signature)
SNC-Lavalin Management (Name)	SNC-Lavalin Management (Signature)
Project Management (Name)	Project Management (Signature)

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6
PROJECT SAFETY STAFFING

6.1 PURPOSE

This chapter is intended to provide guidelines to identify quantities, qualifications, and responsibilities of the project safety staff to support the project. The guidelines provided in this chapter are just a roadmap that contractors can use all or in part that fits their company process, culture, size, and financial resources.

6.2 PROJECT SAFETY STAFFING

The project safety staffing varies from project to project depending on the company staffing policy, project budget, owner contract requirements, project complexity, perceived risk level, size, industry segment, and a project's geographic location. Unfortunately, there is no such thing as construction "industry norm" as it pertains to project safety staffing. Hence, before deciding on project safety staffing, the contractors should consider these following key questions.

- What safety staff requirements were specifically included in the owner's construction contract?
  - Does the safety professional have to be full-time or part-time?
  - Does the safety professional have to be designated or dedicated?
  - Can the safety professional have any responsibility on other projects?
  - What are the minimum qualifications for the safety staff in terms of education, work experience, and professional certifications?
  - Do the contracts call for services of specialists such as industrial hygienists, ergonomists, security managers, and environmental compliance managers?
- Did the owner allow or allocate any specific amount of funds for project safety staffing?
- How intensive is the project's training, inspection, and reporting and recordkeeping requirements?
- What is the total estimated cost of construction of the project?
- What is the level of complexity of the project defined in terms of anticipated and recognized high hazards expected on the project?
- How many subcontracts will be awarded on the project?
- What percentage of the subcontractors were awarded contracts on a probationary status and will be performing work with a corrective action plan (i.e. their safety performance was below an acceptable level during the pre-qualification process)?
  - Identify those subcontractors to see if you need safety staffing, and/or will you require them to add safety staff.
- How many total workers are expected on the project?
- How many workers are expected on site during peak time?
- How many worker-hours will be expended on this project?

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- Is the project undertaken under an owner-controlled insurance program (OCIP) or Contractor Controlled Insurance Program (CCIP)?
- Will the project owner assign an owner safety representative to this project?

It is apparent that there is no one-size-fits-all solution as it comes to project safety staffing. However, contractors should consider all the pertinent factors and come up with a staffing level that will improve the project safety performance.

6.3 DESIGNATED SAFETY REPRESENTATIVE

A designated project safety representative is an individual who may hold non-safety related duties but is present at the site full-time (e.g., Superintendent). Some staffing guidelines about a designated safety representative are presented in this section.

6.3.1 Quantity

Each contractor on the project should be required to "designate" an individual to be responsible for the project safety activities when the crew size is less than "X" employees (e.g., 20 employees), including all tiered subcontractor employees (or) the contract value is below $X million in labor only (e.g., $500,000). The benchmarked number should be based on the contractor risk level and past safety performance.

6.3.2 Site Presence and Coverage

Each contractor should provide safety coverage during all off-shift work, e.g., a three a.m. concrete pour. It is recommended to state clearly that the designated safety representative should be required to be on-site at all times when workers are on the jobsite. It is recommended that no subcontractor labor be allowed on a jobsite without, at least, one designated safety representative, for the general contractor, onsite at all times.

6.3.3 Qualifications

It is recommended that the highest level of supervision (i.e., Superintendent or General Foreman) on the site to be selected as the designated safety representative. Depending on the project risk level, the qualifications of the designated safety representative should be clearly defined in terms of construction industry experience and professional development safety training or certifications. It is recommended that the minimum qualification for the designated safety representative should include at least five years of appropriate construction specialty experience and OSHA 30-hour outreach training.

Recently, the Board of Certified Safety Professionals (BCSP)[1] has introduced a certification called "Safety Trained Supervisor (STS)®. The STS certification provides a means for employers to verify safety and health knowledge of first-line supervisors, managers, and any other person with safety responsibilities. The program requires applicants to meet minimum education and experience requirements and demonstrate knowledge of basic safety and health standards and practices. The STS program is nationally accredited by the National Commission for Certifying Agencies (NCCA). Contractors may also choose to

1 Board of Certified Safety Professionals (BCSP). Certifications. www.bcsp.com (Accessed January 3, 2015)

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require that designated safety representatives at a minimum to hold this certification. However, this is a relatively new certification and not many supervisors currently hold this designation.

6.3.4 Documentation and Approval

All proposed designated safety representatives should be approved by the contractor prior to award of the contract or at the pre-construction meeting to ensure that the person meets the project expectations and has the necessary qualifications to support the applicable project scope.

6.4 DEDICATED SAFETY PROFESSIONAL

A dedicated safety professional is an individual who shall not hold other non-safety duties and is present at the site full-time. The dedicated safety professional should be responsible for developing, managing, implementing, and enforcing the contractor's written safety and health program and may include input from others. Some staffing guidelines about a dedicated safety professional are presented in this section.

6.4.1 Responsibilities

Responsibilities of the project safety professional should be explicitly stated during the approval process and communicated to the prospective professionals. An example of project safety staffing policy and responsibilities is presented as Exhibit 6-1.

6.4.2 Quantity

Each contractor on the project may be required to provide a dedicated on-site full-time qualified safety professional when:

- Actual or expected crew size reaches "X" employees (e.g., 20 employees)
- Required by the contractor's corrective action plan as part of the pre-qualification process
- The contract value exceeds $X million in labor only (e.g., $5 million), or
- Hazardous activities are predetermined to be present

Furthermore, the contractor may also define when the project requires additional on-site full-time qualified safety professional. For example, an additional safety professional may be required for each crew size increment of fifty employees or increments of $10 million in labor only thereafter. This requirement must be defined in all contracts to each, separate, contractor.

6.4.3 Site Presence and Coverage

Each contractor should provide safety coverage during all off-shift work, e.g., a three a.m. concrete pour. It is recommended to state clearly that the dedicated safety professional should be required to be on-site at all times when workers are on the jobsite. It is recommended that no subcontractor labor be allowed on a jobsite without a designated competent person on site for each subcontractor and as supervision for the general contractor.

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6.4.4 Qualifications

Depending on the project risk level, the qualifications of the dedicated safety professional should be clearly defined in terms of education, appropriate construction industry safety experience, and/or professional certifications.

6.4.5 Experience

The more complex and riskier the project the more stringent the qualifications. For example, when requiring a dedicated safety professional for a crane and rigging subcontractor, the individual should have adequate experience in that discipline.

6.4.6 Education

A 2011 report prepared for the National Institute for Occupational Safety and Health (NIOSH) titled "National Assessment of the Occupational Safety and Health Workforce," reported that the majority of the safety professional employers are looking for professionals with bachelor's degree-level.[2] On projects that will include numerous site safety professionals, it is typical to assign a *Project Safety Manager* who will be the lead on the site. Some contractors and Owners prefer college educated construction safety professionals to take on the role of Project Safety Manager to manage construction safety programs including the safety staff at the project level. Here is an example requirement, *"The safety manager must hold a safety engineering or equivalent qualification and have a minimum of seven years' experience in construction safety and five years of management experience."*

Readers should understand that not all contractors, especially smaller contractors will not hire or be able to hire a safety professional with a college degree. Under those circumstances contractors are recommended to hire safety professionals with certain field safety experience and minimum certifications such as:

- OSHA 30 and/or OSHA Outreach Trainer
- Certified or trained Rigging/Signal Person
- Scaffold Competent Person
- Fall Protection Competent Person
- Confined Space Competent Person
- Certified Flagger

These professionals should be backed up by corporate safety professionals who have the 4-year safety degree and applicable professional certifications.

6.4.7 Certifications

Some Owners and few Contractors have also started to require professional certifications such as the Board of Certified Safety Professional's (BCSP) Construction Health and Safety Technician (CHST)® and Certified Safety Professional (CSP)® for their safety staff.

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2 *National Assessment of the Occupational Safety and Health ...* (n.d.). Retrieved from http://www.cdc.gov/niosh/oshworkforce/_br

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The Construction Health and Safety Technician (CHST) certification is designed for individuals who demonstrate competency and work part-time or full-time in health and safety activities devoted to the prevention of construction illnesses and injuries. The CHST certification meets national standards for certifications. Candidates for the CHST certification are typically employed as safety and health specialists on construction job sites, serving in either full-time or part-time positions. Typical individuals are responsible for safety and health on one or more significant construction projects or job sites. They may work for an owner, general contractor, subcontractor, or firm involved in the construction or construction safety.[3]

A CSP (Certified Safety Professional), awarded by BCSP, is certified in the comprehensive practice of OSH. Certified Safety Professionals (CSP) are persons who perform at least 50% of professional level safety duties including; are making worksite assessments to determine risks, potential hazards and controls, evaluating risks and hazard control measures, investigating incidents, maintaining and evaluating incident and loss records, and preparing emergency response plans. Other duties could include; hazard recognition, fire protection, regulatory compliance, health hazard control, ergonomics, hazardous materials management, environmental protection, training, accident and incident, investigations, advising management, record keeping, emergency response, managing safety programs, product safety and/or security.[4]

More information about the certifications is available at www.bcsp.com. Please note according to the American Society of Safety Engineers (ASSE), certifications should be from a professional safety organization accredited by the National Commission of Certifying Agencies (NCCA) or the Council of Engineering and Scientific Specialty Boards (CESB), or a nationally recognized accrediting body that uses certification criteria equal to or greater than that of the NCCA or CESB, certification is an independent third-party indicator of achievement.[5]

6.4.8 Specialists

Even though it is not common, depending on specific project needs, certain large projects (for example projects over $1 billion in construction cost) will include specialists such as Ergonomists, Industrial Hygienists, Security Managers, and Environmental Compliance Manager Full-time on-site. However, for small to medium sized projects, it is typical practice to employ these specialists on an as-needed basis. For example, the project might need to employ an industrial hygienist for only a week, when excavating, transporting, and disposing of contaminated soil or to perform a noise study to analyze project impacts on the neighborhood residential community. Selected certifications are listed below:

- CIH (Certified Industrial Hygienist) has an emphasis on evaluating and controlling physical, chemical, ergonomic and biological hazards. www.abih.org/certified
- CFPS (Certified Fire Protection Specialist) has responsibilities regarding the application of technologies in fire safety, fire protection, prevention, and suppression. www.nfpa.org

3 Board of Certified Safety Professionals (BCSP). Certifications. www.bcsp.com (Accessed January 3, 2015)

4 Board of Certified Safety Professionals (BCSP). Certifications. www.bcsp.com (Accessed January 3, 2015)

5 Board of Certified Safety Professionals (BCSP). Certifications. www.bcsp.com (Accessed January 3, 2015)

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- o CHMM (Certified Hazardous Materials Manager) is involved in environmental protection, waste management, dangerous goods transportation, safety, and materials handling. www.ihmm.org

6.4.9 Documentation and Approval

Documentation of qualifications should be submitted to the Contractor prior to the award of any resultant contract. All proposed dedicated safety professional should be approved in advance by the Contractor prior to award of the contract or at the pre-construction meeting to ensure the person meets the project expectations and has the necessary qualifications to support the applicable project scope.

6.5 COMPETENT PERSON

The constructor and subcontractors should assign a competent person who is capable of identifying existing and predictable hazards in the work environment, which are hazardous or dangerous, and has the authority to stop work or take corrective actions to eliminate the conditions. A list of all major activities in the project should be created and whether or not a competent person would be required at the start of the project. In addition to the DOSH-required competent person mandate, the competent personnel should be required for various other activities if possible.

6.6 FUTURE CONSTRUCTION SAFETY PROFESSIONALS

The demand for qualified safety professionals has increased tremendously in recent years. It has been anticipated there will be a shortage of skilled Occupational Safety & Health (OS&H) in the near future. One of the best ways to overcome the shortage of trained Construction OS&H professionals is starting a construction safety internship program.

It was previously indicated that more and more employers are leaning towards college educated construction safety professionals.[6] It is critical that contractors set a goal to recruit and retain the best and brightest of these entry-level safety professionals. One of the best ways to achieve this goal is to start an internship or cooperative education program with universities that houses occupational safety and health management programs.

Safety internship programs are very common in the general industry but are gaining popularity in the construction industry. The internship program will expose college students through a 3-month summer employment, to all aspects of the construction industry and provide valuable job experience to complement their academic curriculum. As an intern, they will be typically paired with a Project Safety Manager and be involved in the overall implementation and enforcement of the site safety program. It gives the companies an opportunity to test a potential full-time employee and also train the future safety professionals. See example internship description and responsibilities in Exhibit 6-3 that can be used by companies looking to start an internship program. Organizations can visit www.asse.org/academicdirectory for the OSH College and University Directory to find out the colleges and universities near them that offer a safety degree.

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6 *National Assessment of the Occupational Safety and Health ...* (n.d.). Retrieved from http://www.cdc.gov/niosh/oshworkforce/_br

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6.7 ADDITIONAL RESOURCES, READINGS, AND REFERENCES

- **Hiring Guide:** The American Society of Safety Engineers (ASSE) recently published "The ASSE Guide to Hiring the Right Occupational Safety & Health Professional" available at http://www.asse.org/assets/1/7/Hiring_right_OSH_Professional.pdf. It provides guidelines to employers and companies looking to build their safety team. The guide provides essential hiring tips for various safety positions at different levels of expertise. This breakdown helps users focus on important aspects of a potential candidate's skill sets and goals.

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Exhibit 6-1: Example Project Safety Staffing Policy

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Policy Statement

Full time, project safety staff is required on all projects with a contract value in excess of $25 million dollars. It is recommended that the safety staff be assigned prior to the beginning of work, as with other site staff. Additional safety staff may be required when project size is greater than 75 million dollars or risk management plan dictates a need.

Roles and Responsibilities

This safety staff person should perform the following functions prior to and during the life of the project:

- Assist the Business Unit Safety Director (BUSD) in creating the site-specific safety program
- Setup and implement substance abuse testing
- Create and implement a project safety orientation
- Create and implement a project incentive program
- Attend pre-bid meetings to inform subcontractors of specific project safety requirements
- Establish safety pre-planning meetings with all subcontractors and assist the Project Staff in placing meeting times in the project schedule
- Meet with and coordinate response from local EMS officials
- Conduct project safety audits using the Predictive Solutions SafetyNet Reporting System
- Conduct toolbox safety meetings for Turner employees
- Establish and maintain site record keeping files
- Establish and encourage Project Staff safety auditing requirements
- Ensure that all precautions / requirements found in the environmental site assessment are complied with
- Other safety requirements as deemed necessary by the BUSD and / or Project Staff

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Exhibit 6-2: Example Project Site Safety Manager Job Description

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Position Description: The Project Safety and Loss Control Coordinator shall report to the Business Unit Safety and Loss Control Manager. He/she will provide support to the General Manager, Operations Manager, and the Business Unit Staff in an effort to enforce corporate safety and health policies and procedures. In addition to their Business Unit responsibilities, they shall participate in and complete all tasks designated to them by the Business Unit Safety and Loss Control Manager.

Essential Duties and Responsibilities:

- Assist in the development of the project safety program.
- Establish and conduct jobsite orientation for every new employee for the project and administer and record their participation in the orientation program and issue identification to those employees completing the orientation program.
- Attend all initial meetings with the Project Staff and Subcontractor representatives to clearly define their role within the confines of the Project Safety Program.
- Conduct and document pre-planning safety meetings with each subcontractor safety representatives and/or foremen to establish safety procedures prior to subcontractor's activity on the site.
- Establish and conduct regular (weekly) safety meetings with subcontractor representatives and issue minutes of meeting and interface with Project Staff and each Subcontractor Safety Representatives relating to safety regulations to ensure proper compliance.
- Ensure that Subcontractors are conducting the proper training requirements as per the DOSH, standards. If necessary, facilitate training for site personnel for compliance with Federal and State standards.
- Ensure and maintain a log of each subcontractor's toolbox safety meetings held with their employees.
- Review each Subcontractors Safety Program and ensure that it meets or exceeds the Project Safety Program requirements.
- Ensure that each Subcontractor designates a Safety Representative that is properly trained in the DOSH, standards and that person is considered by DOSH, standards, competent for the Subcontractors scope of work and has the proper authority to correct safety issues and hazards relating to their safety compliance. Receive the names of their competent person(s) for their specific work in writing and file
- Conduct regular (daily) jobsite and work area inspections. Conduct formal weekly jobsite inspections and complete the safety checklist noting safety violations and corrective actions.
- Record, notify and prepare written report of any violations or unsafe practices to Subcontractors for immediate correction actions.
- Stop at once any violation or unsafe practice.
- Assist Project Superintendent in establishing and implementing proper fire prevention, evacuation and fire control procedures.

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- Investigate all incidents and generate proper reports.
- Establish and maintain all required job safety records.
- Conduct a monthly overview safety meeting.
- Assist the Claims Coordinator in the management of claims.
- Attend Project Staff Meetings to brief the staff on safety issues on the project and coming from the company and to keep informed of the progress of the job.

Qualifications: A four year degree in Safety and Health or equivalent is preferred with at least two (2) years of safety experience or combination of education/multiple years' experience in building construction, with a working knowledge of safety/environmental principles and techniques. Capable of identifying known/potential exposures and recommending corrective actions. Computer skills and familiarity with Microsoft Office suite programs. Strong management, leadership and interpersonal skills with the ability to communicate well both verbally and in writing.

Physical Demands and Work Environment: Performance of the required duties will require physical ability to climb permanent and temporary stairs, passenger use of construction personnel hoists, ability to climb ladders and negotiate work areas under construction. Specific vision abilities required by this job include close vision, peripheral vision, depth perception, and the ability to adjust focus. Performing this job requires the use of hands to finger, handle, or feel objects, tools or controls, sit, talk and hear, stand, climb, balance, stoop, kneel, crouch or crawl. The employee must occasionally lift and/or move up to 75 pounds. While performing the duties of this job, the employee will work on-site at the construction work site where the employee is exposed to moving mechanical parts; high precarious places; fumes or airborne particles; outside weather conditions and risk of electrical shock. The noise in these work environments is usually moderate to very loud. TURNER IS AN EQUAL OPPORTUNITY EMPLOYER.

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Exhibit 6-3: Example Construction Safety Intern Job Description

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Position Description: The purpose of the internship is to provide the student with supervised practice at the work site and in the continuing daily work of the safety professional. Interns will assist the Project Safety Manager, Superintendent, PM, PX, and BUSD in adhering to company safety and loss control policies. Works on construction projects or in the office to assist in the day-to-day activities associated with safety and loss control. The safety intern shall be supervised by a manager of safety.

Essential Duties and Responsibilities:

- Assists Project Safety Manager, BUSD, PX, PM, and Superintendent in administering and adhering to company safety, health, and environmental policies such as:
- Assist in implementation of the project safety program under the direction of the Project Safety Manager or Superintendent
- Stopping at once and reporting immediately to the Project Superintendent and Business Unit Director of Safety any violation or unsafe practice where there is an imminent danger to life or property.
- Safety coordination duties in such areas as safety committees, preplanning meetings, and tool box meetings.
- Participate in training at safety meetings, tool box meetings, and orientations.
- Assist in a review of subcontractor safety programs for completeness and compliance with Turner's policies.
- Assist in promoting safe work practices and safe working conditions in accordance with all State, Federal, Local regulations, and owner/contractual requirements.
- Participate in administration of a drug screening program (pre-employment, post-accident random and cause) that is consistent with Turner's or Owner's requirements.
- Assist Project Safety Manager and Superintendent in preconstruction meetings and conducting research as needed. Document those meetings under the direction of supervision.
- Assist in conducting jobsite and work area inspections with the Project Safety Manager or Superintendent. Review with the superintendent for distribution to subcontractors and Business Unit Safety Director.
- Assist in maintaining safety records, including training records, tool box meetings, maintenance of the OSHA 300 log, maintenance of the MSDS and chemical inventory sheets, incident investigations, and metrics.
- Assist in conducting an effective worker orientation program for every new employee and administer and record their participation.
- Gather pre-task planning and JHA programs for all project contractors based on contractual requirements and log accordingly.

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Qualifications: Working toward a four-year degree in Safety and Health or equivalent is preferred with at least two (2) years of education, and a basic knowledge of safety/environmental principles and techniques. Capable of identifying known potential exposures and recommending corrective actions. Computer skills and familiarity with Microsoft Office suite programs. Strong management, leadership and interpersonal skills with the ability to communicate well both verbally and in writing.

Physical Demands and Work Environment: Performance of the required duties will require physical ability to climb permanent and temporary stairs, passenger use of construction personnel hoists, ability to climb ladders and negotiate work areas under construction. Specific vision abilities required by this job include close vision, peripheral vision, depth perception, and the ability to adjust focus. Performing this job requires use of hands to finger, handle, or feel objects, tools or controls, sit, talk and hear, stand, climb, balance, stoop, kneel, crouch, or crawl. Intern must occasionally lift and/or move up to 75 pounds. While performing the duties of this job, the intern can work in an office or on-site at the construction work site where the intern is exposed to moving mechanical parts; high precarious places; fumes or airborne particles; outside weather conditions and risk of electrical shock. The noise in these work environments is usually moderate to very loud.

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7
DESIGNING FOR CONSTRUCTION WORKER SAFETY

7.1 PURPOSE

According to the hazard control hierarchy, the best strategy for achieving an injury and illness free construction work environment is by designing out hazards during the early stages of the project design. Construction site hazards can be designed out by implementing an innovative process called Prevention through Design (PtD), also known as designing for construction safety (DfCS). DfCS is the consideration of construction site safety in the design of a construction project. DfCS includes modifications to the permanent features of the construction project and to the preparation of plans and specifications for construction in such a way that construction site safety is considered.[1] DfCS presents multiple challenges for it to be successfully implemented in practice. The DfCS process requires collaboration and frequent interaction between the owner, designer, and the contractors. Hence, DfCS can be "effectively" implemented on projects delivered through design-build contracts and when there is an opportunity for upstream contractor involvement. This chapter offers guidance to project teams interested in the planning, development, and implementation of a DfCS process. The guidelines should be used as a roadmap that contractors can use as a reference by using all or parts of it to fit their needs.

7.2 DFCS PROGRAM – IMPLEMENTATION GUIDELINES

7.2.1 Gain support from the project owner

The greater the support that DfCS has from the owner, the greater its chance of success when implemented on a project. However, the DfCS process is new and requires additional funds to implement it. Currently, there is no scientific evidence showing its positive return on investment. Then why should the owner spend the money on DfCS? A good DfCS process will not only eliminate or minimize risks associated with construction but also the final facility. The buy-in from the owner can also be obtained by communicating to the owner the benefits of DfCS due to the reduced safety risks throughout the project lifecycle. Benefits can include lower claims, reduced workers compensation premiums, reduced costs,[2] fewer delays, enhanced designer-constructor collaboration, better employee morale, and increased productivity.

1 Hinze, J. and Gambatese, J. (1996). *"Addressing Construction Worker Safety in the Project Design."* Construction Industry Institute, Austin, Texas, Research Report 101-11.

2 Occupational Safety and Health Administration (OSHA). Injury and Illness Prevention Programs – White Paper. www.osha.gov/dsg/InjuryIllnessPreventionProgramsWhitePaper.html (Accessed December 15, 2014)

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7.2.2 Develop a formal DfCS process

Similar to other elements that are part of the project safety program, a formal written DfCS program supported by the project owner will yield greater benefits. The DfCS should be distinguishable from other construction management activities and should be an essential ingredient of the project safety program. Also, the process should commence in project planning and design, and include input from those knowledgeable about construction activities and safety hazards. The program can be simple: lists of regular and predictable hazards that should be reviewed with designers and building owners.

7.2.3 Identify the goals of the DfCS process

The owner should define and communicate the DfCS process goals with the project stakeholders during the request for proposal (RFP) process with both designers and contractors. For example, one goal could be to *"eliminate construction, maintenance, and operations related accidents and incidents attributable to the design of the project."* The goals should be specific and measurable.

7.2.4 Select Designers in part based on experience, knowledge, and willingness to incorporate worker safety and health in the project design

One of the biggest barriers to the DfCS process is the reluctance of designers to change designs to accommodate worker safety. Their hesitance can be attributed to liability concerns, lack of experience, or even the perception that construction worker safety is the constructor's responsibility. A committed owner should include DfCS requirements in the owner's request for proposal (RFP) for design services.[3] Designer selection should include: checking past records on designer experience, knowledge of safety and health in design concepts, and personal interviews/knowledge.

7.2.5 Include DfCS requirements in the contract with the designer and the Construction Manager /General Contractor (CM/GC)

Depending on the complexity of the design, it may be difficult to predict the amount of time required to perform a comprehensive DfCS review. Hence, owners may consider signing a Cost-Plus with a guaranteed maximum price (GMP) contract rather than a traditional fixed fee contract, [4] with both the designer and the CM/GC (and tiers). This will allow for more effective participation in the DfCS process from the designers and contractors.

7.2.6 Designate a DfCS coordinator to oversee the DfCS process

Once both the A/E and the CM/GC team are onboard and under contract, establish a team to oversee the DfCS process. Prior to the start of design efforts, the owner should designate a DfCS coordinator, who will oversee the DfCS process. It is typical that the project designer will be the DfCS coordinator who is responsible for the DfCS process for interface with other project players.

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3 Design for Safety. PtD Program Guidelines. http://www.designforconstructionsafety.org/Documents/PtD%20Guidelines.docx (Accessed December 15, 2014)

4 Design for Safety. PtD Program Guidelines. http://www.designforconstructionsafety.org/Documents/PtD%20Guidelines.docx (Accessed December 15, 2014)

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7.2.7 Define Roles and Responsibilities of project stakeholders

In order for the DfCS process to be effective, the roles and responsibilities of all project players should be clearly defined and executed at the start of the design process. A few examples of responsibilities of the key players are:

- *Designer (A/E)* – Provide technical expertise (codes) with design alternates that focus on risk elimination.
- Owner Representatives – Provide design input that will eliminate or minimize safety risks associated with construction, operation, accessibility, and maintenance issues.
- Construction Manager/General Contractor (CM/GC) – Provide design input to improve the constructability of the design, and any design suggestions that will eliminate or minimize safety risks during construction.
- Subcontractors – Provide design input to improve the constructability of the design, and any design suggestions that will eliminate or minimize safety risks during construction that impact their scope of work.

7.2.8 Develop a DfCS Review process

A systematic DfCS process should be developed and administrated. Here are some questions that will help the project team to develop an effective DfCS review process.

- *When will the project team perform the DfCS review?* The owner should establish a DfCS process timeline defined in terms of the stages of design. Typically on commercial and industrial construction projects in the United States, design reviews by the owner occur during four stages: Concept, 30 percent, 60 percent, and 90 percent.[5] These design review stages can be used as milestones to provide DfCS comments. Deliverables from each review should be clearly defined.
- How are the risks and associated controls (design suggestions) obtained from the DfCS reviews tracked for closure?
- How will the owner decide on which design change to implement? Does the owner require a formal risk impact assessment to prioritize all risks identified during the DfCS process to establish a most to least critical importance ranking?
- Should the ranking and prioritization include the costs associated with the risk control options (elimination versus minimization)? For example, elimination of a confined space versus minimization of the associated risk by providing pre-installed rescue and ventilation system.
- What is the timeline for the owner to make a decision on suggested design changes?
- How will the lessons learned from this project be transferred to future owner projects? Who will create and maintain the lessons learned database?

7.2.9 Develop and deliver DfCS process training to all DfCS participants

The training should enhance DfCS participant knowledge of the DfCS concept, construction safety requirements, and the construction processes. The training should ensure the team understands the significance of DfCS in creating an injury-free work environment, the goals of DfCS, DfCS team's roles and responsibilities, DfCS process, and deliverables.

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5 American Society of Safety Engineers (ASSE). Construction Safety Management and Engineering. Second Edition. Editor: Darryl Hill, CSP.

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7.2.10 Provide DfCS tools and resources for designers, contractors, and owner representatives to identify safety hazards

Create a DfCS review log to be used by the review team to document inputs from the design review process. Create a DfCS review checklist that includes common items to look at during the DfCS review from experience (see sample checklist in Exhibit 7-1). The checklist should not be intended to be prescriptive, but rather a memory aid to ensure that all the participants consider the key safety areas during the design process. It is not an exhaustive list that covers all potential safety items that will need consideration during the project. The checklist should include key areas for scrutiny by the reviewers including:

- Accessibility
- Confined space
- Ergonomics
- Fall Protection/Prevention
- Maintenance
- Operation
- Physical hazards
- Emergency Planning and Preparedness

The readers are recommended to use this checklist and other tools provided in the resources section as a starting point and add to the list as new items are discovered during the DfCS review process. Also, provide technological resources, such as Building Information Modeling (BIM), to aid in the design review process. BIM provides a visual representation of building features for the reviewers and makes the review process easier. However, the cost associated with BIM (both software and hardware) should be considered before using BIM. Figures 7-1 through 7-4 shows the use of BIM during design review and eliminating clash. See Chapter 8 for more information about using BIM for DfCS.

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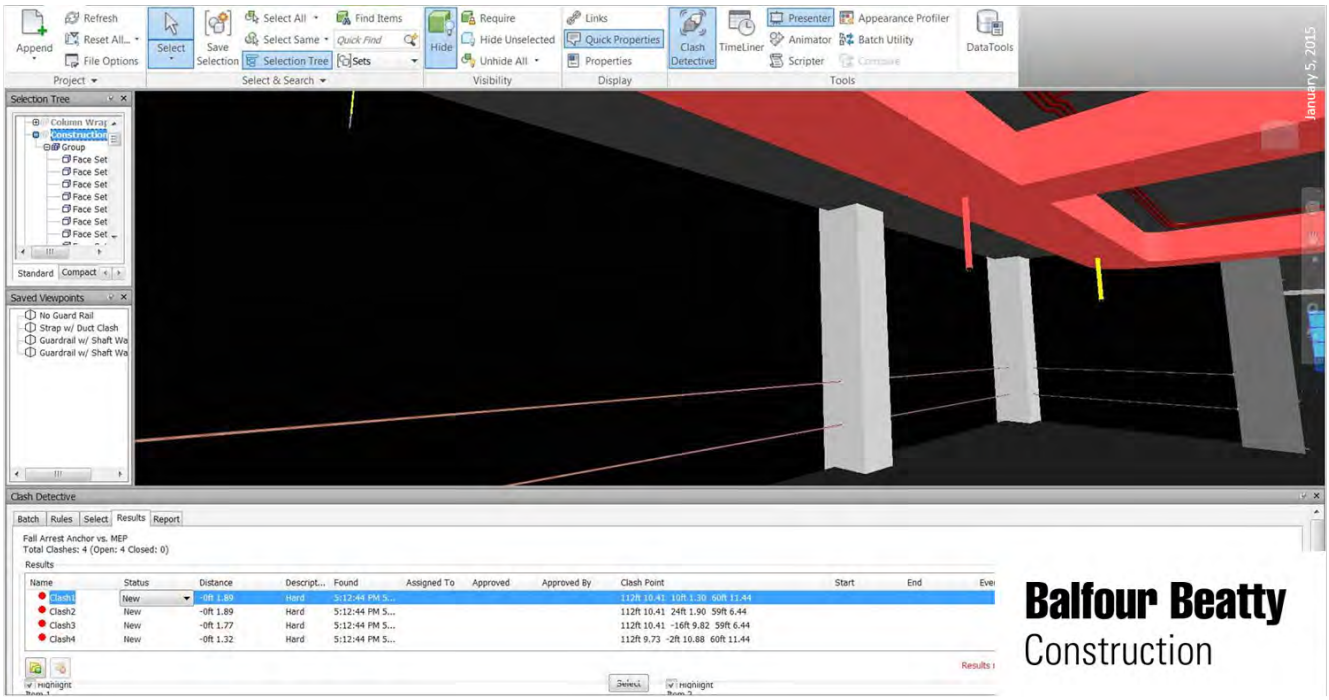

Figure 7-1: Embedded fall protection anchor traps clash with HVAC systems detected using BIM (Picture Courtesy Balfour Beatty Construction)

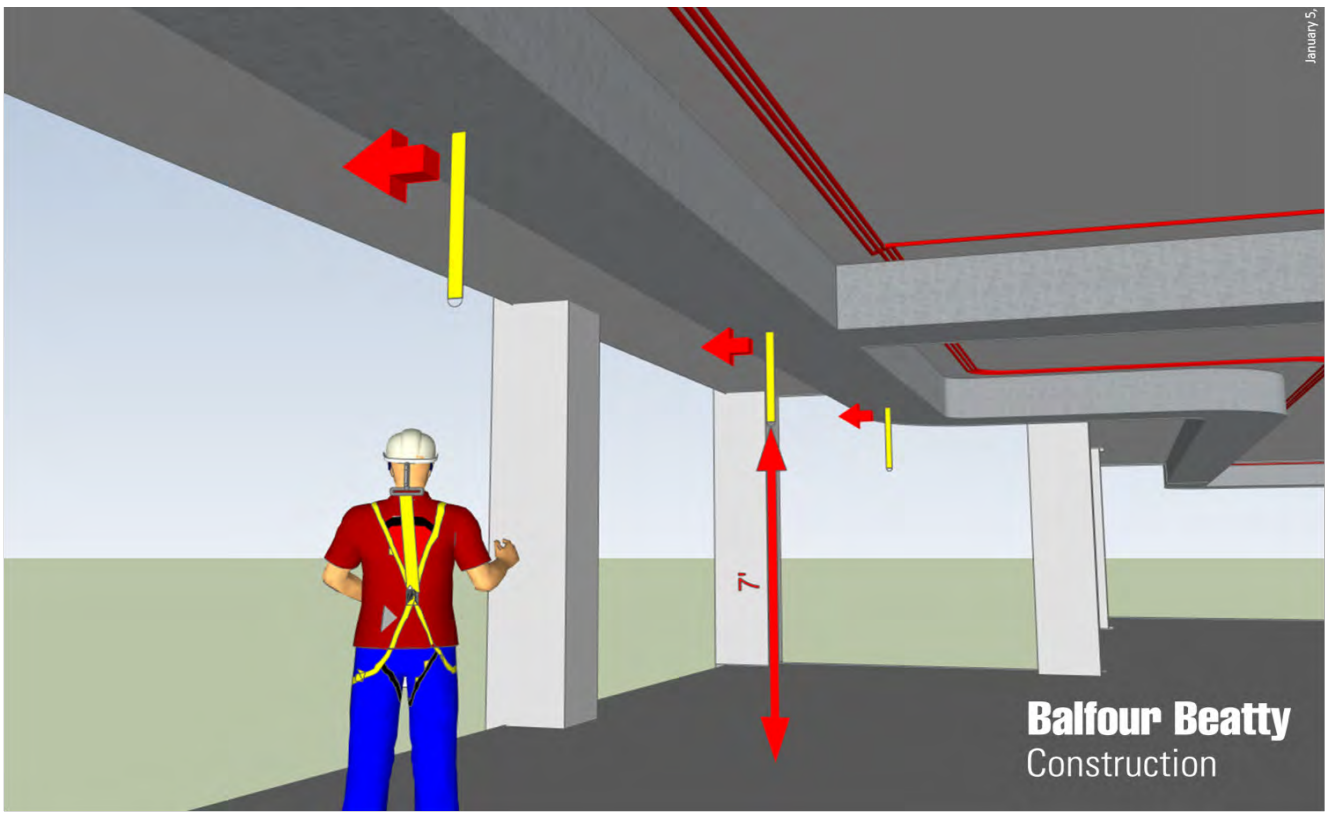

Figure 7-2: Embedded fall protection anchor traps clash elimination with HVAC systems using BIM (Picture Courtesy Balfour Beatty Construction)

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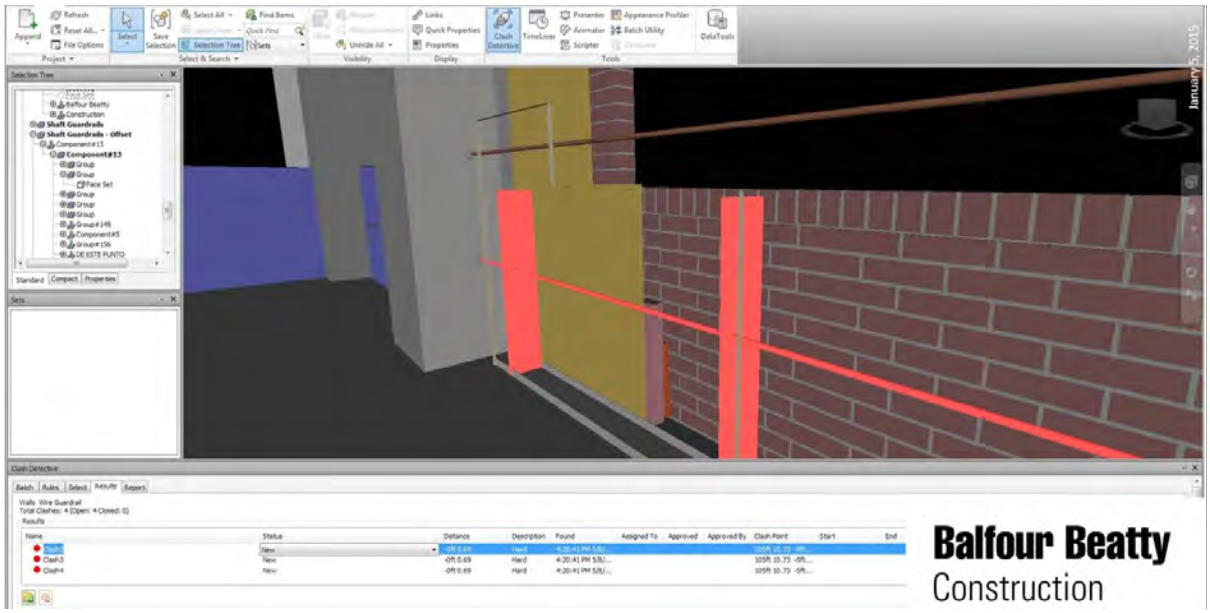

Figure 7-3: Perimeter cable guardrail clash with exterior wall skin detected using BIM (Picture Courtesy Balfour Beatty Construction)

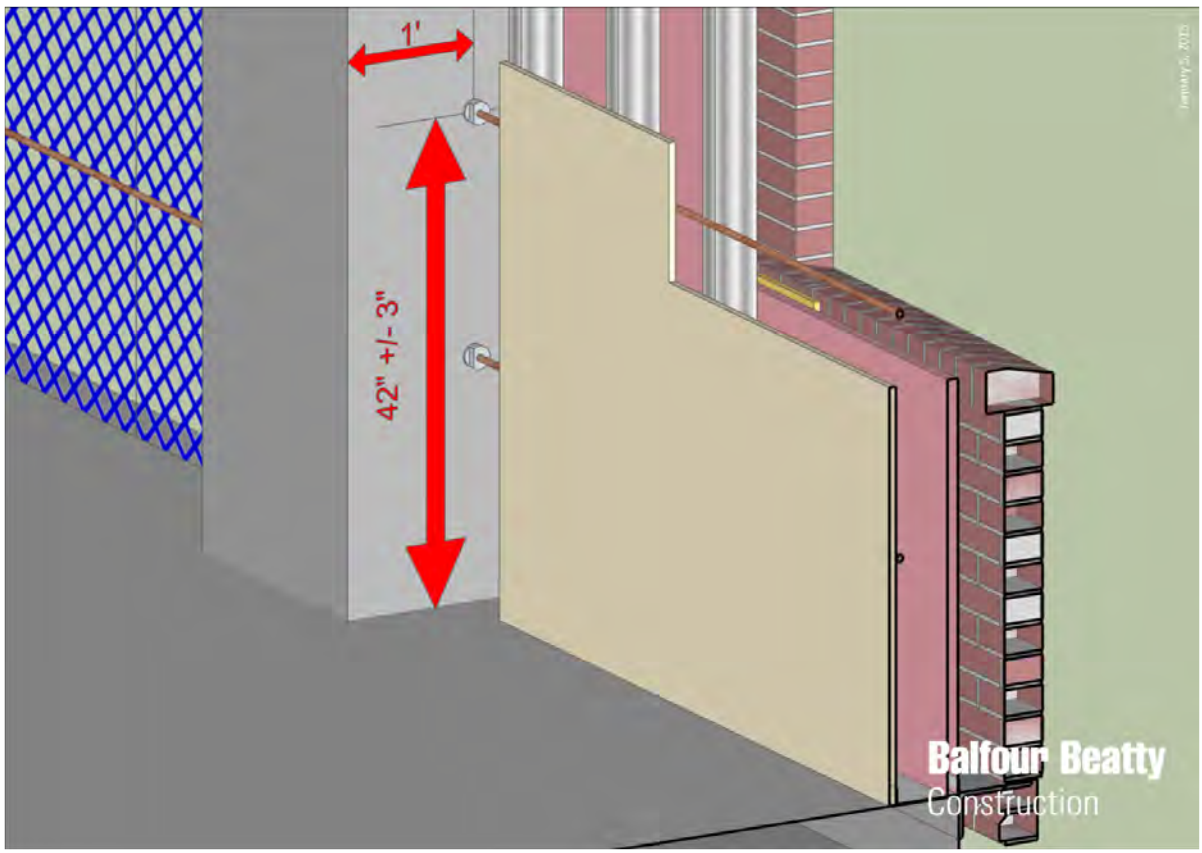

Figure 7-4: Perimeter cable guardrail clash with exterior wall skin removed using BIM (Picture Courtesy Balfour Beatty Construction)

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Additional DfCS Resources, Readings, and References

- **Construction Industry Institute (CII)** – www.construction-institute.org
  - RR101-11 – Addressing Construction Worker Safety in the Project Design by Dr. Jimmie Hinze and Dr. John Gambatese provides a list of 400 design suggestions that reflect all types of design disciplines, job site hazards, and construction components and systems.
- **Design for Construction Safety** - www.designforconstructionsafety.org
  - This website is number one resource for DfCS resources. It has numerous helpful DfCS tools including checklist, training programs, and guidelines.
- **National Institute of Occupational Safety and Health's (NIOSH)** Prevention Through Design Webpage – www.cdc.gov/niosh/topics/ptd
- **American National Standards Institute (ANSI)/American Society of Safety Engineers (ASSE)** Z590.3-2011, Prevention Through Design (PtD): Guidelines for Addressing Occupational Risks in Design and Redesign
- **Design Best Practices** - http://www.dbp.org.uk/welcome.htm

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Exhibit 7-1: Example Design for Construction Worker Safety (DfCS) Checklist

Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdictions. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Accessibility	Will there be adequate headroom for accessing racks, filters, viewports, sight glasses?
Accessibility	Will there be adequate access to elevated areas when construction is complete?
Accessibility	Will routing zones discipline be enforced?
Accessibility	Will there be adequate access to depressed areas such below raised floors (RMF), chemical trenches area when construction is complete?
Accessibility	Will there be adequate access to the tops of tanks and equipment when construction is complete?
Accessibility	Will there be adequate access to cable trays when construction is complete?
Accessibility	Will there be adequate access to valves when construction is complete?
Accessibility	Will there be adequate access to dampers when construction is complete?
Accessibility	Will there be adequate access to electrical controls, switches and relays when construction is complete?
Accessibility	Where access is needed for elevated areas utilize the fall protection hierarchy of controls i.e. in order; eliminate elevated work, provide a platform and guardrail, provide tie-off points last, etc.
Confined Space	Are tanks designed to minimize the need for access during construction or maintenance?
Confined Space	Have at least two tank access ports been provided to aid in egress/ventilation?
Confined Space	Will anchorage points for retrieval be located next to each confined space access point when construction is complete?
Confined Space	Have the gasses being used in the Confined Space been considered as a Suffocation Hazard? If yes, note in further action how this is to be mitigated.
Emergency	Are emergency relief devices (breather vents, relief valves, rupture disks, liquid seals) vented outside the building or to a safe discharge location?
Emergency	What is the most severe credible incident i.e. the worst conceivable combination of reasonable malfunctions, which can occur? Does design address mitigation of this type of incident?
Emergency	What needs are there for emergency relief devices (breather vents, relief valves, rupture disks, liquid seals)? Are they documented in the design?
Emergency	Have you indicated the location of known shut-off valves and switches for existing utilities? Are contact names and phone numbers for local utilities indicated on the drawings? Are these devices readily accessible?

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Emergency	Do drawings show pipe flow direction so the first valve upstream or downstream of an emergency can be located?
Emergency	Does design address provisions for rapid disposal of reactants if required by plant emergency?
Emergency	Does the design indicate necessary fire emergency equipment and allow for adequate execution of fire emergency procedures?
Emergency	Does the design provide provisions for operation or safe shutdown during power failures?
Emergency	Does the design address proper containment and disposal of gas and liquid paths if leakage occurs and primary containment fails?
Emergency	Have adequate Emergency Off (EMO's) been provided and are they in the correct location?
Emergency	Have adequate EW/SSH's been provided and are they in the correct location?
Ergonomics	Does the design eliminate the need for heavy manual material handling?
Ergonomics	Did the design consider the height (from working surface) of all valves and controls that require viewing or operation?
Ergonomics	Is the elevation of valves and sight glasses at an ergonomic level (between 36" and 44" above walking surface)?
Ergonomics	Will there be adequate lighting for maintenance activities provided after construction is completed?
Fall	Are the hierarchy of controls considered for fall protection i.e. in order; eliminate elevated work, provide a platform and guardrail, provide tie-off points last, etc.
Fall	Will rooftop equipment have a 42" parapet at every elevation change?
Fall	Has the worker tied off points been included in the design?
Fall	Stairs vs. ladders: consider access frequency and what a person will be carrying. Does the design provide safe stair and ladder design for intended purpose?
Fall	Do the systems select minimize significant labor in an elevated position (e.g., masonry walls vs. tilt-up concrete)
Fall	Does the design allow for maximizing work on the ground?
Fall	Building offsets of varying size and shape create a falling hazard for construction workers. Does the design minimize offsets where possible, and are necessary offsets safely constructible?
Fall	Do exterior stairs and ramps run parallel to and immediately adjacent to the structure?
Fall	Consider how openings through floors will be protected during construction. Does design group openings together where possible? Does the design locate openings away from the edge of the structure where possible?
Fall	Is rooftop equipment located away from the edge of the structure?

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Fall	When designing openings remember 42" requirement. A window located 42" above the floor provides a built-in guard rail. A parapet 42" tall does the same. Is this accommodated in the design?
Fall	Are adequate craft anchor points for fall protection during construction provided in the design?
Fall	Are adequate sustaining personnel tie offs for maintenance activities provided in the design?
Layout	Is there adequate space to permit the installation and maintenance of equipment?
Layout	Are there access and egress clearances for normal traffic and maintenance?
Layout	Are there access and egress clearances for firefighting?
Layout	Can people and equipment be moved through the building safely during construction and sustaining operations?
Layout	When doing underground work, consider the potential for existing utilities and impact that will have on the construction technique. Has the design addressed this?
Layout	Have you considered construction safety when laying out the project? An obvious example is the location of power lines. What about high-pressure piping lines and combustible gasses? A vehicle vs. Pedestrian traffic flow?
Layout	Are spacing and clearances furnished for normal traffic maintenance and firefighting?
Layout	When placing underground lines, consider the work that follows behind and potential future work in the area. Has the design addressed this?
Maintenance	Can you access instruments for calibration?
Maintenance	Can valves be accessed readily for the operation?
Maintenance	Are pumps and controllers readily accessible for maintenance?
Maintenance	Will the area have adequate lighting to support maintenance operations?
Maintenance	Are special devices required to maintain this equipment?
Maintenance	Does the design package include allowances or clearances for maintenance?
Maintenance	Is signage required for maintenance clearances?
Operation	Are systems routed between buildings analyzed for differential movement in an earthquake?
Operation	Does one set of switches control the lighting and ventilation in a mechanical room, solvent room or confined space?
Operation	If instruments fail simultaneously, is a collective operation still fail-safe? Conduct "what if" analysis.
Operation	Are piping systems analyzed for stresses and movements due to thermal expansion?
Operation	Design ventilating and light fixtures in a mechanical room, or confined space to be operated by the same switch.
Operation	Is there a safe way to load liquids into and to withdraw them from tanks?

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Operation	Does the design locate electric panels within sight of the equipment that they affect?
Operation	Does design designate protective insulation for “hot surfaces”?
Operation	Does the design provide non-conductive flooring at electrical boxes?
Physical Hazards	Have trip hazards been mitigated?
Physical Hazards	Have head knockers been mitigated?
Physical Hazards	Does design address Noise?
Sequence	Does the design consider how design may affect work staging and safety?
Sequence	Have you considered how design releases can impact construction scheduling and safety? For example - if sidewalks are issued early, they can be constructed and provide a more stable base for perimeter wall scaffolding.
Sequence	Can existing systems (corridors, stairs, handrails) be staged for early construction completion?
Sequence	Has the design considered how design can affect construction sequencing to allow energizing electrical panels at the latest possible time without impacting construction schedule?
Sequence	Are fire prevention devices (firewater systems, etc.) designed early so they can be installed for construction safety?
Other	Has the design accommodated for the effects of extremes of atmospheric humidity and temperature? Corrosion?
Other	Have flammable or combustible materials of construction been eliminated or minimized?
Other	Has the use of primers, sealers, coatings, etc. containing hazardous materials been eliminated or minimized?
Other	Are materials of construction compatible with the process chemicals involved?
Other	Does the design consider specification limits on “lift” heights? For example, tall structures can easily collapse during erection if not adequately supported.
Other	Does the design specify testing procedures for complicated designs?
Other	What items need to be added? Please Explain on Back

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8
USE OF MODERN TECHNOLOGY IN CONSTRUCTION SAFETY MANAGEMENT

8.1 PURPOSE

Modern technology is absolutely changing the way construction safety is managed on construction sites. Currently, several construction companies are using modern technology such as 3-dimension (3-D) modeling, computer software, and mobile technologies including smartphone and IPad Applications (Apps), to affect worker safety positively. This chapter will provide information to construction firms to identify "technologies" and "safety management apps" that can be used to improve construction worker safety.

Note: The authors has no financial interest in the products listed in this section. The inclusion is based on the author's experience and their research on industry best practices.

8.2 BUILDING INFORMATION MODELING (BIM)[1]

The term "BIM" is used to refer to two different things: the process of building information modeling and the resultant model (the building information model). BIM is the development and use of a computer software model to simulate the construction and operation of the facility. The resulting model, a Building Information Model, is a data-rich, object-oriented, intelligent and parametric digital representation of the facility, from which views and data appropriate to various users' needs can be extracted and analyzed to generate information that can be used to make decisions and improve the process of delivering the facility.[2] Simply put, imagine walking into a building, walking through the lobby, removing the ceiling tiles and looking at the utilities in the ceiling space—before the building is even built. BIM can help construction professionals do that.

Currently, several construction companies are using BIM as part of their project development process. Only recently, the construction industry has started to look at BIM as a tool to improve worker safety. Given the newness of BIM to the industry, each project or company should designate a construction safety professional (or project engineer) as a champion to help to facilitate the use of BIM for safety. As BIM becomes more commonplace, construction safety professionals should continuously examine how it can improve worker safety on each project. Safety professionals need not be experts in the model creation or its technical aspects; they simply need a basic understanding of BIM, which is essentially a 3-D computer-aided design drawing. *What are the benefits and uses of BIM with respect to the construction worker safety?* Consider these areas in which BIM can positively affect the safety.

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1 Rajendran, S. and Clarke, B. (2011). "Building Information Modeling - Construction Safety Benefits and Opportunities." Professional Safety, Journal of the American Society of Safety Engineers (ASSE), 56(10), 44-51.

2 The associated General Contractors of America (AGC) 2010. The Contractors Guide to BIM. Retrieved Oct 19, 2010, from http://www.agcnebuilders.com/documents/BIMGuide.pdf

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8.2.1 Capture Pre-existing Site Conditions

Typically, a preliminary pre-construction property third-party survey is highly recommended to document existing conditions of adjacent structures and surrounding areas prior to commencement of construction. The survey is performed mostly to protect against third party liability exposures. Three-dimensional laser scanning can be used to capture the baseline existing model. BIM with information obtained using 3D laser scanning can capture pre-existing conditions accurately that can be built into the model.

8.2.2 Constructability Reviews

BIM can be used to conduct constructability reviews due to its ability to visualize what is being constructed in a simulated environment. It helps identify potential errors and omissions and reduces change orders, which improves the quality and can prevent rework. Less rework means better safety performance and higher efficiency.

8.2.3 BIM Enabled Prefabrication

A fully coordinated BIM model can isolate, analyze, and construct any area of the building with a higher reliability. Hence, BIM enables more items to be prefabricated off-site (e.g., pipe assembly), transported to the site, and installed rapidly. Prefabrication minimizes field work and on-site labor and construction, which reduces worker exposure to unsafe conditions (e.g., working at heights, working in inclement weather, etc.). Less exposure means better safety performance. For example, in one project several heating/cooling pipes were assembled off-site in a controlled environment, trucked to the site, and installed quickly and safely. It helped alleviate issues with access, fall protection, and ergonomic concerns.

8.2.4 Designing for Construction Worker Safety (DfCS)

DfCS requires one to consider construction site safety during project design. BIM provides an excellent visualization of the project design; hence construction safety professionals can use BIM to identify where DfCS suggestions can be incorporated. For example, in one project, fall protection anchor points were determined using BIM. BIM review revealed many areas where workers would be exposed to fall hazards, but no anchor points were present. The project team identified several hundred locations where concrete embedded straps could be installed for anchors. BIM helped identify potential conflicts with overhead or under-slab utilities. Chapter 7 of this handbook has a checklist that identifies, by discipline, some safety specifics that can be considered using a BIM.

8.2.5 Construction Site Logistics and Emergency Planning

BIM enables contractors to study existing and future site conditions and hazards before breaking ground, such as traffic considerations, site access, utility concerns, crane radius, and lay down areas. For example, BIM can be used to simulate crane operations in relation to the overhead power lines. It can enable communication with neighbors and subcontractors (see Figure 8-1). For example, in one project BIM was used to map on-site equipment flow. The project required extensive use of dump trucks to transport materials from the excavation pits. A gravel ramp was the best solution for the trucks to enter and exit the excavation area. Locating the ramp correctly, in relation to other construction activities, is critical to proper truck access and avoids congestion and trade stacking. BIM helped simulate the ramp to confirm that no conflicts existed with other construction activities.

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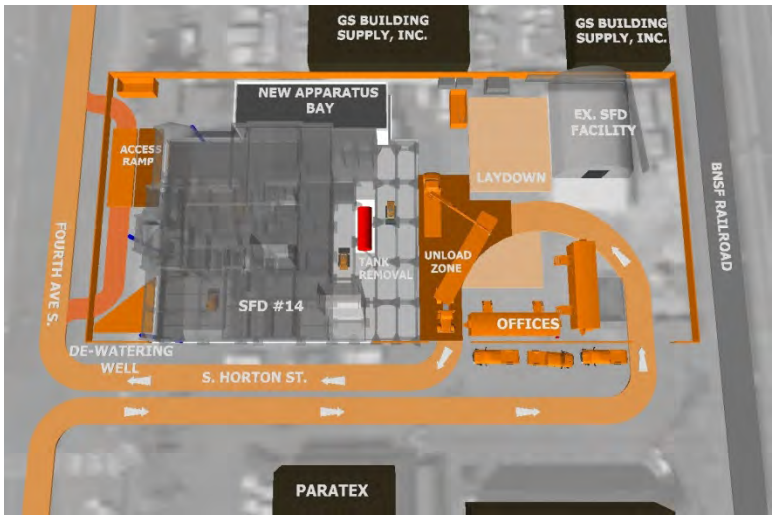

Figure 8-1: BIM-enabled Site Logistics and Emergency Planning (Photo courtesy of BNBuilders)

8.2.6 Safety Training and New Employee Orientation

Craftspeople new to the jobsite are at a higher risk of injuries until they understand the site's working environment. BIM can help them more fully and quickly understand the environment. Figure 8-2 shows the site layout derived from BIM identifying emergency access, safety bulletin board, site office, fire extinguishers location, etc.

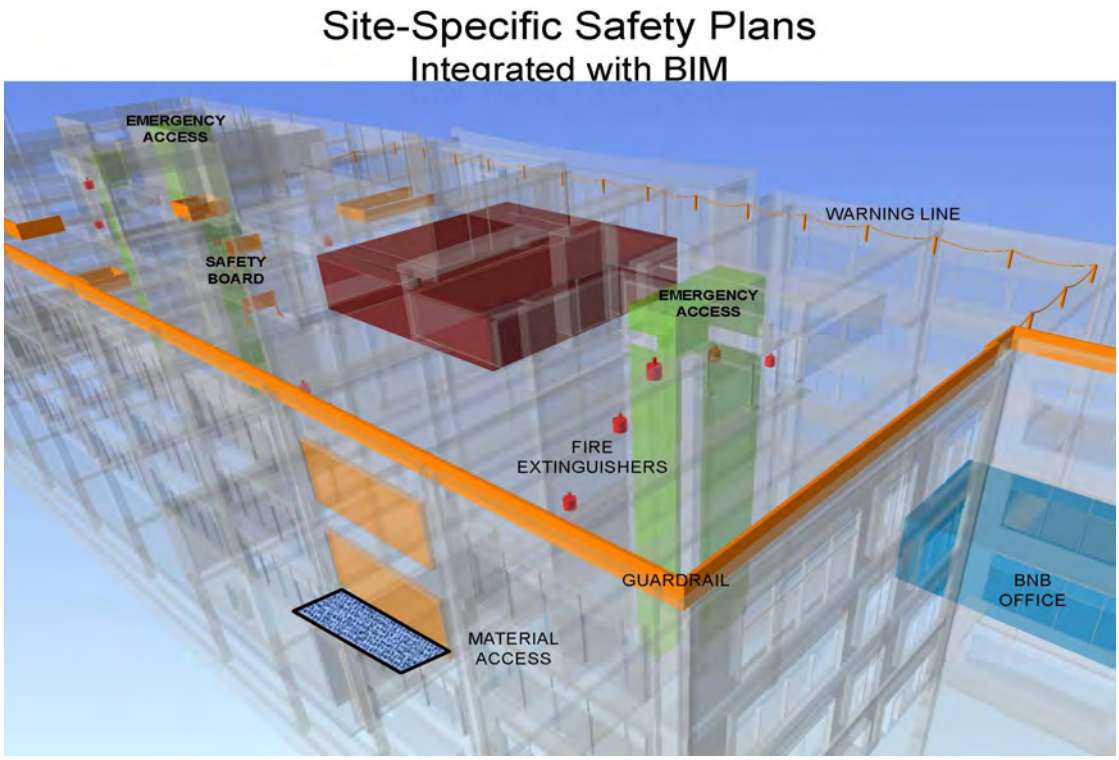

Figure 8-2: Site Safety Plan Integrated with BIM (Photo courtesy of BNBuilders)

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8.2.7 Site Specific Safety Plan (SSSP)

The SSSP can be integrated into the BIM model to identify and control a project's potential hazards. For example, risks posed by site utilities and their proximity to the overhead power line can be analyzed and controlled adequately prior to commencement of work. BIM would be perfect to develop emergency access and evacuation route plans.

8.2.8 Job Hazard Analysis (JHA) & Pre-task Planning (PTP)

Pre-task planning offers the most opportunities to use BIM for construction safety. By virtually looking at the elements to be built, employees can better identify the hazards and control measures so the task could be completed faster and more safely (see Figure 8-3). BIM can be used to evaluate construction sequencing of high-hazard tasks such as steel erection, construction hoists installation, and tower crane erection. The evaluation can eliminate a variety of conflicts with other work in that area before activities commence.

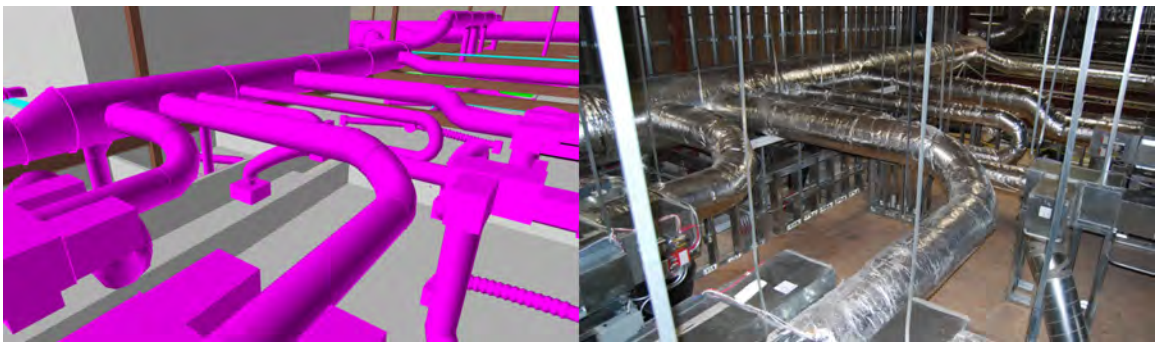

Figure 8-3: Pre-task Planning & BIM: Model vs. Actual As-Built (Photo courtesy of BNBuilders)

8.2.9 Utility Access

BIM allows better understanding of service access to above ceiling devices such as terminal units, fan coils, and electrical junction boxes. If these areas have limited access, they can pose a safety issue to start up, service and maintain.

8.2.10 Accident Investigation

BIM can be used during an accident or incident investigation to recreate event sequence and the incident scene. In one case, a worker was injured when he fell off a leading edge. The project had not used BIM, but during the incident investigation, laser scanning was used to identify existing conditions at the scene, such as location of pipes and HVAC ducts; location of stored equipment; materials storage; and worker position. With these data, an existing condition BIM was created, which captured the incident scene. This model eliminated hundreds of pictures and answered numerous questions related to the scene. It seems logical that BIM can be used during legal proceedings to save resources.

BIM has the potential to improve construction project safety performance. Safety professionals in the construction industry should view building information modeling (BIM) as a tool to improve worker safety and health. BIM can be used in worker safety training and education, design for safety, safety planning (job hazard analysis and pre-task planning), accident investigation, and facility and maintenance phase safety. SH&E professionals should encourage other construction disciplines

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to review safety issues while performing design or constructability reviews. BIM is a tool that can facilitate this process.

8.3 MOBILE APPLICATION SOFTWARE (APPS)

Most of the construction site's dedicated safety professionals and designated safety representatives (foreman, general foreman, and superintendents) typically spend more than eighty percent of their time in the field. Most of these professionals carry at least one or sometimes two portable electronic devices with them – a smartphone and a tablet computer with Mobile-based operating systems (OS). Most of these devices have a touch screen interface with pop-up keyboards, are equipped with a camera, microphone, audio recording features, and Wi-Fi capability. There are several operating systems for tablets with the most common ones include Apple iOS, Google's Android, and Microsoft Windows 8. These portable electronic devices have helped the safety professionals increase their work efficiency while in the field by serving as a:

- Communication tool – send and receive emails and texts
- Reference tool – quick reference to DOSH standards, emergency site plan, emergency contacts, SSSP, JHAs, PTPs, and other safety-related resources
- Hazard Identification and Evaluation tool – perform inspections, audits, record site conditions using pictures and videos, and perform job site exposure assessment

The use of mobile application software (Apps), computer programs that run on these portable devices have increased several folds over the last five years. These Apps are produced by various entities and are available for free or sale from commercial outlets such as Apple's App Store, Amazon's Appstore, Blackberry World, Windows Phone Store, and Google Play. Some common Apps readers must be familiar with including Facebook, YouTube, and Google Play. Mobile Apps can provide several benefits with respect to the construction worker safety. There are hundreds of safety-related Apps available in these App stores. Selected Apps that may be used by field safety professionals to help with construction site safety are discussed in this section.

8.3.1 Safety Support Functions Apps

These Apps are not technical in nature, but it will be very helpful to the construction field professionals to make their job more efficient. Please note some apps are available for iPhone, iPad, Blackberry, and Android; some apps might be limited to only one of these devices. Some apps are free while some apps can be purchased for a fee. Readers are encouraged to visit these app websites by clicking on the link provided to understand these limitations.

- *Camera Apps* – The Apps listed below will be useful to take job site progress pictures, picture evidence for accident investigations, safety inspections, audits, and documentation of pre-existing site conditions.

    - o *DMD Panorama by Dermandar* & *360 Panorama by Occipital* – Both these Apps allows a user to take panoramic photos (360°)
    - o *Night Camera by Sudobility* – Construction work takes place even during odd hours ranging from an early morning concrete pour to late night painting. Standard cameras

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on these devices might not prevent the night time blur. The *Night Camera* App will create clearer photos at night and under low light conditions.

- o *MagicPlan by Sensopia* – By taking a picture, this App will help measure rooms and draw floor plans, which can be useful to measure room dimensions to calculate ventilation requirements, identify correct ladder size, etc.

- *Records Management Apps*

  - o *CamCard by IntSig* – Depending on the project size and complexity, a construction safety professional will meet numerous personnel on the site, and exchange business cards. This App scans and reads business cards, and uploads the contact information into your phone contacts. Less time is spent on typing contact information and more time on field supervision.
  - o *CamScanner by IntSig* – Have you ever wanted to share safety resources on a paper document with others quickly? This App allows you to scan and share a document. Safety professionals can scan a document and readily share with subcontractors. It also provides edit and annotation features, which makes this a very handy App.
  - o *Microsoft Office for iOS by Microsoft Corporation* – This Apps allows viewing, editing, and content creation that includes MS Word, Excel, and PowerPoint.
  - o *Adobe Ideas by Adobe* – This app provides a way for users to write on pictures, which can be useful during accident investigation when marking evidence locations. This can also be used to share safety information regarding audit findings and safety spot checks. And can be used to create photo-based Toolbox Safety Talks.
  - o *UIG Safe Work Apps* – This APP has a completely paperless safety meeting minutes manager, has built in topics and built in systems for auto-generation/ email of meeting minutes to attendees, company designees, and outside sources.

- *Communication Apps* – These Apps assists with safety communication to non-English speaking workers.

  - o *Translate by Google* – This App allows you to translate words, sentences, even an entire document.
  - o *Vocre Translate* – Want to talk to non-English speaking worker regarding safety? This translation App is used to make multi-language conversations possible in real time. This App uses the same technology that powers Siri, the Apple's voice assistant.

8.3.2 Technical Safety Reference Apps

These Apps provide valuable technical safety reference for site supervision on the go.

- *EHS Pocket Guide by Dakota Software Corporation* – This App contains OSHA, EPA, and DOT regulations, which allows the user to search and view applicable documents.
- *NIOSH Pocket Guide by Dangerous Decisions LLC* – This App provides immediate access to the most current safety guidelines regarding hazardous chemicals.
- *ERG Pro by Creative Custom Applications* - A useful tool for hazardous material responders.

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- *MSDS Mobile by KHA, Online-MSDS* – This App allows users to search Safety Data Sheets (SDS) using the keyword, view them, and even send them as an attachment via email.
- *iOSHA 3151 Personal Protective Equipment (PPE) by 4CYTE, LLC* – This App contains OSHA PPE requirements.
- *National Fire Protection Association (NFPA) Apps* – NFPA publications including Codes and standards are available via these Apps.
- *Crane Operator Hand Signals by Special Carriers and Rigging Association* – A simple app that provides information on crane operator hand signals.
- *Sling Calculator by Crosby* – This app allows the user to compute load weight, sling tensions, and load's center of gravity. There is both a free version (limited calculators) and purchase with more options.
- *Pocket First Aid & CPR from the American Heart Association* – Provide simple first aid and CPR instructions.
- Electrical Pro by Multieducator Inc – Assists users with many calculations and information regarding electrical safety.
- *OSHA Safety by William Howard* - This OSHA Safety App includes the full text of the OSHA regulations for General Industry and Business. These OSHA 1910 Regulations cover most workplaces, including manufacturing, service industries, warehouses and distribution centers, and the medical / dental fields.
- *Recalls by Urban Apps* – Recalls™ is an application that keeps you updated on all the most recent product recalls. See product images, descriptions, company information and other important details to track and learn about the recalled products. In one place, you can track recalls from 5 U.S. Government Agencies.

8.3.3 Workplace Exposure Measurement Apps

These Apps allows users to evaluate workplace exposure.

- *Heat Safety Tool by OSHA* - The App allows workers and supervisors to calculate the heat index for their worksite, and, based on the heat index, displays a risk level to outdoor workers. The App also provides guidance on preventive measures.
- *NIOSH Lift Calculator by Humantech* – Makes the use of NIOSH lifting equation easier.
- *LuxMeter Pro by AM PowerSoftware* – This App allows the user to measure light intensity.
- *Decibel 10th by Skypaw Co. Ltd* – This App and many similar Apps lets users measure the sound level at the workplace. However, there is always a question of how accurate are these smart device sound measurement apps. Based on field testing, users should use this app to do a quick "temporary" analysis to determine noise levels, but should follow-up with "calibrated" sound level meter.

8.3.4 Safety Planning and Audit Apps

Helps users to conduct safety audits and inspections, with a feature to take pictures and add them to the report, and email a copy of the full audit report (see Figure 8-4).

- *iAuditor by SafetyCulture Pty Ltd*
- *Safety Audit Pro by Iain Munro*

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- *Inspect Safety, Quality, and Environment by Nimonik*
- *Job Safety Analysis (JSA) by BreakThrough Application Pty Ltd*
- *iSAFE- observation based audit tool- University of Washington*

Figure 8-4: Safety Audit Using Smartphone Apps on an iPad (Photo courtesy of Hensel Phelps Construction)

8.3.5 Custom-made Apps

There are many firms that can build custom apps for company-specific forms and checklists. Apps can be built for other functions such as tracking incidents and accidents, for safe worker observation, safety training, and education, and for many other safety functions. Construction professionals should keep abreast with these innovative technologies and make use of them to improve not only worker safety, but also work efficiency.

8.4 Safety while using mobile technology on site

While these mobile technologies present fantastic benefits, construction companies should be cautious about the negative impact these might have on worker safety through distractions while using these portable devices on site. Companies should develop and implement proper mobile technology use policy on job sites.

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8.5 Other Technology Use

8.5.1 Zonar Electronic Fleet Monitoring System

Contractors with a large equipment and vehicle fleet can consider using Zonar's Electronic Vehicle Inspection Report (EVIR®). Traditional vehicle inspections were conducted manually that were less efficient. This system involves placing a radio-frequency identification (RFID) tags on the vehicle in critical inspection zones, which can be read by Zonar's 2010 inspection tool, and the information is transmitted to a database that can be accessing using web-browser. Zonar enables contractors to monitor their fleet such as daily operator inspection, missed operator inspection, generate speed reports when the equipment exceed specified speeds, and issue alerts when an operator feels the equipment is unsafe. This system helps an operator identify potential equipment hazards before they become a serious safety issue.

8.5.2 Drones

Many construction employers are employing the use of Drones (a remote-controlled pilotless aircraft) for site surveying, promotional videography, as well as safety observations. While these drones give an excellent "birds eye view" of the construction operation, they cannot yet replace the value of a jobsite walk through. These drones can, however, help in observing traffic flow patterns and other critical activities from the comfort and safety of the ground. While this emerging technology is becoming more prevalent in the construction industry, it is not without hazards. Employers should consider a drone safety policy and in-depth operator training/ testing before allowing their use on the job.

8.5.3 Personal Active Safety Systems (PASS)

Personal Active Safety Systems (PASS) are systems worn by individuals to improve their safety while working in high-risk environments. These systems actively alert the wearer or those around him or her of a potentially hazardous situation. Examples include alerting an individual of an imminent danger to their person, notifying a supervisor that someone has possibly fallen on the job, signaling a vehicle operator of an individual in a blind spot, or delineating to civilian traffic the personnel in an approaching work zone.

Two examples of PASS products are The Halo Light from ILLUMAGEAR (see Figure 8-5) and the Safetemp Sensor from Coolshirt Systems. The Halo Light attaches to any hard hat and produces a 360-degree ring of light around the wearer, actively illuminating him or her and making him visible up to a quarter mile away in all directions. It also illuminates the wearer's task area out to the visual periphery, making it easier to see obstacles that could result in slips, trips, and falls. The Safetemp Sensor is placed on the wearer's neck. It monitors an individual's core body temperature and provides an audible alert when the wearer is at risk of heat exhaustion or heat stroke. PASS products such as these are working to change what it means to be safe on the job.

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Figure 8-5: Halo Light – An example of Personal Active Safety Systems (PASS) (Photo courtesy of ILLUMAGEAR)

Additional Resources, Readings, and References

- Rajendran, S. and Clarke, B. (2011). "Building Information Modeling - Construction Safety Benefits and Opportunities." Professional Safety, Journal of the American Society of Safety Engineers (ASSE), 56(10), 44-51.
- BIM Forum - http://bimforum.org/
- Georgia Institute of Technology RAPIDS Laboratory - http://www.rapids.gatech.edu/
- Associated General Contractors (AGC), BIM Education - http://www.agc.org/cs/building_information_modeling_education_program
- WBDG BIM Resource Page - http://www.wbdg.org/bim/bim.php
- NIBS National BIM Standard Committee website - http://www.facilityinformationcouncil.org/bim/index.php

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9
PROJECT SAFETY STARTUP GUIDE

9.1 PURPOSE

This chapter provides a toolbox for contractors to aid in the proper start-up of a construction project from a safety "logistics" standpoint. To be successful, the project should have several items in place before the commencement of any activity on the jobsite. The project superintendent or safety manager should be responsible for ensuring that the following items are in place or completed prior to the start of the project.

9.2 PROJECT SAFETY START-UP KIT

It is best practice for construction companies to develop a "project safety start-up kit" that contains the following at a minimum:

- Occupational Safety and Health Administration (OSHA) 300 log and 300A summary logs
- All applicable local, state, and federal employment and safety posters
- All applicable local, state, federal regulations (e.g., DOSH manuals, MUTCD manuals, etc.)
- Company crisis management plan with all relevant corporate contacts
- Safety resource guides (e.g., rigging guide, crane handbook, etc.)
- Corporate safety manual
- Site-specific safety plan
- Site orientation checklists along with any training videos
- Employee Handbooks
- Drug and alcohol testing-related forms
- Worker compensation related forms
- Accident investigation packages (i.e. forms, cameras, tape measure, etc.)
- Visitor log/liability release form
- Site safety signage (i.e. sidewalk closed, PPE required, Danger, Warning, etc.)

See Exhibit 9-1 for an example project startup checklist that contractors can use as a model to develop their checklist based on applicable local, state, and federal regulatory requirements that impact their workplace.

9.3 SAFETY BULLETIN BOARD

Safety bulletin board is an excellent way to communicate project safety information to the crafts, which in turn helps to improve employee safety awareness. The board should include safety bulletins, safety newsletters, safety posters, accident statistics, safety-related educational materials, government regulatory agency citations, OSHA 300A summary logs, and safety awards. Depending on the project location, bilingual posters may be required to be posted.

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The safety bulletin board should be installed in a prominent location where all workers will see it. It could be at the jobsite trailer entrance, site orientation area, or in the lunch tent. Each location has its benefits; however, the important thing is that the employees should have access to this board to review safety related information.

Projects should ensure compliance with DOSH safety bulletin board requirements (WAC 296-800-19005), and all other applicable local, state, and federal posting requirements. According to WAC 296-155-115, "there shall be installed and maintained in every fixed establishment (the place where employees regularly report to work) employing eight or more persons, a safety bulletin board sufficient in size to display and post safety bulletins, newsletters, posters, accident statistics and other safety educational material." Common materials that should be posted on the bulletin board include:

- Federal Employment/Safety Posters
  - Federal Minimum Wage
  - Employee Rights – Employee Polygraph Protection Act
  - Unemployment Benefits
  - Federal Employee Rights Under the Fair Labor Standards Act
  - Your Rights Under USERRA – The Uniformed Services Employment
  - Americans with Disabilities Act (ADA) Poster
  - Employment Rights on Government Contracts
  - Equal Employment Opportunity
  - Employee Rights and Responsibilities Under the Family and Medical Leave Act
  - DOSH Citations and notices (if received)
  - OSHA 300A summary form during February 1st to April 30th

- State-Specific Employment/Safety Posters
  - Washington State Minimum Wage
  - Your Rights as a Worker in Washington State
  - WISHA poster
  - Notice to Employees—If a job injury occurs
  - Your rights as a nonagricultural worker
  - Washington State Self-insurance poster

- Recommended Safety Program Information
  - Company Safety Policy or Mission Statement
  - Site Specific Emergency Procedure Plan
  - Emergency Contact Information – site contact, fire, hospital, DOSH, EPA, and other regulating agencies.
  - Names and Contacts of First Aid/CPR or EMT Certified Employees
  - Key Site Supervision after-hours contact information
  - Designated Medical Provider Information/maps to clinic
  - Safety meeting minutes including accident information and lessons learned
  - Weekly activity information
  - Safety Award/Recognition Information

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- Names of safety committee members and work phone numbers
- Notices for upcoming meetings, training, or other safety-related events

Some projects will last several years, and it is important to ensure that the information on the board is up-to-date. It is important to receive safety/employment posters from reliable organizations such as trusted vendors, AGC, which can be trusted to notify you when new posters are developed with updated information.

Figure 9-1: Example Safety Bulletin Board (Picture Courtesy BNBuilders)

9.4 SITE SIGNAGE AND FENCING

One of the first things to do before the start of actual construction activities is the installation of a temporary construction security fence to delineate the construction area. Sites where it is not possible other types of barriers should be considered. It should be followed by ordering and posting the following signs on the site fence, as needed:

- DANGER Construction Area – Keep out
- Construction Site - No Trespassing Signs
- NOTICE Authorized Personnel Only

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- Hard Hat Area
- NOTICE – All Visitors Must Report to Site Office
- All activities monitored by video camera
- Safety Rules Signage
- Safety Warning Signage

Note: Depending on the project location, bilingual warning signs may be required to be posted.

9.5 SAFETY EQUIPMENT AND FIRST AID SUPPLIES

Construction projects get busy once you break ground. It is important that the project team ensure that adequate and ample safety equipment and supplies are available at the project before the need arise. A lockable storage cabinet or Knaack box should be used to store extra First-aid supplies and safety equipment. The readers should ensure the project complies with all DOSH first-aid supplies requirements (296-155 WAC and 296-800 WAC) and PPE requirements (296-155 WAC).

- Recommended Basic Personal Protective Equipment
    - Hard hats
    - Gloves
    - Safety glasses and side shields
    - Hearing protection
    - Respiratory protection and related supplies
    - Safety vests
    - Sturdy work boots
- Recommended Safety Equipment and Supplies
    - Automated external defibrillator (AED)
    - First Aid Kits in ample numbers for the job site
    - Eye wash liquids
    - Fire extinguishers in ample numbers for the job site
    - Warning signs/Safety Sings – for example, "NOTICE – Report all accidents and injuries no matter how small, to your supervisor at once."
    - Lockout/tag out supplies
    - Barricade
        - Caution Tape, Custom Caution Signs, and yellow ropes
        - Danger Tape, Custom Danger Signs, and red ropes
        - Traffic Control Candle Sticks
    - Snow Fence and fence T-posts
    - Traffic Control Signage
    - Fall protection/prevention equipment
    - HAZMAT spill kits
- Emergency Equipment and Supplies *(see Chapter 17 Construction Site Emergency Management)*
- Communication Equipment *(see Chapter 17 Construction Site Emergency Management)*

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Figure 9-2: Example Safety Station/Bulletin Board with weather protection (Picture Courtesy BNBuilders)

Figure 9-3 Example of Safety PPE Cabinet (Picture Courtesy of Korsmo Construction)

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Figure 9-4 Project Safety Kiosk (Picture Courtesy of Hensel Phelps Construction)

9.6 PROJECT SAFETY OFFICE

Having a dedicated space available for safety related activities and storing safety equipment and supplies is critical to the successful implementation of the project. Large-scale construction sites, depending on budget and space, can provide a dedicated small job trailer as the safety office. Small-scale project sites should at the least designate a small office within a trailer as the safety area. The safety office should:

- Be secure with a door and a lock – all project-related safety records will be typically stored in this office including extremely sensitive employee records.
- Have a first-aid kit and a sink with running water – could be used to provide first aid for crafts.
- Have several storage cabinets to store all the safety equipment, and supplies discussed above.
- Be equipped with a computer with internet, printer, phone, and fax – it could be used to receive confidential employee records. The room can also be used when employees are communicated with drug and alcohol test results or disciplinary action.
- Have a conference/training room near or within the safety office area to conduct site orientations, if possible. If so, the room should also be equipped with audio-visual equipment, enough space for seating and tables, and ample office supplies.

Note: On projects where the safety office does not have enough space, it is recommended to use a Connex storage container to store all safety equipment or find an adequate area for conducting the site orientation.

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9.7 PREPLANNING FOR EMERGENCY

Prior to the start of the project, jobsite supervision should meet with all local emergency response organizations and perform a review of the construction site. These organizations include but not limited to:

- Local law enforcement agencies
- Local fire department
- Local medical facilities
- Utility Companies
- Government agencies – city, county, DOSH, etc.

Some things to share and discuss with them include:

- What is your project schedule/hours of operations?
- Will the agencies visit the project as conditions change? For example, can they visit and tour the site every three months?
- Share the site emergency plan with the emergency response organizations
- Are there multiple project gates? Which gate should they enter in case of emergency?
- Will there be a pilot vehicle within the project escorting the responders?
- Will there be a lead person from the project who will lead emergency response efforts?
- What is the site evacuation procedures?
- Where are the flammable storage areas?
- Are their special situations such as a tower crane operator rescue, confined space rescue, etc.? Are the local response agencies equipped to respond to these emergencies?

Note: See Chapter 17 Construction Site Emergency Management for more information on emergency planning and preparedness.

9.8 SETTING UP OCCUPATIONAL NON-EMERGENCY MEDICAL FACILITY/DRUG TESTING FACILITY

One of the critical aspects of safety logistics should be setting up an occupational medical facility. In most cases, these occupational clinics will also offer drug and alcohol testing services. Many companies will have made a prior agreement with occupational clinic chains. Note depending on the state, you cannot force a worker to go to a particular clinic. There are several factors that should be considered when "designating" a project occupational clinic for non-emergency medical treatment and drug/alcohol testing:

- Will they be open during the project's working hours? Is the clinic open during the weekend? If not, what is the alternate clinic?
- What type of services are offered by the clinic? Does it have x-ray facilities in-house? Should the project designate a separate clinic for eye injuries or burn injuries?
- What are the qualifications of the physicians? Do they understand work-related injuries? Are they aware of return-to-work programs?
- What is the distance of the clinic from the project? What is the average wait time for injured employees to see the physician?

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- Do they perform drug and alcohol testing? What are the various types of drug and alcohol testing available? What is the average wait time for employees to complete drug and alcohol testing? Do they provide a mobile drug and alcohol testing service?
- Do they have an in-house pharmacy?
- Does your insurance provider have any selection criteria?
- Can they implement custom protocols for treatment and care to meet your company's specific needs?

Only after careful considerations of all these factors, a clinic should be selected. Once selected the following items should be completed.

- Create and post the direction map to the clinic along with name, address, and phone number. Have several copies available to give to supervisors accompanying injured workers.
- Supervisors should drive to the clinic from the project to get used to the route.
- Provide all company specific drug and alcohol testing protocols and consent forms.
- Through your insurance provider meet with the physicians, if possible, to explain your company's "return-to-work" program options.
- Share the information with all your subcontractors during pre-construction meetings.
- Share the information with your employees during site orientation.

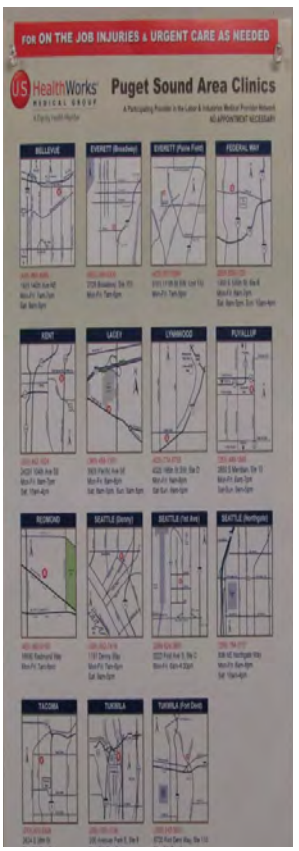

Figure 9-5: Example Occupational Clinic Directions Map Posted on a Jobsite (Picture Courtesy GLY Construction)

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9.9 OTHER CONSIDERATIONS

Communicate with the local community and project neighbors about the project schedule and potential impacts such as noise, vibration, dust, etc. For example, if the project is next to operating hospital, how early can the project start? Are there certain times of the day activities creating vibrations are not allowed? Nominate a project liaison to work with the adjacent properties to minimize impacts.

Survey and record the pre-existing conditions using a video camera and pictures. It will help in case of a claim from adjacent property owners for damages.

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Exhibit 9-1: Example Safety and Health Startup Checklist

(Used by permission from BNBuilders)

Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

1. The following manuals must be on site, reviewed, understood and complied with at all times.
    A. Freedom from Danger Training Manual
    B. Site Specific Safety Manual
    C. Mobile Crane Safety Manual
    D. Crisis Management Plan

   Refer to your Site Specific Safety Manual for specific items to address when work begins on the project. (i.e. fall protection, respiratory protection, PPE, housekeeping, confined spaces, etc.)
2. All subcontractors shall submit copies of their Site Specific Safety Plans for review prior to starting work on the project.
3. A safety filing system shall be established. Where needed, blank copies of the required documents shall be obtained for use if needed.
4. Do all our employees, and that of our subcontractors know what to do in emergencies? Establish and post "Emergency Response Procedures" at locations (typically stairs and exit pathways) throughout the jobsite.
5. Contact Local Workers Comp Claims Representative:
    A. Explain the nature of project.
    B. Obtain names of clinics and physicians to treat various types of potential injuries.
    C. Obtain a supply of reporting forms for physicians and hospitals to report claims.
6. Contact Physicians / Clinics:
    A. Give them our workman's compensation insurance information. Advise them that we will require the use of a medical treatment authorization form (See attached example). Discuss our policy on light duty.
    B. Give them a copy of worker job analysis for use in determining light duty work.
    C. If they will be providing screening for respirator usage, provide them with a copy of the projects respiratory protection plan.
7. Contact Hospitals with your Director of Safety and Health:
    A. May require issuing our workman's compensation insurance information.
    B. Advise them that in emergency case we may require their services.
    C. Give them a copy of project info and contact information for their future reference.
8. Contact Occupational Clinic to establish a collection location for substance abuse screenings.
9. Contact Ambulance Service:
    A. Give them good directions to your jobsite (will need a map).
    B. Describe your job and advise them of the types of accidents to expect.
10. Contact Fire Department:
    A. Give them good directions to your jobsite (will need a map).
    B. Advise them of any particularly flammable or caustic substances that may be on your project or any other unique features of your project.

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C. See if they have a rescue or paramedic unit in their department.

11. Contact Sheriff's Department or Police Department:
    A. Give them good directions to your jobsite will need a map).
    B. Explain your project to them and advise them of the duration and the proposed working hours.
    C. Solicit their assistance and advice in handling traffic, moving equipment and protecting your project from theft and vandalism.
12. Go through the Safety Bulletin Board Checklist (attached) and post all the enclosed forms on your bulletin board. Make sure the posters are protected from water damage or sun fading.
13. Establish, post and maintain a Hazcom / Right-To-Know station on the jobsite. (See Project Start-Up Package)
14. Fill out and post the Emergency Phone Number Poster (found in the Project Start-up Package) at all phone locations on your project.
15. Injury and illness records must be kept as required by OSHA 300 Log, "Employer's First Report of Occupational Injury and Illness", and First-Aid Injury Report.
16. The OSHA annual summary of workplace injuries and illnesses (part of the OSHA Log 300) must maintained at all times and must be posted by February 1st and must remain posted until May 1st
17. Each accident and near miss must be thoroughly investigated using the Accident Investigation Report? Is an action taken to prevent reoccurrence formulated?
18. Each new employee is receiving a thorough safety orientation before they are allowed to begin work, and it is to be documented in writing?
19. Establish a jobsite safety committee or group to regularly meet and report in writing, its activities?
20. All our subcontractors are required to hold weekly safety meetings and report them to you in writing.
21. Assure that the Weekly Toolbox Safety Meetings are effectively conducted and that all employees attend these? It is required by DOSH at the start of the job and weekly thereafter including documented walk around.
22. You and your supervisory staff must be conducting and documenting jobsite safety walk through inspections using the Site Safety Audit forms found in the Project Start-Up Package.
23. Ground Fault Circuit Interrupters must be installed on all the temporary power circuits that energize all portable electric tools and appliances. A qualified person shall test GFCI at least once a month and document these tests.
24. Are all exits marked, visible, and unobstructed?
25. Have you taken special precautions to protect the public from the hazards of our construction work?
26. Portable fire extinguishers must be provided in adequate number and type. Fire extinguishers shall be inspected monthly for general condition and operability and noted on the inspection tag and our fire extinguisher inspection log.
27. Are "No Smoking" signs prominently posted for areas, containing combustibles and flammables?
28. Have provisions been made to dispose of rubbish and litter daily?
29. Only UL approved safety cans, or other acceptable containers shall be and used for handling and dispensing flammable liquids.
30. Are all flammable liquids that are kept inside buildings stored in proper storage containers or cabinets?

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31. Are only trained personnel allowed to operate cranes and forklifts? DOSH requires that all forklift operators be trained for the specific equipment being used. This training must be documented and maintained on the jobsite. Operators must also follow the requirements in chapter 296-863 WAC, Forklifts and other powered industrial trucks. All crane operators and riggers should comply with the "Cranes, Rigging, and Personnel Lifting" standard of 296-155 WAC.
32. Is a copy of the Standard Hand Signals for cranes posted conspicuously at the jobsite and on the side of each crane?
33. Are your first-aid supplies adequate for you workplace:
    A. Are you documenting monthly inspections of the First Aid Kits?
    B. Have arrangements been made either with Company – owned vehicles and ambulance service for the transportation of the injured to the hospital or clinic
34. Hard hats and safety glasses shall be provided and worn while at all times in the workplace.
35. When lunches are eaten on the premises, are they eaten in areas where there is no exposure to toxic materials, and not near a toilet facility?
36. Is the protection against the affects of occupational noise exposure provided? (A good rule of thumb to use in determining if hearing protection is needed: If you have to shout to be heard over the noise, then hearing protection is needed and must be required).
37. A competent person must be making daily inspections of all excavations? (If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken).
38. Does each over-the-road company owned vehicle contain in the glove box an accident reporting kit describing what needs to be done and the forms filled out in the event of an accident? (Additional lists can be obtained from the Safety Department). Report all Company vehicle accidents to the Safety Dept and the local St. Paul Insurance Office.

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Exhibit 9-2: Example Safety Bulletin Board Checklist

(Used by permission from BNBuilders)

Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Put up a Safety Bulletin Board. The Safety Bulletin Board is to be located in an area where it will be readily available to all personnel and near a phone. During the month of February through April, the OSHA 300A Log is to be posted on this board. The same board can be used to post required EEO posters. Use the board to promote safety, and do not let it deteriorate to a junk board.

ITEMS TO POST:	**POSTED**	**INITIAL**
Emergency Phone Numbers:	_____	_____
Federal 5-in-1 Labor Law Poster(Now includes Family Leave Poster) (English & Spanish)	_____	_____
DOSH, Worker's Comp, Minimum Wage and all other required State Posters (English & Spanish)	_____	_____
Notification of Insurance Company (St.Paul posters – English & Spanish)	_____	_____
Safety and Health Policy Statement (Found in Project Startup Package)	_____	_____
Substance Abuse Policy & Procedures	_____	_____
Substance Abuse Hotline Poster	_____	_____
Safety Incentive Poster	_____	_____
Federal Projects: Notice to all employees working on Federal or Federally Finance Construction Projects and Notice to Employees Working On Government Contracts.	_____	_____

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Exhibit 9-3: Example Required Safety Equipment for Project Start-up Checklist
(Used by permission from NOVA GROUP Inc.)

Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

The below equipment is the minimum required for start-up on all Projects. The required equipment is shown with the required quantity for a single activity and quantities needed per activity if needed. **If you need assistance locating or purchasing the below equipment, contact the Safety Director for further information or assistance.**

EQUIPMENT DESCRIPTION	# Required	Unit measure Or activity measure
Project Signage	As needed	"Authorized Personnel Only," "PPE required /Strong Man Banner," "ALL Visitors must check with Jobsite Office," "Zurich Stretch & Flex Banner"etc….. Follow Project Specs
Safety and Health Bulletin Board	1	In a commonly accessed area and covered
Visitor PPE and sign-in sheet	As needed	Site personnel should maintain a stock of common PPE, such as hard hats, eye protection, ear plugs, and reflective vests for use by visitors
Grab "N" Go Packets (Accident/ DOSH)	1/ea	Location should be on office wall near the exit.
Recognize Eliminate Discuss "RED" Books (Mini AHA)	20	Red books should be kept onsite and signed by all
Jobsite SDS's	1	Located on thumb-drive and hung on the wall
First Aid Kits (Station) 25 person	1	Per 25 employees
First Aid Kit (Mobile) ten person Fire Extinguisher, ABC 2.5lb.	1	Each mobile equipment Each vehicle
Fire Extinguisher, ABC 10lb.	1	Each Office trailer
Fire Extinguisher, ABC 20lb	2	Needed for Hot Work requirements. Also should be mounted on portable fuel tanks.
Eye Wash Station or two 32-ounce bottles filled with saline solution.	1	Per 25 employees
Barricade Tape, Yellow "Caution."	1	Standard Rolls
Barricade Tape, Plastic, Red "Danger."	1	Standard Rolls
Delineators, 42" safety warning yellow or red	As needed	Sufficient amount to protect open holes or trenches.
Multi Gas 4-Gas Monitor	1	O2, CO2, H2S, and explosive limits LEL

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PID (Photo Ionization Device)	1	Needed if there is a possibility of contaminated soils.
Absorbent Spill Kit	1	55-gallon spill kit
Fall Protection	1	Harness, Lanyard, Relief steps, and an SRL.
LOTO Station	1	Isolate hazardous energy
Bottled water	As needed	Adequate amount for personnel on jobsite.
PPE	As needed	Adequate amount for personnel on jobsite.
Quanta Provided AED	1	Readily accessible for all

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10
CONSTRUCTION SITE PUBLIC PROTECTION

10.1 PURPOSE

A brick mason's perimeter scaffold collapsed resulting in a severe injury to a pedestrian. A section of a temporary construction fence tipped over during a heavy wind and injured a pedestrian. Can the concerned contractors be held liable for these losses? The answer is a "yes."

Any construction site carries risks associated with its activities that can cause injury/illness to the members of the public and damage to their properties. Construction contractors can be held liable for injury, death, or property damage to the members of the public arising from actions of their employees or subcontractors. This liability is commonly known as a public liability or third-party claims.

The cost of dealing with such lawsuits and claims can be significant. In addition, public liability claims can create adverse publicity to the contracting firm. It is important that contractors understand, in addition to their workers, they also have a duty to protect the members of the public and their property during a construction project. Hence, public protection should be an integral part of the contractor's site-specific safety plan (SSSP). This chapter will provide some guidance to contractors to identify construction site exposures and industry's best practice controls to minimize or eliminate injuries and property damage to the public.

For the purpose of this chapter, "public" will include project visitors, tour groups, homes and businesses within or adjacent to construction sites, guest, delivery drivers, commercial visitors, and the general public. In other words, all persons not employed by or not under contract with the contractors working on a construction site.

10.2 RESPONSIBILITY AND CONTRACTS

With a few exceptions, the general contractor (GC) will have the ultimate responsibility for control of the project site, and to make sure all subcontractors take appropriate measures to protect the public. This responsibility should be included in the contract between the GC and the subcontractors and their tiers.

10.3 SAFETY/ EMERGENCY PLANNING

Prior to starting construction operations, the GC should consider and address all potential risks associated with the project activities that may lead to public injury or property damage. Public protection should be an integral part of every construction activity. Hence, all project-related job hazard analysis (JHA) and pre-task plans (PTP) should consider public protection. In addition, the project should develop an emergency action plan, which is in compliance with DOSH and other applicable regulatory

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requirements. See Section 17 for detailed information about the emergency management. The plan should address at a minimum the following emergencies:

- Flood, hurricane, tornado, serious inclement weather
- Fire
- Electrical outage
- Chemical leak or spill
- Medical emergency, fatality, multiple injury accidents
- Catastrophe or collapse
- Crime against property on the jobsite
- Crime against persons on the jobsite

Instruct personnel on the job site about the emergency procedures. A specific plan to address public contempt or protest that deals with members of the public who purposely place themselves or others at risk by failing to observe or heed warnings or other directives or safety precautions. For example, the plan may require notification to agencies with authority to control public activities, e.g., the police or fire department, and cessation of all construction activities that may cause a hazard until the public is controlled. A specific plan for handling threats or other violence as follows:

- Bomb or arson threats
- Threats of violence to the construction site employees
- Suicide attempts/threats
- Others

The plan should include immediate notification to and interface with appropriate authorities.

10.4 INSURANCE

GCs should ensure that they have adequate insurance coverage to protect them against claims made by members of the public who suffers injury or property damage in connection with the project. GCs should also require subcontractors to include them as additional insured under their general liability policies. Contractors should also consider risks associated with vendors and suppliers, and ways to manage those risks.

10.5 TRAINING

Public protection should be one of the main topics covered during the new employee site-specific orientation. Workers and supervisors should be trained in the various site-specific public risks, and the mitigation measures. The training should also include incident reporting procedures and emergency response procedures.

10.6 PUBLIC COMMUNICATION

GCs should take a proactive approach when it comes to communicating construction impacts with the neighboring homes and businesses. Property owners do not like surprises. Hence, proper communication about the project scope and schedule will build good relationships with the neighbors. Create a project telephone hotline or email to receive project-related inquiries. Some contractors,

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depending on the project size and public risks, have created a position or designated a team member as the project's minimum impact coordinator (MIC) to manage third-party risks and communications. On many projects, this role is assigned to the project safety manager. The project should share MIC's contact information with the neighboring property owners, and let them know to contact the project in case of an issue or concern. Some of the important tasks of the MIC should include:

- Act as a public liaison, by serving as the main point of contact and respond to public inquiries and complaints on matters of public interest and concern.
- Coordinate, attend, and present to business, community, and neighborhood group meetings regarding the project, its impacts, and intended mitigations. Focus on how the project will deal with noise issues, traffic disruptions, dust issues, etc.
- Monitor project's hotline voicemail and maintains a log of incoming inquiries and response.
- Create and distribute project-related public education materials, and be available to attend community events and meetings.
- Prepare and distribute advertisement materials to the neighbors.
- Investigate any accidents related to the public and implement corrective actions.

10.7 PRIVACY

Sometimes construction will take place in proximity to neighboring properties. On one project, a hospital close to the project had patient rooms facing the building site where construction workers can easily see through the patient rooms. These privacy issues should be identified and mitigated prior to starting construction.

10.8 PUBLIC PROTECTION RISKS AND CONTROLS

Some of the most common public risks associated with construction projects, and best practices to control them are discussed in the following sections.

10.8.1 Site Security

What safety and site security measures should the project have in place? The magnitude of site security measures varies from project to project. Several factors determine the level of security needed for the project such as location (rural vs. urban), type of structure (building vs. roadways), size, duration, level of attractive nuisance exposures (e.g., close to school), level of crime in the area and a few others. Some things to consider:

a) Designate a person responsible for security to monitor site security including periodic inspection of fencing and signage. The person should also review site security measures on a regular basis since conditions change on the site frequently. Contractors have hired off-duty police officers or retired police officers to serve as site security managers.
b) Where appropriate, the project sites should have adequate perimeter control with the help of a temporary fencing. The main objective of the fence is to avoid unauthorized or inadvertent access to the project site. The fence should be strong enough and high enough, and properly secured and anchored to prevent tipping. There have been many incidents where pedestrians were struck by the falling fence, which resulted in lawsuits against contractors claiming negligent erection and maintenance of construction fencing.

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c) The perimeter fence gates should have locks, which should be locked at the end of shift and proper access controls during and after hours of operations. Site gates should be closed when not in use and opened only when required for special deliveries or other authorized entries.
d) Post appropriate warnings and signs conspicuously on the fence, gates, and any other site entrances such as "no trespassing and keep out – construction area," to warn the public.
e) Establish a system in place to control vehicle access in and out of the site. Only authorized vehicles should be allowed on the site. This is critical when working near hospitals when patients or elderly people might get easily confused and enter job sites by mistake.
f) Set up an approval system in place to remove or alter fencing. During the course of the project, contractors remove or alter the fence to carry out their scope of work. This practice should be strongly discouraged or should only be allowed after consultation with the project supervision.
g) Issue gate keys only to authorized supervisors and establish a system in place to control the key issuance.
h) When site access control with a fence is not possible or not appropriate, discourage site access using physical barricades, warning ropes, and signage.
i) Taking pictures at the end of the shift of the safe and secure site conditions is the best practice to protect against lawsuits.
j) Inform local law enforcement agencies of your work schedule and security measures, and request them to patrol the site after working hours.
k) Other site security measures that have been successfully used by contractors in conjunction with fencing include but not limited to:
    - Security guard service during non-work hours both weekdays and weekends
    - Live security camera surveillance with motion sensors
    - Site under surveillance signage
    - Intrusion alarm systems or tracking devices tied to a monitoring service

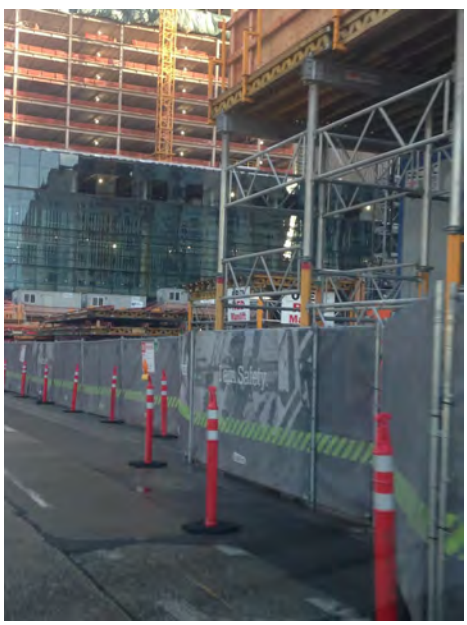

Figure 10-1: Example of Properly Installed Construction Site Security Fence (Picture Courtesy of Sellen Construction)

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Figure 10-2: Example of Properly Installed Site Fence with Appropriate Warning Signage (Picture Courtesy of Hoffman Construction Company of Oregon).

Figure 10-3: Workers Installing Project Perimeter Privacy Barricade (Courtesy of Hensel Phelps Construction)

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10.8.2 Attractive Nuisance

All construction sites are an attractive nuisance, which can attract people to the project to explore it. With its fleet of heavy equipment, tower cranes, mobile cranes, trucks, hiding places, dirt piles; construction sites, in particular, are very attractive to children and teenagers. If they are hurt a while, on the site, contractors can be held liable for their injury. Consequently, the project should take all due-diligence (standard of care) and good faith efforts to safeguard the project. Hence, if site access control fails (fence or other barriers), in order to avoid liability, the following precautions should be taken to prevent injuries:

- Secure storage areas containing hazardous materials and waste.
- Protect open holes and leading edges including manholes and excavations by cordoning the area off with ropes or even physical barriers.
- Ensure the stability of material storage areas.
- Employ tools and equipment controls.
- Restrict access to tower crane towers, electrical rooms, etc.
- Remove keys from the heavy equipment such as excavators, pile drivers, lifts, etc.
- Protect entry into confined spaces.
- Protect and prevent access to unfinished stairways, scaffolds, etc., with physical barriers.
- Remove unattended ladders that can provide access to unprotected areas.

10.8.3 Visitor Controls

How can the project avoid or reduce potential liability associated with visitors? The project should create a visitor access policy. The project should:

- Install signs at the project entrance and gates that instruct all visitors to report to the project office.
- Maintain a visitor log; all visitors should sign-in and out at the project office.
- Require all visitors to sign a "hold-harmless" agreement holding the contractors/owners harmless in case of injury or damage.
- Develop and deliver a modified site orientation and document the orientation. The orientation should, at a minimum, cover the high hazard areas, designated walkways, site Attire and Personal Protective Equipment (PPE) requirements.
- All visitors must wear the required PPE while on the project site. If the visitor fails to comply with the requirements, deny site access.
- Never allow visitors to tour the site by themselves, always provide an escort who is familiar with the site.
- Develop a visitor badge or visitor pass system for ease of identification of the visitor. Some contractors have even used a special hard hat for visitors (e.g., red hard hats).
- Sometimes school children or college students tour sites for educational purposes. Tour groups can be complicated compared to individual visitors; extreme precaution must be taken. Establish some age limit for tours. For example, children under the age of 12 will not be permitted to accompany tours or visit the site. Also in case of children, ensure an adult sign the hold-harmless agreement, preferably a parent or teacher.

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Figure 10-4: Example of visitor signage at the project entrance that instructs all visitors to report to the project office (Picture Courtesy of Lydig Construction)

10.8.4 Traffic Control

Failure to identify and control exposures related to traffic control can lead to significant losses in the form of injuries and public liability to both heavy civil contractors (i.e. highway work zone) and building contractors (i.e. city streets adjacent to jobsites). Some common exposures include pedestrians walking by or near the project and motorists driving by the project. Some of the best practices to follow to avoid losses related to traffic are:

- Implement approved traffic control plans for compliance with applicable local standards. It is best practice to create both an onsite and offsite traffic control plans.
- Use of certified flaggers to control traffic when working in highway work zones, and for directing vehicles in and out of jobsites.
- Proper segregation between traffic and pedestrian routes.
- Backup alarms use on trucks and construction equipment.
- Good use of clean and clear signs and barricades in compliance with applicable local standards.
- Daily inspection of traffic control devices - many times traffic control devices that are blown onto vehicles have led to public injuries. When responding to lawsuits involving a highway work zone accident, attorneys will check to see if proper control was in place.

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- Daily inspection to ensure the roads are free of "ground hazards" created by construction work such as potholes, gravel, steel trench plates, and other debris. Install concrete wash-out and tire wash areas to prevent from mud and rocks migrating to the streets. There have been numerous incidents involving bicyclists slipping on rocks from construction sites on the streets or a broken windshield due to these rocks.

Figure 10-5: Example of Traffic Control around Construction Sites (Picture Courtesy of Korsmo Construction)

10.8.5 Property Protection

What are the various properties that should be considered? How to protect against property damage? Property adjacent to construction sites can be damaged, and its occupants can be put at risk. The property can include:

- Adjacent buildings or structures (neighboring homes and business, city-owned sidewalks, city streets, etc.)
- Adjacent lands
- Vehicles of others (cars driving by the site, cars parked near the site)

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- Tools and equipment of others
- Business interruption related losses

The project team should consider all potential sources that can cause property damage. The construction activities that can cause the most exposure include:

- Crane and rigging work can cause loads to shift and damage adjacent properties.
- Compressed gases, flammable and combustible liquids stored on site can cause an explosion.
- Open flame hot work can cause site fire or smoke damage.
- Demolition activities can cause dust, vibration, flying objects, and noise issues.
- Vibrations can result from activities such as demolition, blasting, pile driving, drilling, tunneling can cause adjacent property collapse or damage.
- Painting activities, concrete pours, etc., can cause material escape from the site and cause damages to passing traffic, pedestrians, and adjacent properties.
- The ground movement caused by excavation, compaction, dewatering, undermining, tunneling, shoring, etc., can cause adjacent property settlement or damage.
- Some example incidents,
    - An excavation contractor's backfill and subsequent compaction caused adjacent property settlement.
    - A painting contractor's overspray caused a parked black car turn into an orange car.
    - An overspray from a concrete hose from a high-rise damaged the windshield of a car driving by on the city street below.
    - A crane load struck a vehicle driven by a member of public close to the job site.

Even though, construction activities can sometimes lead adjacent property owners suddenly to notice cracks in walls and foundations, many of these, however, could be pre-existing. A preliminary pre-construction property third-party survey is highly recommended to document existing conditions of adjacent structures and surrounding areas prior to commencement of construction. The conditions should be continuously monitored as construction progresses. Photographs, videos, physical measurements, etc., should be taken to establish pre-existing conditions clearly. It is highly recommended to conduct a similar post-construction survey to compare with the pre-existing conditions. If the construction activity did cause some damage, it might be beneficial to fix it. Ensure there are physical and fire separation and protection measures for adjacent properties.

A pre-task plan of all activities should consider any potential public property damage and provide control measures is in place. For example, an excavation contractor digging a trench in an area known to have a city water line. The water line supplies water to the entire neighborhood. What precautions should be taken? Any underground or overhead utility service strike can lead to injury or death, and will affect the business and residents. The contractor should identify the existing water line using the "know what's below – CALL before you dig." In addition, the contractor can also use "vacuum excavation" to get a visual on the line before starting to dig with an excavator to avoid utility strike that will affect the residents. For crane and rigging tasks, develop and implement good hoisting and material handling programs.

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Any open flame hot work or smoking that could cause a fire damage to adjacent properties the contractor should develop and implement a good fire prevention and protection program.

10.8.6 Pedestrians

Areas around a construction site pose several hazards to the pedestrians. Some of the common pedestrian hazards include but not limited to uneven or slippery surfaces, steep surfaces, unprotected holes and edges, overhead obstructions, poor pedestrian routes, inadequate lighting and many others.

It is best practice to close sidewalks adjacent to projects when necessary with proper directional signage to channel the pedestrians safely around the construction site per applicable local standards. Certain states and cities have specific requirements when closing sidewalks.

Maintain the pedestrian walkways free of slip, trip, and fall hazards. Ensure the walkways are kept clean at all times by removing any debris and warn pedestrians about any change in elevation of the walking surfaces. Provide adequate lighting for the walkways. When appropriate use overhead protection with the help of covered walkways. Temporary sidewalks, ramps or stairs should be provided with guardrails on both sides.

Where it is necessary to provide alternative or restricted pedestrian routes, make sure you address the needs of persons who are blind or partially sighted, use wheelchairs or have other mobility difficulties. Temporary pedestrian walkways should have uniform surfaces, with access ramps, handrails if necessary, good lighting and a suitable surface like smooth non-slip/trip concrete. Clear signs should be provided to direct people to the correct pedestrian route, particularly if the destination building has been obscured by the construction site. Clearly define the walkway by a continuous barrier and ensure the walkway is kept free of debris and clutter.

Figure 10-6: Example of Pedestrian pathway around construction sites (Picture Courtesy of Korsmo Construction)

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Figure 10-7: Example of Sidewalk Closed Signage and Barricade (Picture Courtesy of Hensel Phelps Construction)

10.8.7 Other hazards

This section lists other common hazards that could cause personal injuries.

Falling Objects

Many construction activities creates a potential hazard of falling objects such as material handling work along the building perimeter, concrete pours, construction debris that can get wind-borne such as loose plywood or cut metal decks, that can cause serious injury or death to members of the public. Is the area subject to strong winds? These hazards can be controlled by protection systems such as:

- Safe and proper material handling procedures so as, not to interfere with any adjacent structures
- Adequate overhead protection
- Adequate edge protection
- Physical separation of the site from the public
- Crane safety procedures during heavy winds

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Figure 10-8: Example of Pedestrian Pathway and Falling Object Protection around construction sites (Picture Courtesy of GLY Construction)

Slips, trips, and falls

- Properly maintained surfaces
- Well protected holes and edges
- Adequate provision of safe pedestrian routes
- Adequate site lighting on pedestrian routes
- Slip-free surfaces

Radiation

- Control of radiation risks is impacting public. For example, how to protect public from welding UV light?
- Installation of proper signage

Noise

- Compliance with local noise ordinance
- Coordinate start time and schedule of high noise activities with adjacent property owners to minimize impacts. For example, concrete pour at three a.m., can generate a lot of noise concrete truck back-up alarms, light towers might shine at the neighbors window, etc

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Fire

- Good fire prevention and protection program
- Smoking controls

Environmental Hazards

- Maintain a clean work area with adequate debris removal
- Develop and implement an airborne contaminant management plan to prevent the escape of a hazardous substance to escape from the site such as silica, asbestos, etc
- Approved erosion and sediment control plan
- Approved hazardous materials and waste management plan
- Daily inspection of the site to contain the environmental hazards

Additional Resources, Readings, and References

- ANSI/ASSE A10.34-2001 (R2012) – Protection of the Public on or Adjacent to Construction Sites - One of the key element of the standard is a public hazard control plan (PHCP). The PHCP is a guideline to aid the contractor in identifying, evaluating, preventing or minimizing their exposures as identified in the standard.

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11
CONSTRUCTION SITE EMPLOYEE WELLNESS PROGRAM

11.1 PURPOSE

The readers might wonder why a construction site wellness program is part of a construction project safety best practices handbook. Construction contractors are always looking for new ideas that will help improve their company's safety performance. One such idea is the implementation of worker wellness program as part of the contractor's site safety program.

11.2 NEED

In 2010, 71% of construction workers were either overweight or obese, 30% had hypertension, and 8% had diabetes. Among those aged 55 years and older, 56% had hypertension, 18% had diabetes, and 15% had heart disease.[1] The construction workforce in the United States is aging. The average age of construction workers was 41.5, and the proportion of workers aged 45 to 64 years was 38.7% in 2010.[2]

Will unhealthy employees (pre-existing health conditions) have extra and more severe workers' compensation claims? Can an employee wellness program improve workplace safety? The answer to both these questions is "yes." A Duke University Medical Center analysis found that obese workers filed twice the number of workers' compensation claims, had seven times higher medical costs from those claims and lost 13 times more days of work from work-related injury or work-related illness than did nonobese workers.[3] Another study by the University of Michigan Health Management Research Center found employees with individual health risks (e.g., smoking, physical inactivity, etc.) had high workers' compensation costs.[4]

Construction operations are physically demanding. In order to physically perform safe and productive work; it is crucial that crafts are physically and mentally fit. Implementing a construction site employee wellness program will develop healthier crafts.

11.3 WELLNESS PROGRAM CONSIDERATIONS

Similar to the construction site safety program, the successful implementation of the project site wellness program depends on the combined efforts of project owners, general contractors (GC), and subcontractors. Each of these parties may already have an in-place corporate wellness program and

1 The Center for Construction Research and Training (CPWR). The Construction Chart Book, 5th Edition. http://www.cpwr.com/sites/default/files/publications/5th%20Edition%20Chart%20Book%20Final.pdf (Accessed December 2, 2014)

2 The Center for Construction Research and Training (CPWR). The Construction Chart Book, 5th Edition. http://www.cpwr.com/sites/default/files/publications/5th%20Edition%20Chart%20Book%20Final.pdf (Accessed December 2, 2014)

3 Duke Medicine News and Communications. http://corporate.dukemedicine.org/news_and_publications/news_office/news/10044 (Accessed November 18, 2014)

4 Musich, S., Napier, D., and Edington, D.W. (2001). The Association of Health Risks with Workers' Compensation Costs. Journal of Occupational and Environmental Medicine. 43(6): 534-541.

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might address wellness on each of its projects. The other case would be a contractor who does not have a corporate program in place but is required by the owner (in case of GC) or GC (in case of subcontractors) to participate in a project-level wellness program as part of the contract. Either way, contractors might find the program guidelines provided in this section to be useful to help develop and implement an effective workplace wellness program. Remember wellness programs are not required by any government regulatory agencies, it is a voluntary program to promote healthy behaviors.

11.3.1 Obtain project owner support

Like workplace safety, the project owner has a significant role in the implementation of a project-level wellness program. Some questions to consider:

- Does top management of all project stakeholders buy-in to the idea of the jobsite wellness?
- Do they understand the financial benefits of implementing a jobsite wellness program?
- Does the project budget allow implementation of a wellness program?

Projects insured under Owner Controlled Insurance Program (OCIP) or Contractor Controlled Insurance Program (OCIP) have a huge incentive to implement project-level wellness program. Contractors who are self-insured even for their health insurance plans will benefit from this program. The support should include establishing a project budget for the wellness program. If the owner refuses to support a wellness program financially, will the project still be committed to implementing this program?

11.3.2 Consult legal counsel

There could be legal issues associated with implementing a wellness program including the Americans with Disabilities Act (ADA), the Health Insurance Portability and Accountability Act (HIPAA), tax laws for incentives, and the Genetic Information Non- Discrimination Act (GINA). Please consult your legal counsel to avoid legal issues.

11.3.3 Try to integrate wellness and worker safety

The project should aim to integrate wellness and safety since both the program's goal is employee well-being. Since there are many parallels between these programs; it would be very efficient to integrate them. For example, safety incentives vs. wellness incentive, safety newsletter vs. wellness newsletter, safety committee vs. wellness committee, etc.

11.3.4 Develop a policy statement

The owner should issue a policy statement that outlines the site wellness program goals and show a commitment to employee wellness. A well-written policy statement will show the employees that the management cares and is committed to creating a healthier workforce. The policy should be communicated to employees during new employee orientation. If possible, instead of a separate policy statement, including wellness in the site safety policy statement would be beneficial.

11.3.5 Receive a commitment from subcontractors

Include wellness program requirements in the construction contracts. Specify the commitment required such as the cost associated with the "time" commitment required by their employees to participate in site wellness initiatives, which allows contractors to include it in their project budget. For example,

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does the project require a daily morning 15-minute stretch and flex program? It can cost a specialty firm employing 100 workers ($55/hour billing rate) more than $ 30,000 a month by requiring them to participate in a stretching session every day for 15 minutes.

11.3.6 Establish a jobsite wellness committee

Depending on the project size, a jobsite wellness committee can be established to lead the wellness efforts. Since most jobsites are required to have a safety committee, the project can just charge the safety committee to oversee the site wellness initiatives. This would be a better idea on smaller and short-term projects. The use of a multi-discipline (e.g., electrician, plumbers, etc.) wellness team is essential in a project-level wellness program. Some firms have included workers who lead a sedentary lifestyle or who currently smoke and are committed to change their way of life.

11.3.7 Assess the needs and interests of the workers

Before the committee can create and implement wellness initiatives, it is important to determine the needs and interests of the workers. Construction is different; generic wellness initiatives might not work and will result in very low participation. Never assume construction workers will participate because it is good for them. Identify some initiatives that will be feasible to implement at a project-level, considering the jobsite constraints, and then survey the crafts.

The survey should be simple with less than ten questions and can be administrated during weekly site safety meetings. Remind the employees that the wellness program is not mandatory. Some of the items to include in the survey:

- Gauge interest – Are they interested in participating? Determine what percentage of workers are interested in participating in the program.
- Activity type – What are the different types of wellness activities they will most likely participate (e.g., weight-loss, stress management, smoking cessation, etc.)?
- How would they like to receive wellness training and education? (e.g., paycheck stuffer, stand-alone trainings, messages on safety bulletin board, the project newsletter, etc.)
- What will motivate them to participate? (e.g., types of incentives)

11.3.8 Offer free biometric screenings

The project should provide a free biometric screening to establish a health baseline, and encourage employees to take advantage of this free screening. The administration of the program can be modeled similarly to other site programs such as drug and alcohol testing programs. The project can make arrangements so that employees can take their biometric screenings at the same clinic where they do their drug and alcohol testing to improve participation and make it efficient.

11.3.9 Select and implement “simple” wellness initiatives

Remember, traditional wellness initiatives will not work well on construction sites since most crafts are on the jobsite only for a short-term. Even when they are on the site, they are “on-the-go” all the time. They do not have the time to maintain a food journal or fill out an activity log. Provide them with tools such as a pedometer or an activity tracker or even buy them mobile apps that will make it easier for them to track progress while on the go.

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In addition, it might be challenging to benchmark health data to set long-term goals to reduce at-risk behavior at a project-level. Also, the project duration can vary from few months to several years. Hence, the project team should aim for simple initiatives that could be a "starting point" for workers to make lifestyle changes – every little bit helps. A few examples of wellness initiatives that can be implemented on a construction jobsite include:

- Locate craft parking lot a little farther away from the site to promote walking
- Require daily stretch and flex exercises
- Replace junk foods in the site vending machine with fruits and vegetables
- Provide healthy food and snacks at safety lunches and meetings
- Conduct team weight loss competitions, erect "number of pounds lost" signage similar to safety signs "a number of days without injuries"
- Provide discounts for the gym membership near the project with a minimum attendance requirement
- Conduct project-specific runs
- Offer educational seminars on the impact of health risks and workplace safety
- Support wellness programs such as smoking cessation, stress management, and substance abuse program
- Supply free or discounted nicotine-replacement products
- Include health tips in their pay stub envelopes
- Post health tips/flyers on the project safety bulletin board
- Leave health magazines in the lunch tent and rest areas
- Create a "wow board" where employees can share their success
- Provide water coolers at several locations to encourage workers to hydrate

Figure 11.1: Example of Employee Wellness Program - A Workplace Fitness Center (Picture Courtesy of Exxel Pacific General Contractors)

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11.3.10 Provide incentives

Implement a wellness incentive program in conjunction with safety incentives to increase program participation with simple rewards such as a $20 gift card for:

- Completing a health risk assessment
- Participate in a biometric and other health-related screening
- Lead site stretch and flex exercises
- Meet some activity-based goals such as perform stretch and flex exercises every day, walk a certain number of steps, etc.

Note: Keep incentives simple and available to all employees for participation. Does the wellness programs incentives violate the Americans with Disabilities Act (ADA)? A final ruling was scheduled in early 2015 "to address numerous inquiries the U.S. Equal Employment Opportunity Commission (EEOC) has received about whether an employer that complies with regulations implementing the final Health Insurance Portability and Accountability Act (HIPAA) rules concerning wellness program incentives, as amended by the Affordable Care Act (ACA), will be in compliance with the ADA." Employers should consult their legal counsel and frequently review their wellness programs for compliance with all appropriate regulations.

11.3.11 Maintain a hygienic jobsite

Employee morale is crucial to a good jobsite safety performance and a wellness performance. One cannot promote wellness on a project with poor housekeeping issues. The project should ensure superior cleanliness of site toilet facilities, lunch areas, sleeping quarters, changing rooms, drinking water, washing facilities and general site housekeeping, and proper vermin control.

11.3.12 Involve worker family in wellness & safety program

The program should make every effort to include a worker's family members. Over the years, construction companies have involved family members in promoting safe worker behavior by creating safety calendars, construction safety activity books, family/home safety books and few others successfully.

Similarly, an employee's lifestyle can be changed by including their family members. For example, some companies like PCL Construction Services, Inc., headquartered in Denver, Colo., publish "PCL Family Safety" handbook. Its contents include safety topics such as skating safety, lawn and garden safety, winter safety tips, etc. In addition, the book includes wellness topics such as stress management, healthy eating, and physical activity tips. This is an excellent way to show that the company cares about not only a safe and healthy work environment, but it also cares about their employees and families' well-being.

11.3.13 Evaluate program effectiveness and document lessons learned

Wellness programs should be continually assessed for performance effectiveness. Listen to concerns and feedback from management and employees that will help improve the program. Prepare "lesson learned" list on an ongoing basis, which can be applied in future project wellness programs.

Even though there are unique challenges associated with implementing a wellness program on a fast-paced, short-term, and ever-changing jobsites, it is possible.

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Additional Resources, Readings, and References

- NIOSH has prepared a Research Compendium: The NIOSH Total Worker Health™ Program: Seminal Research Papers 2012 – An overview of the relationship between wellness programs and workplace safety: www.cdc.gov/niosh/docs/2012-146/

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12
DEVELOPMENT OF SITE SPECIFIC SAFETY PLAN (SSSP)

12.1 PURPOSE

The Site Specific Safety Plan (SSSP) is a safety planning tool that outlines project safety and health requirements and guidelines to help protect site personnel, visitors, the public, and the environment from exposure to potential safety and health hazards. The SSSP should address all anticipated hazards that will be encountered on the project. The SSSP should evaluate both field and office activities to identify hazards and provide control measures. This chapter presents guidelines intended to help the project team develop an effective SSSP.

12.2 SSSP REQUIREMENT

It is typical for a construction project to have multiple SSSPs. The general contractor should develop and implement an overall project SSSP. The plan should require all subcontractors and their sub-tier subcontractors to complete an SSSP for their scope of work. For example, a mechanical subcontractor will develop an SSSP for their scope but will also require an SSSP for their sub-tier insulation subcontractor. At a minimum, the subcontractor SSSP must meet the requirements of the project SSSP and all applicable regulations in relation to the project's jurisdictions.

12.3 REVIEW AND APPROVAL

The general contractor's overall SSSP should be reviewed and approved by the Project Superintendent and the Project Manager. Some companies even send their SSSP to their corporate office for review and approval by their upper management. On certain projects, the project owner might contractually require GCs to submit the overall SSSP for the owner's approval. The general contractor should require every subcontractor and their sub-tier subcontractors to submit their SSSP for review and approval by the Project Superintendent or designee, and the Project Safety Manager, at least two weeks before commencement of work. The review should ensure that the SSSP meets the project safety requirements. The subcontractor should not be allowed to commence work prior to their SSSP approval. An example Subcontractor Safety Plan Evaluation Form is presented in this section as Exhibit 12-1.

12.4 SPECIFICITY

It is common to contractors just to refer/submit their corporate safety manual in place of an SSSP. All SSSP's must be project specific. Do not accept their corporate safety manual. Require each contractor to submit an SSSP.

12.5 REVISIONS

It is common that the site conditions change due to several factors including change in scope of work. The SSSP should be updated when conditions change and should be submitted for approval. All changes should be communicated to the site personnel impacted by the change.

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12.6 PHASED SCOPE

Some projects will have multiple contract packages or even multiple structures. For example, one project might have three different types of buildings. In those situations, it is recommended to develop a separate SSSP for each package.

12.7 SSSP PREPARATION AND CONTENT

The project SSSP should be prepared in collaboration with the safety department and the project management. It is recommended to hold a pre-job safety planning meeting to discuss the SSSP contents that shall include: company policies, owner safety requirements, all applicable laws, project-specific issues that will impact the safety performance of the project. The SSSP, whether it is for the overall project or a specific subcontractor, it shall include safety procedures as they pertain to their scope of work. If the scope does not have the exposure, the corresponding safety element is not required. The following content and safety work procedures, as applicable, should be part of the project SSSP.

12.7.1 Project Safety Policy

The project should establish a documented safety policy as the core of the project safety program. At a minimum, the policy should include a commitment to worker protection, worker involvement, and compliance with company and all appropriate regulations.

12.7.2 Scope of work

This section should include a brief description of the scope of work, details of the structure, detail any unusual site conditions and exposures, and it should also include an overview of activities that will be performed by the subcontractors.

12.7.3 Responsibilities

The SSSP should identify the responsibilities of the project team that should include: project manager, project superintendent, general foreman/foreman, safety department, and the crafts.

12.7.4 Site Logistic Plan

Include a site-specific logistics plan that includes:

- Pedestrian walkways
- Job trailer park
- Connex & Lay-down areas
- Delivery entrance
- Site security fence line (gate location, site lighting, security services)
- Concrete washout
- Tire washing area
- Evacuation muster points
- Craft parking
- Site orientation trailers
- Toilet Trailers
- Lunch tent
- Material staging and hoisting area

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12.7.5 Safety and Emergency Contacts

Include the name and contact information for project safety and field management personnel. Also, create a list of other contacts such as:

- Company legal counsel
- Project spokesperson
- Government agencies/offices (DOSH, OSHA, MSHA, EPA)
- Grievance counselors
- Red Cross
- Transportation services
- Utility companies

12.7.6 First Aid and Emergency Medical Services

Create an information sheet that includes information about the closest urgent care clinics, occupational clinics, eye clinics, and hospitals that will provide medical treatment to workers injured on the job. The project emergency contact information sheet should include the name of the facility, route map, phone number, and hours of operations. If the project has an on-site nurse station, ensure it is communicated to the employees during orientation and safety meetings.

12.7.7 Owner Requirements or Impacts

Address any site specific rules when working in or around operating facility. For example, adding a new building next to a large airport runway. Ensure appropriate rules are in place to minimize impacts to owner facility or operations. Many owners require special permits such as a dig permit, odor permit, dust permit, etc, when working in or close to their operating facilities.

12.7.8 Safety Administration Programs

The SSSP should include the following safety administration/management level elements.

- Senior management policy statement
- Job site postings
- Workplace Substance Abuse Programs
- Subcontractor Site Specific Safety Plan
- Safety Trainings
- Safety Meetings
- New Employee Orientation
- Safety Inspections
- Pre-task Planning and Job-Hazard Analysis
- Accident and investigation reporting procedures
- Return to work programs
- Crisis Management Plan
- Disciplinary procedures
- Safety Staffing

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12.7.9 Technical Areas

The following elements, if applicable, should be key components of the SSSP. Ensure detailed procedures are in place to address all high hazard operations.

- Site Environment (existing utilities)
- Public Protection (covered walkways, road closures, sidewalks)
- Industrial Hygiene (mold, dust, noise, lead, PCS, asbestos, lead, mercury, silica)
- Traffic Control Plan
- Trenching and Excavation
- Fall Protection
- Housekeeping
- Ladder and Scaffold Safety
- Lockout/Tagout
- Hazard Communication (HAZCOM)
- Confined space
- Electrical
- Bloodborne pathogens
- Traffic control plan
- Fire prevention and protection
- Hot work program
- Personal Protective Equipment (PPE)
- Respiratory Protection
- Hearing conservation program
- Welding and cutting
- Motorized Vehicles and Equipment
- Crane, rigging, and hoisting
- Material handling
- Environmental (Heat or Cold Stress Programs)
- Any Special Hazards that are not included above

The level of formality or details associated with an SSSP will vary depending on the project's anticipated risk level, which depends on the type, complexity, and size of the project. A large high-rise project might pose a lower risk compared to a small airport project. It can also depend on government requirements. An example is when working on an Army base you would have to follow the Army Corps of Engineers standards vs. regular OSHA standards, even though, the base is a federal facility. Hence, the project team should identify significant hazards and develop control measures by developing an excellent SSSP.

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Exhibit 12-1: Example Subcontractor SSSP Evaluation Form
(Used by permission from Exxel Pacific General Contractors)

Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Plan submitted by (Contractor Name):_____ **Required Safety Program Elements**	**Submitted in Plan?**	
	Yes	**No**
Company Safety Policy		
Designated Site Safety Representative		
First Aid and Emergency Procedures		
Procedure for Reporting Injury or Illness on the Job		
Weekly Safety Meetings		
Weekly Walk-around Safety Inspections		
General Safety Rules		
Personal Protective Equipment		
Fire Prevention and Protection		
Hazard Communication Program		
Material Safety Data Sheets and Chemical Inventory		
Fall Protection Policy		
Job Hazard Analysis		
Disciplinary Action Policy		
Heat-Related Illness Program		

If Contractor's scope includes any of the following elements, they must submit additional information as detailed in the Appendix to this Evaluation Sheet Sections 1 through 20	**Required?**		**Submitted?**	
	Yes	**No**	**Yes**	**No**
1. Work at a height greater than 10 feet?				
2. Work from Ladders				
3. Work from Scaffold				
4. Work from Scissors Lift or Boom Lifts				
5. Trenching/Excavation				
6. Cranes and Rigging				
7. Steel Erection				
8. Demolition				
9. Disturbance of Lead-Containing Substances				
10. Asbestos Abatement				
11. Use of Powder Actuated Tools				

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12. Use of Fork Lifts				
13. Entry to Confined Spaces				
14. Removal of contaminated soils considered hazardous waste				
15. Traffic Control				
16. Work on energized conductors				
17. Concrete and Masonry Work				
18. Use of electrical equipment, including plug and cord tools				
19. Noise Exposure above 85 dBA				
20. Exposure to Respiratory Hazards, including:				
Concrete grinding, chipping, cutting				
Application of spray-on material, including paint				
Application of adhesives or sealant				
Welding/Torch Cutting				
Sanding Drywall				
Use of combustion engines indoors				
Other Hazardous Chemicals?				

1. Work at height greater than 10 feet	**Included in Plan?**	
	YES	**NO**
Contractor must provide Fall Protection Work Plan, which includes provisions for:		
▪ Identifying all fall hazards in the work area.		
▪ Identifying the method of fall arrest or fall restraint to be provided.		
▪ Specifying the correct procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used.		
▪ Specifying the correct procedures for the handling, storage, and securing of tools and materials.		
▪ Identifying the method of providing overhead protection for the workers who may be in, or pass through the area below the work site.		
▪ Specifying the method for prompt, safe removal of injured workers.		
▪ Ensuring that employees are trained and instructed in the items described in the fall protection work plan.		
▪ The use of a Fall Protection Monitor System is **not** permitted on Exxel Pacific projects.		
2. Work from Ladders	**Included in Plan?**	
	YES	**NO**
Contractor safety plan must address:		
▪ Ladder inspection, condition, and repair		

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▪ Ladder storage and transport		
▪ Ladder set-up and use		
▪ Employee training		
3. Work From Scaffolding	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Design of scaffold by named qualified person(s)		
▪ Erection of scaffolding under the supervision of qualified, competent person(s)		
▪ Inspection of scaffold		
▪ Use of scaffolding by trained personnel		
▪ Training		
▪ Access to scaffolds		
▪ Fall Protection considerations during assembly/disassembly and use of scaffolding		
▪ Use of toe boards or other falling object protection		
4. Work from Scissors Lifts or Boom Lifts	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Inspection, testing and maintenance of equipment		
▪ Operator training and authorization requirements		
▪ Pre-use operator survey for area hazards such as loose terrain, drop-offs, ditches, overhead obstructions, etc.		
▪ Fall Protection		
5. Trenching / Excavation	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Avoiding underground installations		
▪ Providing means of access and egress from excavations		
▪ Protection of employees from cave-ins		
▪ Protection from falling objects or surface encumbrances		
▪ Daily inspection of excavations by a competent person		
▪ Maintaining the stability of adjacent structures (if present)		
6. Cranes and Rigging	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Operating within load ratings		
▪ Control of overhead loads and use of tag lines		

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▪ Crane certifications and inspections		
▪ Protecting swing radius		
▪ Avoiding overhead utilities and obstructions		
▪ Operator qualifications		
▪ Rigging Inspections		
▪ Rigging use and rigger qualifications		
7. Steel Erection	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Development of erection plan		
▪ Rigging of loads		
▪ Maintaining structural stability during erection		
▪ Landing metal decking and other loads		
▪ Fall protection -The use of a Fall Protection Monitor System is **not** permitted on Exxel Pacific projects.		
▪ Falling object protection		
▪ Training for erectors		
8. Demolition	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Demolition survey conducted by named competent person		
▪ Copy of the survey report to be maintained on site		
▪ Evaluating site for the presence of asbestos and other hazardous materials or chemicals		
▪ Control of utilities during demolition		
▪ Protection from falling materials		
▪ Dust control		
▪ Respiratory hazard evaluation and protection		
9. Disturbance Abatement for Lead	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Conducting Initial Exposure Assessments		
▪ Protecting employees during Initial Exposure Assessments		
▪ Evaluating Initial Exposure Assessment to determine the need for developing a Worker Lead Protection Plan		
▪ * For assistance reviewing Worker Lead Protection Plan, contact Exxel Pacific Safety Director.		

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10. Asbestos Abatement	Included in Plan?	
	YES	NO
Contractor Safety Plan must include provisions for:		
▪ Abatement to be performed by Licensed Asbestos Contractor		
▪ Asbestos Worker Training and Certification		
▪ Asbestos Supervisor training and certification		
▪ Providing written notification to L&I of abatement project		
▪ Exposure assessments and monitoring		
▪ Communication of asbestos hazards to other persons on site		
▪ Establishing regulated areas		
▪ Establishing work practices and engineering control methods, including wetting, HEPA vacuuming, glove bagging, local exhaust ventilation, and negative pressure enclosures		
▪ Respiratory protection		
▪ Collection and disposal of asbestos containing material		
11. Powder Actuated Tools	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Operator training and qualifications		
▪ Personal Protective Equipment		
▪ Care and custody of powder actuated tools and loads		
▪ Posting of hazard warning signs		
▪ Avoiding use of soft, thin or easily penetrated materials		
12. Use of Fork Lifts	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Inspection, testing and maintenance of equipment		
▪ Operator training and authorization requirements		
▪ Pre-use operator survey for area hazards such as loose terrain, drop-offs, ditches, overhead obstructions, etc.		
13. Entry to Confined Spaces	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Identifying and controlling confined spaces		
▪ Permit entry procedures		
▪ Employee training		
▪ * For assistance reviewing permit required confined space entry program, contact Exxel Pacific Safety Director		

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14. Removal of Contaminated Soils considered hazardous waste	Included in Plan?	
	YES	NO
Contractor Safety Plan must include provisions for:		
▪ Conducting preliminary site evaluation to assess hazards		
▪ Developing a written HASP (Health and Safety Plan) for hazardous waste operations		
▪ * For assistance reviewing the HASP, contact Exxel Pacific Safety Director		
15. Traffic Control	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Developing temporary traffic control plans		
▪ Orientation of traffic personnel and flaggers to traffic control plan		
▪ Use of certified flaggers		
▪ Use of warning signs and barriers		
16. Work on Energized Conductors	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Lockout / tag out policy		
▪ Specific lockout / tag out procedures		
▪ Employee training		
17. Concrete and Masonry Work	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Protection from impalement hazards		
▪ Safety considerations specific to the concrete delivery method (concrete pump, bucket)		
▪ Personal protective equipment and first aid supplies to protect from caustic burns		
▪ Post-tensioning operation		
▪ Respiratory protection for concrete finishers		
▪ Establishing limited access zones for masonry wall construction		
▪ Bracing of masonry walls		
18. Use of electrical equipment, including plug and cord tools	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Inspection of cords, cables and connectors		
▪ Ground fault protection		

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▪ Grounding		
▪ Protecting cords from damage		
19. Exposure to noise above 85 dBA	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Identifying and controlling noise sources		
▪ Noise monitoring		
▪ Hearing Protection		
▪ Employee Training		
20. Exposure to Respiratory Hazards	**Included in Plan?**	
	YES	**NO**
Contractor Safety Plan must include provisions for:		
▪ Identifying and evaluating respiratory hazards		
▪ Material Safety Data Sheets for chemical products		
▪ Methods for controlling employee exposure		
▪ Methods for controlling fugitive emissions		
▪ Written Respirator Program		
▪ * For assistance evaluating written respiratory protection program, contact the Exxel Pacific Safety Director		

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13
JOB HAZARD ANALYSIS & PRE-TASK PLANNING

13.1 INTRODUCTION

Many construction accidents and injuries happen because construction crafts are not trained in proper job safety procedures. One of the best ways to prevent construction accidents and injuries is to develop and implement Job Hazard Analysis (JHA) and Pre-task Planning (PTP) programs as part of a company's overall project safety and health program. The JHAs/PTPs helps prevent accidents and injuries, by identifying workplace hazards associated with a job or task, and the effective controls (eliminate or minimize) for the hazards. The purpose of this chapter is to provide guidance to construction contractors to develop a new or improve their existing JHAs/PTPs programs based on industry best practices.

13.2 DIFFERENCES BETWEEN JHAs AND PTPs

Even though both JHAs and PTPs are safety planning and communication tools, there are some subtle differences between them as listed in Table 13-1.

Table 13-1: Major Differences between JHAs and PTPs

Job Hazard Analysis (JHA)	Pre-task Planning (PTP)
JHA is used to analyze a "job," normally a larger scope of work that involves more than one task.	PTP, on the other hand, involves the analysis of a single "task," which is a specific section of work done within the broader scope of work.
Overall project JHAs are typically completed by the general contractor's project supervision with input from the safety department before the start of the project. Subcontractors and their sub-tier subcontractors will be responsible for developing their JHAs before mobilization on the site.	PTPs are completed by the general contractor (for the self-performed scope) or subcontractor crew led by their foreman, for every task daily, at the start of each work shift or whenever the crew's task or work conditions changes. This increased involvement of crews in the safety process is one of the major benefits of the PTP processes.
The JHA evaluates hazards associated with a particular broader job scope to determine the associated project safety requirements and methods to control potential exposures.	This on-site assessment tool evaluates hazards associated with a particular task to identify methods to control potential exposures. The PTP typically includes hazards and safety precautions identified in the JHA.
JHAs are normally submitted along with the site-specific safety plan for review and approval by the upper tier contractor.	PTPs are submitted to the project supervision or the project safety personnel, on the day of the task.

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Example - A JHA will be required for overall concrete pours on slab-on-metal deck for a high-rise office building.	Example - A PTP will be required to complete a small section of the concrete pours on a slab-on-metal deck for a section of the deck on just one floor, which will be completed on a particular day.
JHAs serves as a reference document during the accident investigation process.	PTPs also serves as a reference document during the accident investigation process.
Even though the basic concept is the same, companies have different names for JHAs such as Job Safety Analysis (JSA), Job Task Assignment (JTA), and Total Safety Task Instructions (TSTI).	Even though the underlying concept is the same, companies have different names for PTPs such as Task Hazard Analysis (THA), Task Safety Analysis (TSA), Pre-job Safety Instruction (PSI), Pre-task Briefing (PTB), etc.

13.3 JOB HAZARD ANALYSIS (JHA) PROGRAM BEST PRACTICES

The purpose of this section is to provide guidance to construction contractors to develop a new or improve their existing JHAs programs based on industry best practices.

- Determine the jobs within your company to be analyzed. JHAs should be first developed for jobs with the highest risk. Risk is defined as the product of "severity" and "probability" of accidents and injuries (see Table 13-1). High risk or hazard jobs include crane and rigging, demolition, confined space, public protection, etc. Other jobs to consider include any new job scope, jobs involving new equipment (e.g., a new model of crane or excavator), jobs infrequently performed, and routine jobs that require deviation from documented procedures.

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Table 13-1: Example of a Risk Assessment Code (RAC)

(Used by permission from NOVA Group Inc.)

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as Catastrophic, Critical, Marginal, or Negligible

H = High Risk

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on JHA. Annotate the overall highest RAC at the top of AHA.

L = Low Risk

RAC Chart

E = Extremely High Risk

M = Moderate Risk

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Table 13-2: Example of Hazard Analysis for General Safety for weather exposure using RAC
(Used by permission from NOVA Group Inc.)

Job Steps	Hazards	Controls	RAC
General Safety Requirements all Steps	Exposure to Cold or Hot Weather	**Minimum Personal Protective Equipment Dress:** • Long Pants • Shirts with Sleeves • Hardhat • Covered Shoes (Steel Toe Preferred) • Safety Glasses (Potential Eye Hazard Areas) **Weather:** • Wear appropriate clothing for the hot or cold weather. **(List specific clothing or refer to Company quick sheet, SOPs, plan, etc. for specific details)** • Sun block • Lip balm **Dehydration:** • Drink at least ½ liter of water an hour.	L
	Dehydration	• Refer to Company quick sheet, SOPs, plan, etc. for specific details on heat stress signs and symptoms.	

- The JHA is typically documented with a JHA worksheet. The worksheet usually consists of three columns:
    1. Break down the job sequence of individual steps,
    2. Identify the hazards associated with each step, and
    3. Develop control measures for each hazards including applicable regulatory, and project-specific safety and health requirements associated with each hazard.

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- *Job Sequence:* Select an individual who is experienced and knowledgeable about the job to ensure "all" the steps involved with the job is identified. For example, when developing a JHA for tower-crane operations, choose an experienced tower crane operator and rigger who can provide valuable input to the entire process. There is no scientific data on what is the optimum number of "steps" for each JHA, but limiting it to ten steps would make it efficient.

- *Hazards:* During the hazard identification phase it is critical to identify all actual and potential hazards, which by itself or interaction with other factors can cause harm. It is best practice to receive feedback from superintendents, general foreman, foreman, employees, safety professionals within the company (and outside the company), and trade associations. Review of your company accident data, industry accident data for that particular job or the trade that performs the job, insurance claims frequency and severity data for that industry classification, can also shed some light into hazard identification. For example, the National Institute of Occupational Safety and Health (NIOSH)'s Fatality Assessment and Control Evaluation (FACE) program identifies various "factors" that contribute to fatal injuries and also provides comprehensive "recommendations" for preventing similar deaths. *What are some of the most common hazards encountered on construction sites?*
    - Caught In/Between
    - Chemical Burns
    - Chemical Spill
    - Compressed Gases
    - Confined Spaces
    - Crane
    - Electrical Shock
    - Elevated Work
    - Explosion
    - Falls from Elevations/Same level
    - Fire
    - Hazardous Chemicals
    - Heat Stress
    - High Noise Levels
    - Inadequate Access
    - Inhalation Hazard
    - Ladders
    - Lockout/Tagout
    - Manual Lifting
    - Mobile Equipment
    - Particles in Eyes
    - Poor Housekeeping
    - Radiations
    - Rigging
    - Scaffolding
    - Sharp Objects
    - Struck By
    - Thermal Burns

- *Controls:* Similar to the hazard identification phase it will be beneficial to receive feedback from different stakeholders to identify control measures. As with any hazard, the first control that should be considered is engineering controls followed by administrative controls and Personal Protective Equipment (PPE) being the last option.
    - Engineering controls involves, to the extent feasible, to redesign the work environment and the job itself to eliminate hazards or reduce exposure to hazards. Engineering controls should be the first option in dealing with any hazards. The following principles as recommended by the Occupational Safety and Health Administration (OSHA) should be followed: (a) if feasible, design the facility, equipment, or process to remove the hazard or substitute something that is not hazardous, (b) if removal is not feasible, enclose the hazard to prevent exposure in normal operations, and (c) where complete enclosure is not feasible,

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establish barriers or local ventilation to reduce exposure to the hazard in normal operations.
  - o Administrative controls involve altering the way work is performed such as job rotations, etc.
  - o PPE introduces a barrier between the worker and the hazard, should be the last control method.

In addition, determine if there are other options available to perform the job. For example, make changes to concrete block cutting procedures so that they are cutting using wet methods that eliminate silica dust versus using dry cutting methods that generate dust and the use of respirators.

- *Continuous Improvement:* After successful development and implementation of the JHAs, in order to be effective, the JHAs should be reviewed periodically and updated as needed as part of the program's continuous improvement process based on: (1) lessons learned from new accidents and injuries that requires revision of JHA, (2) feedback from workers and supervisors on particular job procedures, hazards, and control measures.

- *Training and Communication:* How will the current and new workers get trained on the JHAs? How will changes to JHAs be communicated to the workers? How and who will the workers provide feedback with regards to the JHAs?

- *Example JHA:* An example JHA form is presented in Exhibit 13-1. Contractors can use this as a template to develop their own JHA form that suits their company's needs.

13.4 PRE-TASK PLAN (PTP) PROGRAM BEST PRACTICES

The purpose of this section is to provide guidance to construction contractors to develop a new or improve their existing PTPs programs based on industry best practices.

- A written policy in place regarding the PTP procedures to involve construction workers in this important safety process.

- The PTP meeting should be conducted, at a minimum, prior to the start of each workday, prior to any new work activity or whenever the current task or work conditions change. Even though a crew might perform the same task every day, due to the changing nature of construction activities or crew membership, it is still necessary to complete a new PTP at the beginning of each day.

- The crew foreman should lead a PTP session. The crew foreman will typically identify the task and the crew as a team develops a plan.

- The PTP meeting should be held at the location where the task is to be performed. See Figure 13-1, which shows a crew performing PTP.

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Figure 13-1: Construction crew performing PTP (Picture Courtesy Guy F. Atkinson Construction)

- All crew members should participate in pre-task planning and should sign the completed PTP (see Figure 13-2).

- The critical steps involved in a PTP process: (1) work area assessment, (2) breakdown of tasks into separate steps, (3) identification of hazards associated with each step, (4) identification of control measures to minimize or eliminate the hazard, and (5) crew sign-off. Ensure the crew has the applicable JHA for the task. The PTP should include hazards and precautions identified in applicable JHA.

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Figure 13-2 Safety Task Assignment before work (Picture Courtesy Hensel Phelps Construction)

- All project personnel should be trained on how to prepare an effective PTP. This training can be part of the new employee orientation or a stand-alone PTP training. The crew foreman should receive additional training on how to conduct an effective PTP session, and also how to document the PTP. Consideration should be given to non-English speaking workers when not only delivering the training but also during the PTP process itself. It can include providing training and related documentation in another language or providing interpreters.

- It is common to use pre-task planning forms that document the results of the meetings.
    - o *Pocket card vs. Regular A4 sheet:* The format of the form varies from company to company. Some companies have used a trifold PTP that will fit in a safety vest pocket while some firms have used a PTP printed on an A4 sheet.
    - o *Open*-ended vs. Close-ended: A typical PTP worksheet consists of crew demographics (project, work description, location, supervisors, date, contractor name, and crew sign-off) and an open-ended three columns (steps, hazards with each steps, and controls for each hazards). Some companies have developed PTPs with a combination of both open-ended like above and have included close-ended questions to serve a reminder for the crew such as, "Is air monitoring required?" "Are there any special permits required to complete this task?", etc.

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- A copy of the completed PTP should be readily available near the work area where crew members have the knowledge of its location. The original PTP should be submitted to the project supervision for review and feedback.

- A PTP program should also include a formal audit process in place to confirm the quality of hazard recognition. All PTPs should be reviewed by the Project Superintendent or designee, and provide feedback regarding the PTP contents. The review and following field audits should identify potential inadequacies:

    - Failure to identify all the steps that are needed to complete the task,
    - Failure to identify the potential hazards associated with each step,
    - Failure to identify the control measures for each hazard,
    - Failure to review the PTP with crew members (missing signatures),
    - Failure to post PTP in the work area,
    - Failure to follow the PTP, and
    - Failure to stop work when there is a change of conditions and make appropriate changes to the PTP.

- As part of a continuous improvement process and to capture lessons learned, a good pre-task plan should include a post-task comment section. The post-comment section will provide the foreman and his crew a place to include lessons learned from the task such as new hazards encountered, things that went well, etc.

- Exhibit 13-3 through 13.5 presents a few examples of PTP worksheet. Contractors can use this as a template to develop their own PTP form that suits their company's needs.

Note: The example PTPs and JHAs provided in the exhibits are only included as an example, and the users should be aware that they may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

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Exhibit 13-1: Example Job Hazard Analysis
(Used by permission from GLY Construction)

JOB HAZARD ANALYSIS | JOB # XXXXXX
GLY CONSTRUCTION

Job #:

Write-up Date:

Task Date:

Company:	**Area of Work:**	**Page x of x**
Author:	**Task to be Accomplished:**	
Start Date:	**End Date:**	**Crew Size:**

WORK EVALUATION	CIRCLE ONE		CIRCLE ANY THAT ARE REQUIRED	
Does this task require special training?	Yes	No	**Eye/Face PPE**	**Signage**
Should Project superintendent be involved in this planning?	Yes	No	**Hand/Arm PPE**	**Open Flame**
Do you need to review an MSDS to proceed?	Yes	No	**Hearing PPE**	**Extinguishers**
Will weather conditions effect the safe completion of the task?	Yes	No	**Fall Pro. PPE**	**Specialized Tools**
Are enough workers assigned to this task to complete it safely?	Yes	No	**Respirator**	**Rescue System**
Does this task require special permits / procedures?	Yes	No	**Barricades**	**Ladders**
Does this task require disassembly of systems or equipment?	Yes	No	**Forklift**	**Man Lift Required**
Are there shop drawings needed to do the work?	Yes	No	**Other:**	
Are materials & tools to do the job on hand?	Yes	No	**Other:**	
Has the planning of the work involved walking the location of the work?	Yes	No	**Other:**	
Are there overhead hazards?	Yes	No	**Other:**	
Are any employees new to the work involved?	Yes	No	**Other:**	
Are barricading required?	Yes	No		
Has the JHA been reviewed with the crew doing the work?	Yes	No		

SEQUENCE OF ACTITIVES	HAZARDS IDENTIFIED	HAZARD PRECAUTIONS

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Exhibit 13-1: Example Job Hazard Analysis Contd.
(Used by permission from GLY Construction)

SEQUENCE OF ACTIVITIES	HAZARDS IDENTIFIED	HAZARD PRECAUTIONS
LIST OF TOOLS REQUIRED:		

Foreman's Signature	**Phone**
Crew Signatures:	
1	**6**
2	**7**
3	**8**
4	**9**
5	**10**

IF WORK CONDITIONS CHANGE, STOP WORK. A NEW JHA SHOULD BE FILLED OUT.

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Exhibit 13-2: Example Completed Demolition Work Job Hazard Analysis

(Used by permission from Exxel Pacific)

Note: This best practice tool is only included as an example, and the users should be aware that the it may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this example JHA for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Construction Phase: **Demolition**	Project:
Contractor	Location:
Contractor Number:	Estimated Start Date:

Operation:	**Hazard:**	**Action to be taken:**
1. Selective Interior Demolition	1.1 Construction employees and non-job related employees entering removal area	1.1.2 Flag and post perimeter with "danger" signs and "Danger" tape
	1.2 Contact with existing utilities	1.2.1 Owner, General Contractor, and Electrical Sub will review existing construction plans to locate existing utilities and their control points
		1.2.2 Electrical Subcontractor to lock, tag and try out control points
		1.2.3 Foreman will review with all employees existing hazardous chemicals and systems that must remain operational and the process and care to be used to prevent damaging any existing system.
	1.3 Dust Inhalation	1.3.1 Employees performing this GWB demo will wear a dust mask
1. Interior Selective Demolition (Cont.)	1.4 Electrocution	1.4.1 Utilize an assured grounding or ground fault circuit interrupter program
		1.4.2 All electrical tools and cords used in this operation will be inspected daily prior to use

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Operation:	Hazard:	Action to be taken:
		1.4.3 Cords will be kept clear of falling debris and debris cart paths
		1.4.4 Electrical tools will not be lowered down from ladders or scaffolding by the cord
	1.5 Flying debris/Contact with power tools/Hearing Loss	1.5.1 Employees will wear hard hats, ear plugs, safety glasses, face shields, gloves, and work boots while performing this operation
	1.6 Back injuries	1.6.1 Employees will be instructed in proper body mechanics: A. Keep back Straight B. Bend with your knees (Not Your Back) C. Lift with your legs (Not Your Back) D. When twisting, pivot your feet
		1.6.2 Demo debris will be cut into pieces small enough for two people to load into dumpster
		1.6.3 When loading debris into dumpster use the buddy system for the large pieces
	1.7 Ladders	1.7.1 Inspect ladder for defects before each use
		1.7.2 Never use a ladder in a horizontal position as a walk-plank or scaffold
		1.7.3 If a ladder is too short, get a taller ladder
1. Interior Selective Demolition (Cont.)		1.7.4 Hold side rails with both hands when going up or down a ladder. Material or equipment will be raised or lowered with a rope

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Operation:	Hazard:	Action to be taken:
		1.7.5 Face the ladder when climbing up or down and never slide down a ladder
		1.7.6 Never climb higher than the second step from the top of stepladders
		1.7.7 Observe all warning signs on ladders
		1.7.8 Ladders will be maintained free of oil, grease and other slipping hazards
		1.7.9 Ladders will not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity
		1.7.10 The area around the top and bottom of the ladders will be kept clear
		1.7.11 Ladders placed in any location where they can be struck by workplace activities or traffic, such as in passageways, doorways, or driveways, will have "Caution " tape across the opening to keep the activities or traffic on the other side, or use a spotter
		1.7.12 While working on ladders they will not be moved or shifted
1. Selective Interior Demolition (Cont.)	1.7 Ladders (Cont.)	1.7.13 Cross bracing on the rear section of stepladders will not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections
		1.7.14 Employees will not climb ladders while carrying tools or materials

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Operation:	Hazard:	Action to be taken:
		1.7.15 Step ladders will be fully extended with the spreader bars locked in place before climbing
	1.8 Scaffolding	1.8.1 No scaffold will be erected, moved, dismantled, or altered except under the supervision of the project competent person.
		1.8.2 The Scaffold Competent person will inspect the scaffold daily before use.
		1.8.3 Guardrails and toe boards will be installed on all open sides and ends of platforms more than 4' above the ground or floor.
		1.8.4 Debris will be removed off the scaffold platform as it accumulates
		1.8.5 An access ladder or equivalent safe access will be provided.
		1.8.6 Slippery conditions on scaffolds will be eliminated as soon as they occur.
		1.8.7 Employees will not ride on scaffolding while it is being moved
1. Interior Selective Demolition (Cont)	1.9 Falls	1.9.1 Competent person will enter all fall hazard areas onto company fall protection work plan such as: Scaffolding, leading edges, steel erection.

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Operation:	Hazard:	Action to be taken:
		1.9.2 Competent person will enter means of protection from fall hazards onto company fall protection work plan such as: Standard Guardrails and toe boards, catenary line secured to the structure, full body harness and lanyard.
		1.9.3 Competent person will train all employees to the fall protection work plan and the means of protection. Employees are required to sign-off on the training.
	1.10 House Keeping	1.10.1 Debris will be kept out of walking paths
		1.10.2 Debris will be thrown away daily

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Exhibit 13-3: Example Pre-task Plan/Job Hazard Analysis *(Used by permission from Andgar Corporation)*

HSE Concerns

Check the applicable activities in your area and evaluate safe measures:

- ☐ Asbestos/Lead Exposure
- ☐ Asphalt
- ☐ Attendants
- ☐ Barricades
- ☐ Cement
- ☐ Confined Space
- ☐ Corrosives
- ☐ Cranes / Life Equip
- ☐ Dismantle / Demolition
- ☐ Electrical
- ☐ Emission Controls
- ☐ Equipment Inspection
- ☐ Erosion Controls
- ☐ Excavation / Trenching
- ☐ Fall Protection
- ☐ Flammable Material
- ☐ Hazard Communication
- ☐ Heavy Equipment
- ☐ High Pressure Cleaning
- ☐ Housekeeping
- ☐ Insects'
- ☐ Lifting Safety
- ☐ Lock Out / Tag Out
- ☐ Lead Exposure
- ☐ Material Storage
- ☐ Tank / Pipe Testing
- ☐ Pinch Points
- ☐ Powder Actuated Tools
- ☐ Power Lines
- ☐ Power Tools
- ☐ Pressurized Equipment
- ☐ Respiratory Protection
- ☐ Rigging
- ☐ Traffic Management
- ☐ Vehicles / Mobile Equip
- ☐ Ladders / Scaffolds
- ☐ Weather Conditions
- ☐ Working at Height
- ☐ Working in Cold
- ☐ Working in Heat
- ☐ Working with Sharps
- ☐ HSE Team Involvement
- ☐ Others

_____
_____
_____
_____

Involved Crew Members

Name	Pre Task Initial	Post JHA Initial

Post JHA

Foreman: _____

Date: _____ Time: _____

Was anyone injured or did an unplanned incident occur today?
☐ Yes ☐ No

If yes, explain: _____
_____
_____

Was it reported to the Safety Office?
☐ Yes ☐ No

Is the work area clean and free of debris from the day's work?
☐ Yes ☐ No

What problems did you have with today's work assignment?
_____

What can we do to improve performance?
_____
_____

Miscellaneous concerns:
_____
_____

Reviewers

General Foreman: _____

Safety Department: _____

Management Participation

Printed Name: _____

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DAILY

JHA / Task Plan

Project Name: _____

Work Area: _____

Cell Phone Contact: _____

Contract Supervisor: _____

Foreman: _____

Date: _____ **Time:** _____

Task Location: _____

Task Description: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

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Exhibit 13-3: Example Pre-task Plan/Job Hazard Analysis Contd.

(Used by permission from Andgar Corporation)

Job Hazard Analysis

The JHA process significantly impacts the success of our HSE culture and the reduction of incidents. The interactive process requires that management / supervisors and employees shall:

- Define the task for each activity.
- Identify known and potential HSE hazards associated with the task.
- Determine work practices to complete the task safely.
- Address requirements for all personal protective equipment.
- Establish that all crew / department employees understand the above information.
- Execute the task as described or stop and repeat the process.

JHA's will be completed daily for each task. Post this JHA in an obvious place during the length of the task. Each crewmember involved with the task will sign this JHA.

1. List job steps associated with the task.
2. List hazards associated with the job steps.
3. List safe work practices to eliminate the hazards.

At the end of the day, submit this JHA to Product Area Leader. If deviation from safe work practice occurs, work must be stopped.

Personal Notes:

Personal Protective Equipment

Clothing
☐ Reflective Vest or High Vis T-Shirt

Ear Protection
☐ Ear Plugs ☐ Ear Muffs

Eye / Face Protection
☐ Safety Glasses ☐ Welding Hood
☐ Goggles ☐ Face Shield

Fall Protection
☐ Full-body Harness ☐ Rope / Slid Grip
☐ Lanyard, all types ☐ Other_____

Foot Protection
☐ Steel Toed Boots ☐ Leather Work Boots

Hand & Arm Protection
☐ Leather ☐ Rubber / Latex
☐ Kevlar or Equivalent ☐ Forearm Cuffs

Head Protection
☐ Hard Hat

Respiratory Protection
☐ Qualified to wear?
Type: _____

Other Personal Protective Equipment

_____

_____

Procedures & Permits Required

☐ Hot Work
☐ Hot Work Confined Space
☐ Confined Space
☐ Excavation
☐ Lockout / Tagout / Control of Hazardous Energy
☐ Signs / Barricades
☐ Hazardous Material Compliance
☐ Crane Lift
☐ Scaffolds
☐ Fall Protection Work Plan

Other Procedure & Permits Required

_____

Employee Certifications Required

☐ Crane Operator ☐ Forklift Operator
☐ Mobile Equipment Operator ☐ Vehicle Operator
☐ Powder-actuated Tool User ☐ Hazardous Waste
☐ Heavy Equipment Signalman
☐ Competent Person (excavations, confined space, scaffold inspections, hazardous material, heavy equipment, rigging / signaling)

Other Employee Certifications Required

_____

Step 1
Identify Task Steps

_____

_____

_____

_____

_____

_____

Step 2
Identify Hazards Associated with Task Steps

_____

_____

_____

_____

_____

_____

Step 3
Identify Safe Work Practices Associated with Task Steps

_____

_____

_____

_____

_____

_____

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Exhibit 13-4: Example Pre-task Plan

(Used by permission from Balfour Beatty Construction)

Balfour Beatty
Construction

BALFOUR BEATTY CONSTRUCTION PRE TASK PLAN (PTP)

nstructions: (1) ***No physical work is permitted to take place absent a detailed PTP.*** The PTP is used in conjunction with other tools (JHA, Site Logistics Plan, Dig Authorization, rane Pick plan, etc.). **(2)** The Supervisor/Foreman and crew must complete the PTP. The Supervisor/Foreman must lead the discussion with the work crew soliciting feedback o ensure that all workers are familiar with the PTP. **(3)** The crew shall walk the work areas prior to starting work to identify hazards. **(4)** Corrective measures shall be nplemented to eliminate or mitigate hazards associated with the task. **(5)** Each day prior to work commencement, the work task(s) shall be reviewed. **(6)** All crew members hall sign the PTP. The PTP shall be displayed in the work area. If conditions change, the job changes, a significant hazard presents itself, or a deficiency in plan is noted the ork shall STOP and a new plan must be compiled. The foreman must convey to the crew that each individual has the obligation and authority to STOP and seek guidance if e/she is unsure of the task to be carried out.

nstructions to complete the columns below: Column 1. Write the name of the task. It is critical that the PTP for the particular work task is specific to the task and lists the teps associated with the work task. The PTP should recognize unique project circumstances such as crew experience, PPE, equipment to be used, means of communication, gnage and barricades, adjacencies, weather, access, lighting, etc. **Column 2.** List the potential hazards associated with the task. **Column 3.** List the activities required to chieve a safe plan to overcome/eliminate the hazard.

roject Name: **ate:**	**Work area (Building/Floor/Area):**	**Contractor:**
ctivity/Task: **upervisor has walked/checked work area in dvance of work: (initials)**	**Resource Applicability (Attach as Necessary):** ☐ AHA/JHA ☐ Logistics Plan (People/Equipment) ☐ EAP (Contingency Plan) ☐ Other	**Supervisor/Foreman:** **Phone #:** **Emergency Contact:** **Phone #:**
ermits/Forms required: Yes ☐ No ☐ ☐ Confined Space ☐ Utility/Excavation Permit ☐ Hot Work (FPP) ☐ Dig Authorization ☐ Energized Electrical Work ☐ Proximity to Haz Electrical Source ☐ Crane Pick ☐ Fall Protection Plan ☐ Lockout/Tagout ☐ Other	**Tools & Equipment (List):** 1. 2. 3. 4. 5. 6.	**Additional PPE required: Yes ☐ No ☐** ☐ Hand (Glove Type) ☐ Hearing ☐ Face (Goggle or Shield) ☐ Fall Arrest ☐ Respirator ☐ Other

Weather Conditions: Temperature_____*deg.* Precipitation_____*inches* Wind Speed (Sustained)_____*MPH* (Gust)_____*MPH* *Heat Index*_____
escribe your plan for protecting workers in unfavorable weather conditions at the bottom of this page.

TASK (*in sequence*):	HAZARD ASSOCIATED WITH THE WORK:	SAFE PLAN TO ELIMINATE/CORRECT HAZARD:
Column 1	Column 2	Column 3

ORKER CONCERNS OR IDEAS
concerns or ideas to help improve safety for future follow-up.

EW MEMBER SIGNATURES *(Print and Sign)* **Foreman/Lead** _____

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Exhibit 13-5: Example Pre-Job Safety Instruction Form

(Used by permission from PCL Construction Services, Inc.)

Pre-Job Safety Instruction (PSI)

Please complete a **PSI** at the task location prior to start of each task or when conditions change.

Company / Craft	Date	Time	Job No. / Permit No.
Project	Task Location		Muster / Meeting Point

✓ Review these items with the crew at the site of the task and check the blocks that apply to the work.
"HIGH RISK" activities need a HSE Operating Procedure or a JHA. (Supervisor to Identify)

Environmental Hazards
- ❑ spill potential / containment
- ❑ HAZMAT / TDG storage
- ❑ weather conditions
- ❑ MSDS reviewed for hazardous materials
- ❑ ventilation required
- ❑ heat stress / cold exposure
- ❑ lighting levels too low
- ❑ housekeeping

Ergonomics Hazards / Material Handling
- ❑ working in a tight area
- ❑ parts of body in line of fire
- ❑ working above your head
- ❑ pinch points identified
- ❑ repetitive motion

Work at Height Hazards
- ❑ barricades, flagging, and signs in place
- ❑ hole coverings in place
- ❑ protect from falling items
- ❑ powered platforms
- ❑ others working overhead/below
- ❑ fall arrest systems
- ❑ ladders

Activity Hazards
- ❑ welding / grinding
- ❑ burn / heat sources
- ❑ compressed gasses
- ❑ working on / near energized equipment
- ❑ electrical cords / tools - condition
- ❑ equipment / tools inspected
- ❑ critical lift meeting required
- ❑ energy isolation
- ❑ airborne particles
- ❑ open hole(s) / leading edge(s)
- ❑ mobile equipment / vehicle
- ❑ rigging
- ❑ excavation / underground work hazards
- ❑ confined space

Access / Egress Hazards
- ❑ scaffold (inspected and tagged)
- ❑ slip / trip potential identified
- ❑ required permits in place
- ❑ excavations
- ❑ walkways / roadways
- ❑ Other: _____

Personal Limitations / Hazards
- ❑ clear instructions provided
- ❑ trained to use tool and perform task
- ❑ distractions in work area
- ❑ working alone (communication)
- ❑ lift too heavy / awkward position
- ❑ external noise levels
- ❑ physical limitations
- ❑ first aid requirements

PPE Requirements
- ❑ goggles / Fectoggles / Spoggles
- ❑ face shield
- ❑ gloves (kevlar or leather)
- ❑ coverall (fire retardant)
- ❑ hearing protection
- ❑ respirator
- ❑ harness / lanyard
- ❑ reflective vest
- ❑ footwear (condition / application)

✓ Identify the task steps and hazards, and then identify the plans to eliminate or control the hazards.

TASK STEPS	HAZARD	CONTROL

DO NOT SIGN UNTIL YOU UNDERSTAND AND AGREE WITH THE PSI. REVIEW AND INITIAL AFTER BREAKS AND LUNCH.

Worker Signature:	1st Break	Initial after: Lunch	2nd Break	Worker Signature:	1st Break	Initial after: Lunch	2nd Break

Supervisor: _____ _____

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Exhibit 13-5: Example Pre-Job Safety Instruction Form Contd.

(Used by permission from PCL Construction Services, Inc.)

Auditor: _____ Print Name _____ Signature _____ DD/MM/YY

	Adequate	Inadequate		Adequate	Inadequate
1. Task description			6. Workers' names legible		
2. Hazard identification			7. Reviewed / signed by foreman		
3. Hazard controls			8. Muster / assembly point identified		
4. All sections implemented			9. Tools and equipment inspected		
5. Initialed after breaks / lunch			10. PSI at task location		

Comments: _____

Auditors will comment on all inadequate items and those that are worthy of positive recognition.

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14
SAFETY TRAINING

14.1 INTRODUCTION

How many times have we heard the lack of "common sense" as a reason for accidents? There is no "common-sense" in safety, either workers have the knowledge and skill to succeed or they do not. An effective safety training will increase worker competence and knowledge to identify and control hazards, resulting in fewer job site accidents. Safety training should be an integral part of every Site Specific Safety Plan (SSSP). This chapter provides guidelines for developing a new or improving an existing site-specific training program.

14.2 IDENTIFICATION OF TRAINING NEEDS

The project supervision and a representative from the safety department should review the following information, and develop a site-specific training matrix. A training matrix is a tool that lists the training requirements for all site personnel including workers, supervisors, and managers.

- Regulatory training programs (required by federal, state, or local laws such as DOSH, federal OSHA, fire department, EPA, DOT, etc.)
- Project-specific contract requirements (e.g., U.S. Army Corps of Engineers EMS 385)
- Site-specific hazards (e.g., tunnel safety, boring machine safety)
- Company's accident, audit, and inspections history from similar projects
- Manufacturer requirements for equipment and tools use

For example, the Washington State Department of Labor & Industries has summarized the various rules requiring training on their website.[1]

14.3 TRAINING REQUIREMENTS IN CONTRACTS

The general contractor should contractually require each subcontractor and tiers to document hazard-specific safety training requirements by job classification, and include it in their SSSP. For example, develop a matrix for different tradespeople like plumbers, fitters, etc. In addition, require written training records available for audit on the site. Use the contracts to remind and require the subcontractors to provide bilingual supervisors who must be on site any time non-english speakers are on the jobsite.

1 Washington State Department of Labor and Industries, Division of Occupational Safety and Health (DOSH). Rules Requiring Training. http://www.lni.wa.gov/SAFETY/TRAININGPREVENTION/PROGRAMS/REQUIREDTRAINING.ASP. (Accessed January 31, 2015).

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14.4 TRAINING DEVELOPMENT AND DELIVERY BEST PRACTICES

A general review of training "best practices," reveals four characteristics that sound training programs have in common. The best training programs are accurate, credible, clear and practical.[2] OSHA has developed voluntary training guidelines for employers to provide effective training to employees. OSHA's training guidelines follow a model that consists of:[3]

- Determining if training is needed
- Identifying training needs
- Identifying goals and objectives
- Developing learning activities
- Conducting the training
- Evaluating program effectiveness
- Improving the program

More guidance on training development best practices can be found in American National Standards Institute (ANSI)/ American Society of Safety Engineers (ASSE) *Criteria for Accepted Practices in Safety, Health, and Environmental Training*, ANSI/ASSE Z490.1-2009. This standard establishes criteria for safety, health and environmental training programs, including development, delivery, evaluation and program management.[4]

Safety trainers should understand the adult learning process. OSHA provides one of the best guidance on adult learning techniques. The following are the basic principles of how adults learn, which is directly applicable to safety and health training programs:[5]

- Adults are voluntary learners – Most adults learn because they want to. They learn best when they have decided they need to learn for a particular reason.
- Adults learn needed the information quickly – Adults need to see that the subject matter and the methods are relevant to their lives and to what they want to learn. They have a right to know why the information is important to them.
- Adults come with a good deal of life experience that needs to be acknowledged – They should be encouraged to share their experiences and knowledge.
- Adults need to be treated with respect – They resent an instructor who talks down to them or ignores their ideas and concerns.
- Adults learn more when they participate in the learning process – Adult need to be involved and actively participating in class.

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2 Occupational Safety and Health Administration (OSHA). Best Practices for the Development, Delivery, and Evaluation of Susan Harwood Training Grants. https://www.osha.gov/dte/sharwood/best-practices.html. (Accessed January 31, 2015)

3 Occupational Safety and Health Administration (OSHA). Training Requirements in OSHA Standards and Training Guidelines. www.osha.gov/Publications/2254.html. (Accessed January 31, 2015)

4 American Society of Safety Engineers (ASSE). ANSI/ASSE Z490.1-2009 Criteria for Accepted Practices in Safety, Health, & Environmental Training. www.asse.org.

5 Occupational Safety and Health Administration (OSHA). Best Practices for the Development, Delivery, and Evaluation of Susan Harwood Training Grants. https://www.osha.gov/dte/sharwood/best-practices.html. (Accessed January 31, 2015)

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- Adults learn best by doing – Adults need to "try-on" and practice what they are learning. They will retain more information when they use and practice their knowledge and skills in class.
- Adults need to know where they are heading – Learners need "route maps" with clear objectives. Each new piece of information needs to build logically on the last.
- Adults learn best when new information is reinforced and repeated – Adults need to hear the concepts more than once. They need time to master new knowledge, skills, and attitudes. They need to have this mastery reinforced at every opportunity.
- Adults learn better when information is presented in different ways – They will learn better when an instructor uses a variety of teaching techniques.

14.5 TRAINING MATRIX

Each subcontractor should be required to maintain an employee training matrix by reviewing their training needs based on project requirements. A matrix is a tool that will allow employers to ensure their employee training is current. Table 14-1 shows an example of an employee training matrix. The project should designate an individual whose job is to ensure employee training and safety meeting attendance records are complete at the end of each session. This individual should also be in charge of updating the training matrix to reflect current qualifications and training (also see Exhibit 14-1, for example, project-specific training matrix).

Table 14-1: Example Employee Training Matrix by Contractors showing employee name role, training type, and date of last training*

Employee Name	Supervisor (S)/ Worker (W)	NEO**	First Aid	Leadership	OSHA-10	OSHA-30
A	W	12/12/14	10/12/14	NA	12/12/14	NA
B	S	12/14/14	10/14/14	12/14/14	NA	01/12/14
C	W	12/14/14	10/14/14	NA	12/12/14	NA
D	W	12/15/14	10/15/14	NA	12/12/14	NA
E	W	12/15/14	10/15/14	NA	12/12/14	NA
F	S	12/15/14	10/15/14	12/15/14	NA	02/12/14

* For some certifications that have time limits either state the due date or its time limit from last training to remind that they are not expired. First Aid is two years; Forklift is three years, etc.
**New Employee Orientation (NEO)

14.6 IMPLEMENT IDENTIFIED TRAINING

The following sections provides common training delivered by construction contractors and its associated best practices.

14.6.1 New Employee Orientation (NEO)

Workers new to the jobsite, regardless of their work experience, are at higher levels of risk of injuries and fatalities. Hence, the NEO is the most critical element of the site training program. Some best practices for NEO include:

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- *Identify who should attend the NEO* – Does the owner, visitors, vendors, and suppliers require NEO? NEO training should be administered to all new employees prior to their initial work assignment. New workers and workers returning to the site after a significant absence, should be oriented by their trainer for the site logistics and the new job hazards.

- *Management participation in NEOs* – The NEO is the first opportunity to show the employee that the project is committed to worker safety and well-being. Hence, the project manager or owner representative should attend the NEO for a few minutes to personally welcome the workers to the site and deliver their safety policy. For example, in a pharmaceutical manufacturing facility project that will produce life-saving cancer treatment drugs, the owner representative participated in all NEOs and communicated the purpose of the facility. The message increased worker motivation by making them realize that they are part of a special project.

- *Use of NEO checklists* – The project should use an NEO checklist as an aid to ensure all site-specific safety policies has been presented to the employee. The checklist should have an NEO acknowledgment section that should be signed by all the employees who completed the NEO. The NEO checklist should be archived as part of the project safety records (see Exhibit 14-2 for an example checklist).

- *Address site-specific topics* – Work activities and site conditions and associated hazards vary from site to site. In addition, each contractor has certain policies that are above and beyond OSHA standards and regulations. Make sure majority of the NEO focuses on site-specific issues such as start time, break time, lunch time, smoking policies, toilet locations, parking, and any restrictions. For example:
    - Are workers allowed to carry their food or beverage into the building?
    - What special training is needed since the site is close to a light rail track?
    - What are the challenges associated with working on a university campus, hospital campus, etc.?

- *Change the content periodically* – How many contractors use the same NEO video from the 90s? Some workers, for example, fire caulking contractors work on more than ten sites any given month.

  Since large contractors have multiple job sites in the same geographical location, these workers are listening to or watching the same video every time. Try to be fluent with the training tools so that the training does not lose its effectiveness.

- *Construction high hazard tasks*[6] – In Washington State, several employees die each month from injuries or illnesses related to their work. Many others are hospitalized, sometimes with injuries or illnesses that will persist for a lifetime. The L&I website publishes information regarding these fatalities and injuries, and their causes. Spend more time on serious exposures on that site that could lead to fatalities or serious injuries.

6 Washington State Department of Labor and Industries, Division of Occupational Safety and Health (DOSH). Fatalities and Injuries. http://www.lni.wa.gov/Safety/TrainingPrevention/FatalitiesInjuries/fatalities.asp. (Accessed January 31, 2015).

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- *Walking Tour* – Some companies have used a walking tour of the site to point out hazards.

- *Use Modern Tools* – Use of tools such as Building Information Modeling (BIM) to communicate site-specific hazards can help workers understand the environment better and faster.

- *Questions* – Provide an opportunity to ask questions concerning the site safety and assigned work.

- *Assess the employee knowledge* – Administer a test at the end of the orientation, and follow-up with remedial training if needed.

- *Obtain employee commitment* – In addition to the acknowledgment slip, designating a wall space in the trailer as an area to express worker commitment is another best practice. The wall should state the project safety commitment and goals while asking the workers to join the efforts by signing at the bottom of the wall.

- *Issue identification to verify NEO completion* – Establish a means to identify employees who have completed the NEO in the form of a badge or hard hat sticker.

- Provide trade-specific training – In addition, to the general site orientation general contractors should require subcontractors to deliver a short, but adequate supplemental trade-specific training to their workers. This training should be documented in writing and filed on the site.

- Assign a mentor or buddy – Require subcontractors to create a "buddy" system for "new" employees, and assign them to work with a journeyman as a work partner. Some companies have used a special colored hard hat for identification of new employees for at least a 6-month period.

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Figure 14-1: New Employee Orientation (Picture Courtesy of Turner Construction Company)

14.6.2 Pre-task safety planning (PTP) & Stretch and Flex (SF) meetings

The foreman typically conducts the daily pre-task safety planning along with stretch and flex during their meetings. The meeting is normally held at the start of the work shift to discuss safety and work tasks for that day. If required by the project, SF exercises should also be conducted during these meetings. It is used as a daily "safety training" to ensure the workers are set up for success. These meetings are considered the "first line of defense" against accidents. It allows the foreman to ensure all crew members have been trained in safe work practices and procedures for their assigned tasks. If a worker is not trained, the foreman should train the employee before assigning the task. More information on PTP is provided in Chapter 13 of this handbook.

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Figure 14-2: Stretch and Flex Meeting (Picture Courtesy BNBuilders)

14.6.3 Toolbox talks or Tailgate Talks

The weekly toolbox talk is also conducted by the foreman (one crew) or general foreman (multiple crews) at the start of the work week, usually Monday mornings. Contractors should ensure they comply with the requirements of WAC 296-155-110-5 through 296-155-110-9. On large projects, there may be several toolbox talks taking place at the same time. Weekly Toolbox talks are a golden opportunity for the management staff to show its commitment. It is best practice to require project office personnel such as cost managers, engineers, schedulers, etc., to participate in these toolbox talks.

These meetings are 5-10 minutes long and focus on industry-specific safety topics related to the current work activities and circumstances. For example, would it be appropriate if the foreman chooses to discuss cold weather hazards in the middle of summer. The toolbox talks can also be used to alert workers about any site accidents or major safety infractions. Keep the toolbox talk group to 20 or less. Ensure the meeting is documented using a sign-in sheet (see Exhibit 14-3 for the template). There are a number of free resources available to contractors who need help finding a construction toolbox talks topic:

- The Center for Construction Research and Training (CPWR) maintains a collection of 52 toolbox talks, one for each week of the year – www.cpwr.com/publications/handouts-toolbox-talks
- The Washington Department of Labor & Industries has created a year's worth of the construction toolbox talks and guidance to foreman on how to select a topic – http://www.lni.wa.gov/safety/topics/atoz/toolboxtalks/PDFs/ToolBoxTalksComplete.pdf
- The Occupational Safety and Health Administration (OSHA) has numerous QuickCards™ – https://www.osha.gov/pls/publications/publication.athruz?pType=Types&pID=6

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Figure 14-3: Toolbox Talks (Picture Courtesy Guy F. Atkinson)

Many general contractors require a site-wide safety meeting attended by all site personnel including workers, supervisors, managers, and even owner representatives. Some contractors hold this meeting weekly while some bi-weekly. This meeting should be conducted by the project superintendent, preferably Monday morning before work begins. This meeting will allow workers to ask questions, offer suggestions, and report concerns regarding safety on the project. While this meeting does not include a pre-selected topic, it should include at a minimum:

- Lessons learned from accidents and incidents
- Safety inspection findings and corrective actions
- Communication of major project activities and associated hazards
- Communication of access change, emergency action plan change, etc.
- Safety suggestions by workers and response by management
- Reports on any environmental changes that may affect the site i.e. weather.
- Issuance of rewards to employees (e.g., best pre-task plan award)

Some projects have used a Microsoft PowerPoint software as a visual aid during these meetings to communicate safety issues and site changes.

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Figure 14-4: Toolbox Talks (Picture Courtesy Hensel Phelps Construction)

Figure 14-5: Site-wide Safety Meeting (Picture Courtesy BNBuilders)

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Figure 14-6: Site-wide Daily Huddle (Picture Courtesy Turner Construction Company)

14.6.4 Safety Committee Meetings

Many job sites form a safety committee that is comprised of workers from major subcontractors on site. The Project Superintendent will appoint the chairperson for this committee. The committee is charged with conducting bi-weekly safety committee meetings and bi-weekly safety inspections. The committee will typically report the safety issues to the project superintendent to resolve them, and get back to the workers on corrective actions implemented. Findings of this committee are presented during weekly site safety meetings.

14.6.5 Safety Leadership Committee

Some sites have a leadership safety committee comprised of project managers from each major subcontractors and is led by the general contractor's Project Manager (PM). Since the members of this committee are primarily accountable for project safety, they engage in strategic planning for the project that will maintain an injury-free culture. This committee usually meets once a month.

14.6.6 Special Craft Training Programs

In addition to the NEO training and other training discussed above, every contractor should be aware of special training required before workers are allowed to perform a task or use equipment. Special training may involve the following topics, but not limited to:

- Aerial Lifts

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- Asbestos / Lead Awareness
- Bloodborne Pathogens
- Confined Space
- Crane Operator
- Fall Protection
- First Aid/CPR
- Flagging
- Forklift Operation
- HAZWOPER
- Ladders
- Lockout / Tagout
- Personal Protective Equipment
- Respiratory Protection
- Rigging
- Scaffolding
- Use of Specialty Equipment

14.6.7 Foreman Training

Many contractors make the crew foreman responsible and accountable for their crew's safety. Before giving the foreman the responsibility for the safety of their crew, they should be trained in leadership skills. In addition to training required by applicable laws, contractors should consider following training for their foreman:

- Leadership
  - Injury Free Work Culture - Safety culture training that includes the concept of injury free work environment and ways to develop it. Training that helps foremen develop skills to train and motivate their crew members.
  - Foreman responsibility and accountability
- Administration
  - Project administration requirements
  - How to conduct a pre-task planning meeting?
  - How to conduct a thorough accident investigation?
  - How to hold a weekly toolbox talks are meeting?
- Technical
  - OSHA 30-hour Construction hazard recognition and control training
  - First Aid, CPR, and AED
  - Applicable competent person training
  - Ergonomic Risk Factor
  - How to lead a stretch and flex session?
  - Site Emergency Procedures
  - Process safety management (on industrial sites)

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14.6.8 Management Training

Management refers to project managers, engineers, and superintendents, from all contractors on site. Typically the management personnel is held accountable for the project's safety. Hence, it is critical to their success to be properly trained. The following training is recommended for management personnel:

- Leadership
  - Leadership Training/Injury Free Work Culture - Safety culture training that includes the concept of injury free work environment and ways to develop it. Training that helps foremen develops the skills to train and motivate their crew members.
  - Management responsibility and accountability
- Administration
  - Project administration requirements
  - Corporate safety manual orientation
  - Substance abuse testing & reasonable suspicion training
  - Hazard recognition and control strategies
  - Job hazard analysis and how to conduct them.
  - Accident investigation
  - How to conduct a thorough accident investigation?
  - Site environmental management
  - Construction liability related training (e.g., public protection)
  - Development, measurement, and reporting of safety performance metrics
- Technical
  - OSHA 30-hour Construction hazard recognition and control training
  - First Aid, CPR, and AED
  - Process Safety Management (on industrial sites)
  - Site Environmental Management
- Monthly Supervisors Forum – Many contractors hold this monthly company-wide supervisor training at a neutral location, to share best practices and lessons learned from their projects. These meetings are preferably held as an early morning meeting with breakfast.

14.7 SALARIED EMPLOYEES TRAINING

All other salaried employees (i.e., clerical staff, human resources) are typically issued a copy of the company's corporate safety manual and SSSP, and they should be trained in general safety matters by the project safety manager/manager. In addition, the following training is recommended:

- Office Ergonomics
- Project Safety Record keeping
- Equal Employment Opportunity/Harassment

Additional Resources, Readings, and References

- The Occupational Safety and Health Administration (OSHA) Training and Reference Materials Library - https://www.osha.gov/dte/library/materials_library.html
- The Center for Construction Research and Training (CPWR) has developed and maintains the Electronic Library of Construction Occupational Safety and Health (eLCOSH.org) was developed

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to provide accurate, user-friendly information about safety and health for construction workers, employers, researchers and others interested in construction safety and health from a wide range of sources worldwide - http://www.elcosh.org/index.php

- The Washington Department of Labor & Industries provides a variety of training materials – http://www.lni.wa.gov/Safety/TrainingPrevention/Materials/default.asp

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Exhibit 14-1: Example Project Training Matrix

Name	Job Title	Project Safety Orientation	Subcontractor Orientation	Reporting Procedure	Evacuation	Substance Abuse	Buddy System	HazCom/ GHS Awareness	Pre-Task Planning	PPE	Fall Protection	Ladder Safety	Confined Space	Energized Electrical Work	LOTO	MEWP	Scaffolds	Barricading	Insp. Of Tools	Lifting Procedures	Ergo	NFPA 70 E (awareness)	Powder Actuated Tools	OSHA 30	OSHA 10	CPR FIRST AID	All Terrain Forklift	Inside Forklift	Scissor Lift	Aerial Boom Lift	Certified Rigger	Site Emergency Procedures

Notes:

1. Use Microsoft Excel to create this matrix.
2. Use an X mark to indicate completion of training.
3. Using the “comment” function or by creating a separate column include the training date or the expiration date.

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Exhibit 14-2: Example Project New Orientation Form

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Note: This best practice tool is only included as an example, and the users should be aware that the checklist may reference safety regulations depending on the company's regulatory jurisdiction. It is the user's responsibility to ensure that they adapt the best practices provided in this checklist for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Hardhat #: _____ Badge #: _____

PROJECT SAFE AND SUSTAINABLE ORIENTATION

The signatures below document that the appropriate elements have been discussed to the satisfaction of parties, and that both supervisor and employee accept responsibility for maintaining a safe and healthful work environment.

Print Name: _____

Sign Name: _____

Company Name / Date: _____

Supervisor Acknowledgement: _____

Emergency Contact Name and Number: _____

General Initials	**1. No one under the age of 18 is allowed to work on the Project property / construction site.** 2. Drug testing is mandatory A. Your employer must provide the results to Turner in order to receive badge or attend orientation. B. Pre-employment/prior to badging C. Post Incident D. Test for cause – suspicion E. If tested positive or refuse to test, will not be allowed on site 3. Badging / orientation sticker All employees on site for more than one (1) day must obtain a badge / attend orientation / drug screen 4. All OSHA regulations will be strictly enforced. A. Disciplinary Procedures – 3 strikes, you're out 1. Verbal = ***Orientation*** 2. Written 3. Termination 4. Turner retains the right to have you removed from site, based on the nature of the violation, without the 3 strikes (i.e., ZERO TOLERANCE). 5. Fall Protection – **ZERO TOLERANCE** Policy in effect 6. Every crew member must complete and participate in a Pre-Task Plan (PTP) meeting each day before starting work. 7. No headphones, IPods, radios, etc. are permitted on the job.

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Incident Reporting Initials	1. Any injuries / illnesses / near misses on site must report to their supervisor immediately after the event, if physically possible. 2. You and your employer shall cooperate with the incident investigation. 3. A "First Report of Injury" form must be filed with Turner Safety Office within eight (8) hours after an accident. 4. If sent to a doctor for treatment all follow-up appointments must be kept. 5. A Temporary Modified Duty policy is in place. 6. The worker must strictly follow any and all work restrictions issued by doctor.

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100% 6-Foot Fall Protection **(Regardless of Trade)** Initials	**1.** **100%** FALL PROTECTION 6-foot and above (Includes all Trades) **2.** **ZERO TOLERANCE –** For Fall Violations 3. Full body harnesses and double lanyards with double locking snap hook 4. Gear to be inspected prior to every use. **Contact your supervisor immediately if gear is damaged. DO NOT USE DAMAGED GEAR**. 5. No knots or rigging can be used for fall protection. 6. Warning lines are to be a min. of 15 feet back from the edge. (see criteria in Turner Safety Manual) 7. Tie off point must hold 5,000 LBS or 2x SF as engineered anchorage point. 8. 100% tie off when working from extensible / articulating boom aerial lift. 9. Employees must be trained on the use of fall protection. 10. Vertical or horizontal rebar or other impalement hazards shall be protected. 11. Any hole 2" or larger must be covered, secured, labeled (supporting 2X max the indented load) 12. Scaffolds A. Must be built under supervision of competent person who has necessary certifications (w/ **100% Fall Protection while erecting**) B. Proper ladder access is required. Cross bracing cannot be used as a ladder or for a guardrail. C. Scaffold must be inspected before each shift by the Subcontractors competent person and tagged/dated as safe. If you climb onto a scaffold not tagged and dated as safe, you may be removed from the jobsite. D. 100% tie off when working from all types of lifts that have a manufactured tie off point. Dual action controls require that there be two separate actions to activate the lift. If it arrives on site and does not have dual action controls, then it must remain inoperable until a Dual action control is installed. E. All mobile scaffolds must have rails at all heights & the wheels locked when in use. 13. Standard Railing A. Top edge height of top rail must be 42" + 3" above the walking/working level and all systems must include a toe board and midrail. B. Guardrails will not be used as a horizontal anchorage for personal fall arrest equipment. 1. Do not tie off to guardrails C. Guardrails must be provided at floor openings and open sides, or personal fall protection must be used. D. Wood rail supports shall not be more than 8 foot on center. E. Wire rope guardrails – min 3/8 inch cable, flagged every 6 feet, cannot have more than 3 inches of deflection, 3 clips are required at each termination, no open turnbuckles 14. Ladders A. No aluminum or wood ladders are permitted on the site, only platform ladders are permitted B. Ladders cannot be used onsite unless a ladder permit has been filled out & approved by the Turner Superintendent. Use lifts or scaffolds as the first option. C. Please inspect all ladders before each use D. Never use a folding ladder as a straight ladder E. Never use the top two (2) steps or the top of the ladder F. Never store material or tools on the steps of a ladder G. Employees shall be trained on ladder use/safety H. Use the 3-point rule: 2 hands and a foot or vice versa to be in contact with ladder at all times. Keep belt buckle between side rails. If three point contact is not possible 100% fall protection using a retractable devices is required. **Turner will approve perimeter access points for material handling. Personal fall protection must be put in place before cables or rails are taken down, or holes uncovered. Barricade the area, place sign, and leave a spotter.**

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Safety Enforcement Initials	1. All personnel are encouraged to ask questions and report actual and **perceived** hazardous conditions to site supervision. Perceived hazardous conditions may need further clarification and hazard assessment. . If you have any questions or concerns, please ask for assistance. 2. There is a "Safety Enforcement" Fine System in place on this project. A. You are **ACCOUNTABLE** for your actions on this project. B. Monetary fines imposed upon your **EMPLOYER** for your inability to work in safe manner or complacency w/ regard to "**MINIMUM**" safety rules **C. $250.00 - $5,000.00** – depending upon severity of violation. D. You will be **physically removed** from job for serious and/or repeat violations. **3. ALL personnel** are empowered and encouraged to stop unsafe acts, identify unsafe conditions, & stop non- construction personnel and escort them out of the work areas. Please care for your project teammates.
Emergency Procedures Initials	1. In the event of an emergency A. Notify job foreman **immediately** B. Give the exact nature of the emergency (i.e. broken leg, fire, etc.) C. Give the exact location by area column or other easily recognizable terms D. Stay on the phone until Safety has confirmed that you have provided accurate information E. If an evacuation is not required, stay on the scene to brief emergency personnel upon their arrival. 2. Evacuation Procedures A. 3 horn blasts will indicate site is to be evacuated B. Proceed in a calm, orderly manner to the designated safety zone. **1. PRIMARY MUSTER POINTS ARE TBD** 2. Report to your designated foreman/superintendent in designated area for head count. **C. DO NOT LEAVE SAFETY ZONE OR GO HOME UNTIL INSTRUCTED BY YOUR SUPERINTENDENT** **D. ALL DANGEROUS AND/OR EMERGENCY SITUATIONS MUST BE REPORTED TO TURNER ON SITE STAFF within 15 minutes of the event if feasible.** **E. Turner to call 911 for ambulance as necessary.** **F. Where is the location of your first aid kit and fire extinguishers? Keep this in mind while working.**
Personal Protective Equipment Initials	1. Basics: A. 100% Hardhat Protection, Non Metallic, **REQUIRED AT ALL TIMES. ANSI approved** B. 100% Eye Protection (ANSI Z87.1) **REQUIRED AT ALL TIMES**. C. Hard sole work boots are required, **no sneakers or soft shoes are allowed, ANSI Z41.1. Steel toed boots/metatarsals must be worn as dictated by the hazard assessment.** D. Long pants in good condition, no shorts allowed E. Shirts must have sleeves at least 4" long F. Cut resistant gloves are required when using knives or handling sharp material/objects. Additional hand protection may be required depending on the hazard assessment. G. Ear protection as required when exposed to noise above 85 DBA H. Face-shields or goggles required when cutting / grinding / chipping / etc. I. No loose clothing or jewelry J. High visibility vest is required when working around machinery. K. Any contractors requiring the use of dust masks and/or respirators must submit a written respiratory protection program Turner. This program must address medical surveillance, fit testing, etc. Voluntary usage of dust mask type respirators used by employees must also be included in the respiratory protection program and shall meet or exceed OSHA standards.

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Electrical / LOTO Initials	1. Industrial heavy weight cords (14 gauge or heavier) with proper grounds are to be used at all times. 2. 100% Ground Fault Circuit Interrupter (GFCI) Protection. 3. Inspect all cords and welding leads before each use A. Damaged items must be repaired or removed from the job site B. All cords and leads are to be elevated above all main walkways. **4. ALL** Electrical and mechanical systems are to be considered **LIVE**. 5. All boxes containing live wires must have a cover. **6. NEVER** work on live electrical panels without prior approval from Turner. **7. LO/TO – Single lock keys (cannot have multiple keys)**
Equipment Initials	1. Proper training and certification is required prior to operating any equipment. 2. All stops must be observed at intersections. Complete stops must be observed. 3. Speed limit on site is 5 mph or a safe operating speed whichever is slower. 4. A spotter is mandatory when view is obstructed by load. 5. Backup alarms must be present on all required vehicles. 6. Horns and lights are recommended for all equipment. 7. Always follow the manufacturer's operating instructions for all equipment and tools used on this project. 8. Seatbelts must be worn at all times. 9. The use of cell phones is prohibited while the machine or vehicle is in motion. 10. The forks of a forklift cannot be used for free rigging.
Cranes Initials	1. Awareness of overhead loads – listen for horns. **2. NEVER** stand or walk under an elevated load. 3. Awareness of crane swing radius (should be flagged off). 4. Cannot operate a crane within 20' of any power line. 5. Rigging must be inspected before each use by a qualified rigger. Damaged rigging must be removed from service. 6. Crane operator must submit operator certifications 7. Employees cannot signal a crane unless trained. 8. Each rigger & signal person must be qualified & proof of training given to Turner Construction
Barricade Tape Initials	1. Types of Tape **A. Red** – ***Imminent Danger*** exists. Only authorized personnel performing actual work are to be allowed in this barricade tape area. The only exception for entry into a red area is with prior permission of those authorized to work within the area **B. Yellow** – a hazard exists that would warrant ***Caution***. A yellow area can be accessed by anyone who is authorized to be on the job site, and who stops to observe the existing hazard and takes the proper precautions prior to entering the tape barricade area.
Training Requirements Initials	1. Must be trained / certified to operate forklifts, aerial lifts, scaffolding, cranes, etc. 2. Contractors are required to provide workers that are trained as required by OSHA standards and site policies. 3. All workers are to be trained by their employer for the task at hand – ladders, scaffolds, excavations, etc. 4. No worker may lift more than 50 pounds, unassisted. Use mechanical means first.

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Housekeeping Initials	1. All trash/debris is to be placed immediately upon creation into rolling trash bins or hoppers that do not require workers to lift or carry. This includes lunch/break trash. Housekeeping is a CONDITION OF EMPLOYMENT. 2. Sweeping compound is a requirement of the Indoor Air Quality (IAQ) Management Plan. 3. Dust creating activities will take place only in accordance with the IAQ Management Plan. Any alterations in the finished areas will require either temporary dust protection or a vacuum with HEPA filter to collect dust generated. 4. Strict compliance with the Construction Waste Management Plan is required. Recycled materials include but are not limited to wood, scrap metal, concrete, cardboard, and drywall. Construction waste shall only be placed in the appropriately labeled dumpster. 5. Zero use of tobacco policy. No tolerance policy for smoking in building during construction. 6. Extension cords, hoses, welding leads, etc., must be run 8' overhead in all stairs, aisles, and exit areas. 7. When using stilts, the floor must be broom swept with not trip hazards. (Cords, material, and trash) 8. No glass containers are permitted onsite. 9. Storage of material must not be within 6 feet of any interior opening or 10 feet to the exterior without protection.
Hand & Power Tools Initials	1. All drills, grinders, etc. that are designed with guards and/or control bars must have them in place when the tool is in use. The grinding wheels must be rated per the specifications of the grinder. 2. Work stations are to be elevated. Chop saws & other work activities. 3. Powder Actuated Tools - No lead based shot is permitted onsite 4. Tools are to be used the way the manufacturer intended. Do not modify any tool.
Hot Work Initials	1. The contractor performing hot work will be required to have a charged and inspected 20 pound ABC dry chemical fire extinguisher present in the work area. 2. Appropriate permit procedures, shields, and blankets shall be used when developing site specific fire prevention programs. 3. Subcontractor is required to implement a fire watch during all burning operation for a minimum of 30 minutes following completion. 4. Hard Hats are required while welding. 5. Safety glasses are required under the shield when chipping or grinding 6. Cylinder Storage must be stored upright and properly secured. When not in use, disconnect hose/gauge assemblies and cap the cylinder. Stored cylinders must have a ½ hour fire rated barrier 5 feet tall or be stored 20 feet apart. Propane tanks cannot be stored in any building. (Turner must be notified prior to propane used onsite) All torch carts are to have a fire rated barrier between the cylinders. 7. Anti-flash devices are to be located at the torch head & at the cylinders 8. Hot Work activities must be pre-approved by Turner (Permit to be issued)
Excavations Initials	1. Any excavation greater than 4' must be sloped, shielded or benched properly 2. The bottom of the trench box must be within 2 feet of the bottom of the trench. The top of the trench box must sick up 18 inch above the slope or the bench. The box cannot be moved while workers are inside. 3. Access must be provided by a ramp or a ladder. Travel distance to ladder must not exceed 25 feet. 4. Any excavation must be barricaded off with orange fence or equivalent, regardless of depth. 5. You cannot bench Type C soil. 6. Before you dig, Miss Utility must be notified days in advance

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Hazard Communication / GHS Initials	1. This employee, by his initials in this section acknowledges that he/she has been trained by their employer. 2. Turner will coordinate the sharing of Safety Data Sheets (SDS) between contractors. 3. The SDS's are available at the project.
Construction Waste Management Initials	1. All waste leaving this project is tracked on Turner's Online Waste Tracking (OWT) system. Strict compliance with the project Construction Waste Management Plan (CWMP) is required. The recycling goal is _____%. The construction and demolition dumpsters on this project are (co-mingled) (site-sorted). Materials recycled include, at a minimum: A. Wood: pallets, wood-framed boxes, temporary lumber, etc. B. Concrete: concrete, block, brick, asphalt C. Metal: scrap metal, metal studs, metal pipe, etc. D. Cardboard, paper E. Drywall: drywall, mold board, (NO Dens Glass) F. Construction Trash: food waste, sweepings, non-recyclable waste, etc. 2. Collect and sort your construction waste throughout the workday and transport the waste to the appropriate dumpster at the time established by your Foreman or Project Manager. 3. All Subcontractors are required to recycle to the maximum extent possible as a part of their Contracts using Turner's OWT tool. In cases of non-compliance, only the Subcontractor(s) responsible for contaminating dumpsters (placing waste in the wrong dumpster) will be responsible for fines, additional tipping fees, or other penalties as may apply.
Indoor Air Quality Initials	1. Strict compliance with the project Indoor Air Quality (IAQ) Management Plan is required. 2. Safety Data Sheets (SDS), along with VOC content, of all adhesives, sealants, coatings, paints, carpets, composite woods, etc. must be submitted for review and approval prior to these products being brought on site. 3. Stored material shall be covered, stored off of the deck, and kept in a dry environment. Quantities should be limited to what can be installed in a reasonable time (e.g. two weeks or less). 4. This project is **Tobacco-Free.** Zero tolerance for smoking in the building during construction. 5. Changes in finished areas should be treated as renovations. 6. For large changes, install temporary dust protection to separate the work area from the finished space. The work area should be kept negative and a HEPA filter should be used to filter the air prior to it leaving the space. The temporary protection and filter system should be approved by a Turner superintendent before beginning work. Once the work is complete, the area should be thoroughly cleaned and the temporary protection should be removed. 7. For small changes, a vacuum with a HEPA filter should be used to collect any dust that is generated and the areas should be thoroughly cleaned after the work is complete. 8. Daily clean-up of all work areas is required by each subcontract. 9. All subcontractors will be required to use sweeping compound. 10. All cleaning products used on the project must comply with Green Seal Standard GS - 37 for Industrial and Institutional Cleaners. 11. Mold and moisture control is a key to proper indoor air quality. If possible, drywall activities should not begin until the building is watertight. If drywall must start before the building is watertight, moisture resistance board should be used.

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Site Management Initials	1. Strict compliance with the project Construction Activity Pollution Prevention Plan (CAPPP) and Erosion and Sedimentation Control (ESC) Plan. 2. Use and maintain earth dikes, silt fence, sediment traps, and/or catch basin filters to trap and separate silt. 3. Cover all stockpiles with plastic sheeting on a daily basis. 4. Do not leave spoils piled on site for extended periods. If possible excavate, install utilities, backfill and grade each day. Sequence the work to minimize exposure. 5. Maintain existing hardscapes/landscapes (asphalt, concrete, grass, plantings) as long as possible. 6. Provide and use wheel washing facilities or maintain rip rap entries and exits. 7. Use Eco pans for concrete truck clean-up if available. If not make sure slurry is contained and does not infiltrate catch basins or waterways. 8. Secure all materials and stockpiles and check site prior to storm events. 9. Use only designated areas for equipment maintenance and wash down. 10. Minimize the generation of dust and the tracking of sediment to off-site paved areas. 11. Minimize site disturbance during construction activity. 12. Comply with all applicable noise mitigation activity. 13. Comply with all applicable vehicle emissions requirements.
Stormwater Management Initials	1. Stormwater Pollution Prevention Plan (SWPPP) requirements were reviewed for subcontractor employees involved in ground disturbing activities. 2. The SWPPP requirements including Best Management Practices (BMP's) were reviewed and will be followed as required by the SWPPP. 3. The SWPPP drawings, project sequence and how sequencing will affect BMP locations were reviewed. 4. Notify Turner of any disturbances of the Best Management Practices (BMP's) including silt fences, vehicle mud removal areas, vegetative cover, other sediment and erosion controls. 5. Ensure all concrete/cement washout is performed at designated locations and into designated containers, notify Turner personnel immediately if washout is not adequately containing wash water and stop washout activity. 6. All site dewatering must be performed in a manner compliant with the SWPPP and all pump discharge locations must be previously approved by Turner. 7. Inspect all equipment and chemical storage containers for leaks as well as excess grease/grim/oil/fuel, if any of the above are discovered ensure that mechanics are notified (if necessary) and equipment/containers are wiped clean and containments disposed of properly. 8. Ensure parked equipment and chemical storage containers are parked/stored in locations previously approved by Turner and are identified on the SWPPP map. 9. Know where the SWPPP map is located and identify the spill kit location on it, notify Turner personnel immediately if a spill occurs.

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Nothing Hits the Ground Initials	**FABRICATION:** 1. All material fabrication shall be performed at a work station between 30 and 39 inches off the floor. 2. Work station shall be mobile and include a fire stop directly behind all chop saws. 3. Rubbish containers shall be mobile and located directly adjacent to the work station. 4. Mobile rubbish containers must be made available for subcontractors work. **HOUSEKEEPING**: 1. All rubbish shall be disposed of as it is generated and be immediately place in a mobile rubbish container provided by the subcontractor. 2. Cordless power tools are required unless the subcontractor can demonstrate a hardship or need to use tools with power cords. 3. The subcontractor is required to elevate off the ground all power cords in order to minimize tripping hazards on walking/working surfaces. 4. Debris is not allowed to be consolidated on the floor. **MATERIAL HANDLING/ STORAGE:** 1. Material may not be stored within 10 feet of the building perimeter or adjacent to shafts or stairwells. 2. All material laydown areas must be coordinated and designated by Turner. 3. Material must be stored to promote mobility of material. Pipes, conduits, metal fabrications and steel framing are to be stored on rolling racks or similar means of conveyance. Bulk material should be palletized to allow for easy mobility using a pallet jack. 4. Just in Time" delivery required to minimize clutter. Nothing should be stored on a floor that cannot be installed within one week. 5. Heavy material such as glass and drywall must be loaded so as not to overload the structure. The subcontractor is required to do a floor loading analysis for submission to Turner for review and approval.

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Exhibit 14-3: Example Weekly Safety Meeting Attendance Sheet Template

Date: _____ **Location:** _____
Topic: _____ **Meeting Facilitator:** _____
Meeting Agenda attached: Yes No **Start Time:** _____ **End Time:** _____
Number of Attendees: _____ **Total workers onsite:** _____

EMPLOYEE NAME*	COMPANY NAME	SIGNATURE

*Use additional sign-in sheets if necessary

Safety Suggestions / Recommendations to improve site safety	**Actions Taken**	**Supervisor Signature / Date Completed**

Distribution: Original to Project Safety File

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15
WORKPLACE SUBSTANCE ABUSE PROGRAM

15.1 INTRODUCTION

Construction is a hazardous industry, and most jobs associated with the industry carry a higher risk level of accidents and injuries. A recent study found that occupations involved in the construction industry have the highest prevalence of illicit drug use and heavy alcohol use.[1] Eliminating or minimizing construction worker substance abuse can help construction companies not only to reduce workplace injuries, but it will increase productivity and improve work quality. One of the best ways to address substance abuse on construction sites is to implement a comprehensive substance abuse program. The primary intent of this chapter is to offer guidance based on industry best practices to develop a workplace substance abuse program that may help eliminate or minimize accidents or injuries related to substance abuse.

The first step when a company has decided to implement a substance program is to consider these two questions:

- Are drug and alcohol testing legal in your state?
- Are there any restrictions on any aspects of the testing (e.g., random testing)?

Note: When developing programs, policies, or procedures relating to substance abuse programs, contractors should always seek guidance from its attorneys/legal counsel or seek guidance from an employment law specialist. This helps to ensure compliance with all applicable local, state, and federal laws.

15.2 DEPARTMENT OF LABOR (DOL) RECOMMENDATIONS

One of the best resources available to develop a substance abuse program was developed by the Department of Labor (DOL). The DOL recommends that a company's formal substance abuse program should contain at least the following components:[2]

1. Written substance abuse policy
2. Supervisor training
3. Employee education
4. Employee assistance program
5. Drug and alcohol testing

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1 Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Worker substance use and workplace policies and programs. Available at: **http://www.oas.samhsa.gov/work2k7/work.htm#High**. (Accessed November 17, 2014)

2 Occupational Safety and Health Administration (OSHA). Drug-Free Workplace Policy Builder http://www.dol.gov/elaws/asp/drugfree/drugs/screen1.asp (Accessed November 17, 2014)

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15.3 BEST PRACTICES

In addition to the DOL recommendations, consider the following questions when developing a substance abuse policy for your company. Please note on some projects the project owner might have stringent or additional requirements on their substance abuse program. It is important to identify and comply with those owner or project-specific requirements.

15.3.1 Why should your company care about workplace substance abuse? What are the effects of substance abuse on the construction worker safety and health performance?

A recent study found that occupations involved in the construction industry have the highest prevalence of illicit drug use and heavy alcohol use.[3] Eliminating or minimizing construction worker substance abuse can help construction companies not only to reduce workplace injuries, but it will increase productivity and improve work quality.

15.3.2 What is your company's policy or position on workplace drug and alcohol use?

Contractors should seek and gain full support and cooperation from their workers when developing their substance abuse policy. As with any safety policy, employee involvement is critical to the success of the program. It is recommended to find a way to receive and incorporate employee feedback in the policy. By educating the workforce that employees under the influence of drugs, alcohol, or other controlled substances on the jobsite pose serious safety and health risk not only to themselves, but to their coworkers and the public. It is a best practice to obtain employee consent and to indicate clearly drug and alcohol testing is a requirement for employment with the company or the jobsite. The policy should state the benefits of drug and alcohol testing within the construction industry such as improved workplace safety performance, better performance, better quality of living, and decreased rates of employee absenteeism.[4] For example, the company policy can state, "Company ABC will not tolerate drug or alcohol use on its premises and projects." See Exhibit 15-1 for a sample drug and alcohol prevention program.

15.3.3 What are the prohibited substances, articles and conduct not tolerated by the company? What are their cut-off levels?

Prohibited *s*ubstances can include alcohol, drugs, selected prescription drugs, illegal drugs, and contraband. The company policy should clearly list each of these substances to avoid confusion. Employees who are taking prescription drugs, for which there is a potential unsafe side effect, should be required to report to their supervisor. The company should clearly list the controlled substance and its cutoff level in its policy. For example, ethanol alcohol the cutoff is 0.03 g/dl.

15.3.4 Which employees will be tested?

Companies cannot be discriminatory, hence, "all" company employees should be tested. On a construction project, general contractors should require all subcontractor and sub-tier subcontractor employees to undergo drug and alcohol testing. General contractors should also consider project owner representatives and other personnel who will be present on the jobsite. Will they be tested as part of the project drug and alcohol testing policy? What about the vendors and suppliers?

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3 Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Worker substance use and workplace policies and programs. Available at: **http://www.oas.samhsa.gov/work2k7/work.htm#High**. (Accessed November 17, 2014)

4 Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Worker substance use and workplace policies and programs. Available at: **http://www.oas.samhsa.gov/work2k7/work.htm#High**. (Accessed November 17, 2014)

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15.3.5 Who covers the cost of testing?

It is recommended that the employer cover the cost of testing regardless of test results. Some contractors require the employees to pay for return-to-work testing after a verified positive test result. The policy should also indicate who covers the cost for the time an employee spends testing. On a typical project, the testing cost might be built into the project budget that is ultimately paid by the owner. In some cases, when it involves union workers, collective bargaining agreement might address the payment issues related to drug and alcohol testing.

15.3.6 When (what circumstances) will the tests be conducted?

At a minimum, industry best practices recommend that the employees should be tested under the following circumstances:

- Pre-employment/Pre-hire
- Jobsite or project transfer
- Return-to-work testing
- Reasonable Suspicion/Probable cause
- Random
- Post-Accident

15.3.7 What is the policy for employees who refuse to submit to the test?

The best practice should be to consider refusal to test as a positive result (the employee failed the test), and the employee should not be considered for employment by the company.

15.3.8 What are the testing procedures and protocols?

Before initiating any drug and alcohol testing for employees, it is critical to establishing effective drug and alcohol testing policies and procedures. It should be reminded that the company should consult with their attorney. The Department of Health and Human Services (DHHS) and the Substance Abuse and Mental Health Services Administration (SAMHSA) has published standards and guidelines regarding testing protocols. Contractors should refer to these guidelines when developing their testing procedures or protocols.

15.3.9 Who is allowed to access the results of a drug and alcohol test? How will the company ensure confidentiality of the test results?

Test results are extremely sensitive since it involves employee privacy. All information regarding the tests should be treated in a confidential manner in accordance with applicable laws unless otherwise permitted upon the written consent of the employee.

15.3.10 How will the company select a licensed/certified laboratory? Does the lab meet all applicable state and federal licensing requirements? Does the lab have properly written testing protocol including a clear chain-of-custody? Does the lab have a protocol in place to prevent adulteration or substitution of specimens in the case of urinalysis?

The Substance Abuse and Mental Health Services Administration (SAMHSA) maintains an archive of monthly certified lab lists as recorded in the Federal Register, which can be accessed at http://www.

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samhsa.gov/workplace/lab-list. Use of HHS/SAMSHA approved laboratories, and medical facilities are recommended. In some cases, mobile testing laboratories are also used, mostly for post-accident testing, when the hospital does not have testing facilities. The company should ensure any use of mobile testing facilities should follow all applicable local, state, and federal requirements.

15.3.11 Is there any Employee Assistance Programs (EAP) available to the workers?

The policy should state the employee responsibilities to seek treatment through the company's EAP program if any.

15.3.12 Is your company subject to state and certain Federal regulations, such as the U.S. Department of Transportation's (DOT) drug testing rules? Is the company substance abuse policy compliant with these requirements?

Employees who operate commercial motor vehicles should be tested in accordance with the Federal Department of Transportation (DOT) regulations and other applicable state DOT regulations.

15.3.13 How will the workers and their supervisors be trained on the company's substance abuse program? What are the topics that these training should cover?

Employee education and supervisor training should be an important component of a workplace substance abuse program. Employee training should address:

- The importance of training
- Dangers of substance abuse in the workplace
- Company policy
- The penalties due to non-compliance, and information about employee assistance programs, substance counseling programs and services, and substance abuse rehabilitation programs

All company supervisors and management should also be trained to assist in identifying and addressing workplace substance abuse such as:

- Supervisor roles and responsibilities with the program implementation and enforcement
- Signs and symptoms of use of drugs and alcohol
- Procedure to handle a non-compliant employee
- Resources regarding employee assistance programs

All employee and supervisor training should be documented (agenda, training content, attendee sign-up sheet) to verify understanding of the company substance abuse program.

15.3.14 If your company provides a general contracting service, will the company accept drug and alcohol testing conducted by your subcontractors or unions through their substance abuse program?

This should also be considered as part of your policy. For example, some labor unions have their drug and alcohol testing program and issue proof of testing in the form of cards. These cards are valid for six months.

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15.4 PROJECT LEVEL CONSIDERATIONS

- Include project drug and alcohol testing requirements in the contracts so that all contractors are aware of the requirements.
- *Testing facility considerations:*
    - Identify the closest certified drug and alcohol testing facility to the project. The closer, the better since it saves a lot of travel time for the workers.
    - Develop a billing mechanism for a particular project. Typically general contractors will create a "project identification number (PID)," and will share it with their workers and subcontractor workers. When workers visit the testing facility, they will inform the facility about the project they are associated with, and the testing facility will charge the project accordingly.
    - The workers usually fill out a consent form and a chain of custody form at the facility in the presence of the collector. Ensure the testing facility has plenty of your company's consent forms. The forms should be 3 or 4 part forms so that the worker, your company, and the project receives a copy of the consent form.
    - Project supervision should talk to workers about the quality of service provided by the testing facilities, the time taken to complete testing, etc., as part of the continuous improvement process. If the company is not satisfied, it might be a good idea to meet with the facility to rectify the deficiencies or change the facility.
- Create an information sheet that includes a facility name, contact information, and directions from the project, and PID. After completion of the new employee orientation, workers can go to the testing facility with the information sheet and complete the testing return to the jobsite.
- When workers return to the jobsite verify the consent form, make sure there are no modifications made on the consent form.
- Ensure the project has good secure storage cabinets to store all documentation related to the project. These documents should also be archived as part of your project record retention policy. Drug and alcohol testing documentation can include:
    - Consent forms
    - Chain of custody copies
    - Test results
    - Copies of disciplinary actions related to testing
    - Reasonable suspicion forms
- Ensure the project has at least a secure room (conference room) which can be used to communicate test results to workers or to deal with anything related to drug and alcohol testing. Due to the sensitive nature of the information, each contractor on the jobsite should come up with a plan on how to communicate the test results, and how to remove workers from the project for positive test results.

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Additional Resources, Readings, and References
For more information about substance abuse program best practices and guidelines, please refer to the following resources.

- **Department of Labor's (DOL)** online Drug-Free Workplace Advisor helps employers develop customized drug-free workplace policies (that may or may not including drug testing) by reviewing the different components of a comprehensive policy and then generating a written policy statement based on the user's responses to pre-set questions and statements. The Advisor can be accessed at http://www.dol.gov/elaws/asp/drugfree/drugs/screen1.asp.

- The **Substance Abuse and Mental Health Services Administration (SAMHSA)** has numerous resources on this topic such as:
    - Drug-Free Workplace Toolkit: http://www.samhsa.gov/sites/default/files/workplace-kit.pdf
    - Model Plan for a Comprehensive Drug-Free Workplace Program: http://www.samhsa.gov/sites/default/files/workplace/ModelPlan508.pdf

- The **U.S. Department of Transportation (DOT)** also has many resources on this topic that can be accessed at http://www.dot.gov/odapc

- National Institute on Drug Abuse - www.drugabuse.gov

- Nationwide Medical Review - www.drugfreeworkplace.com

- **National Business Group on Health Publication** -An Employer's Guide to Workplace Substance Abuse: Strategies and Treatment Recommendations: http://www.businessgrouphealth.org/pub/f3151957-2354-d714-5191-c11a80a07294

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Exhibit 15-1: Sample Prevention of Drug and Alcohol Abuse Plan

Note: This Drug and Alcohol Abuse Plan is only included as an example, and the users should be aware that the plan may reference laws and regulations depending on the company's jurisdictions. It is the user's responsibility to ensure that they adapt the information provided in this plan for their jurisdiction and comply with all applicable local, state, and federal regulations affecting their workplace.

Introduction

Employees are the most valuable resource of "Construction Company", and because of that the health and safety of these employees is of paramount importance.

To ensure the continued health and safety of its employees "Construction Company" will implement the following policy regarding drug/alcohol/substance abuse in the workplace and on "Construction Company" business. The purpose of this policy is to support and further ABC's existing safety programs and to eliminate drug and alcohol related work performance problems by ensuring, if at all possible, a workplace that is drug and alcohol free.

"Construction Company" has the right, both under the law and under general industrial practices, to implement reasonable work rules governing the conduct of employees on "Construction Company" property, "Construction Company" jobsites, and/or "Construction Company" business while off of "Construction Company" property or jobsites. Under the Drug Free Workplace Act of 1988, "Construction Company" has a legal duty to comply with all the requirements of the act.

While "Construction Company" employees are necessarily free to select their own life-styles, "Construction Company" need not and will not accept the risks that drug and/or alcohol use by employees will cause in the form of accidents, injuries, and other job performance problems.

Policy

Employees are expected, and must, report for work without illegal drugs in their bodies or in their possession and not under the influence of alcohol. Compliance with this requirement is a mandatory job qualification.

ANY PERSON ACCEPTING OR CONTINUING EMPLOYMENT WITH THE "CONSTRUCTION COMPANY" GIVES HIS/HER CONSENT TO THE TESTS AND EXAMINATIONS SET FORTH IN THIS POLICY.

1. There will be no alcohol consumption on or off Company property during working hours.

2. Employees who are under the influence of alcohol and/or who possess or consume alcohol on the job have the great and real potential for interfering with job performance by themselves and other employees and endangering themselves and other persons and employees. Should such interference and/or endangerment occur as the result of alcohol consumption, and/or possession, administrative action up to and including termination of employment, depending upon the particular situation, the nature of the interference and/or endangerment, the employee's present job assignment, the employee's record with "Construction Company" and other relevant factors, may result.

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3. The illegal use, sale or possession of narcotics, drugs, or other controlled substances while on the job or on "Construction Company" property is a dischargeable offense. Any illegal substances will be disposed of lawfully and appropriately.

4. Drugs which are illegal or controlled under Federal, State, and/or local laws include, but are not limited to, marijuana, heroin, hashish, cocaine, hallucinogens, depressants and stimulants NOT prescribed for CURRENT personal medical treatment by an accredited physician. While the use of prescribed drugs as part of a personal medical treatment program is not in and of itself grounds for disciplinary action, should such use adversely affect an employee's job performance or behavior, administrative action up to and including termination of employment, depending upon the particular situation, may result.

5. Off-the-job drug use which could adversely affect the employee's job performance and/or the health and safety of other employees, the public, "Construction Company" property and/or equipment may result in administrative action up to and including termination of employment, depending upon the particular situation, the nature of the interference and/or endangerment, the employee's present job assignment, the employee's record with "Construction Company" and other relevant factors.

6. Employees reasonably suspected of being under the influence of alcohol, narcotics, illegal and/or dangerous drugs as evidenced by job impairment, high absenteeism or other such manifestations, shall submit to a physical examination, including a medically validated chemical analysis of blood and/or urine sample by a recognized hospital, clinic or laboratory.

   Reasonable suspicion shall include, but not be limited to, any employee involvement in any accident resulting in any medical treatment, including first aid, being administered by an accredited physician, resulting in any property damage in excess of five hundred dollars ($500), and employee involvement in any physical altercation in the work place. All employees involved in the said accident, property damage, and/or altercation shall be subject to the foregoing. If the involved employee(s) refuses to submit to testing or examination, he/she will be immediately suspended from work without pay, pending results of the investigation as more fully explained hereafter.

   As soon as reasonably possible after the suspension, the suspended employee will be given a hearing by a "Construction Company" personnel panel to present evidence why such employee should not be required to undergo testing or examination or should not be discharged for refusal to submit to testing or examination. Should such employee refuse to participate in the hearing or fail to present good and sufficient reasons or evidence justifying such refusal, termination of employment may be taken.

   Employees found by such tests and/or examinations to have illegal drugs in their systems while at work are considered to be "under the influence" of such drugs and in violation of this policy, even if impairment of functions may not be present. Because unauthorized drug use is illegal and because of the potentially serious safety consequences, "Construction Company" will not accept even the slightest risk employees with illegal drugs in their systems may cause, or contribute to, an

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accident. For the protection of "CONSTRUCTION COMPANY", other employees and persons, these employees with illegal drugs in their systems will be immediately suspended from work without pay as follows:

If the initial test results are negative, the employee shall immediately be returned to work with back pay; if the initial test results are positive, the suspension without pay shall continue until the test is confirmed by gas chromatography, gas chromatography-mass spectroscopy or another comparably reliable method by a duly licensed laboratory. If the results of the confirming test are negative, the employee shall immediately be returned to work with back pay. If the results of the confirming test are positive, the suspension without pay shall continue until such time as the subject employee has enrolled in or completed an assistance program acceptable to "Construction Company" and the employee's medical tests and examinations demonstrate no evidence of such drugs. The subject employee may be allowed to return to work subject to such follow-up tests and/or examinations as "CONSTRUCTION COMPANY", in conjunction with accredited assistance program personnel and/or accredited physicians, may determine. "Construction Company" will assist in referring such employees to appropriate treatment or assistance programs.

These suspensions are intended to allow time for drugs to be totally eliminated from an employee's system and to allow the employee to enroll in (and complete, if so necessary) an appropriate substance abuse assistance program. An employee will be permitted only one (1) suspension for this reason. Any recurrence of drug abuse shall constitute grounds for immediate termination without eligibility of rehire.

7. Any employee who, while on the job, suffers, causes, and/or is involved in a personal injury requiring medical treatment, (including first aid), by an accredited physician, shall undergo a test and/or examination for drug/alcohol/substance abuse. Testing will be done at medical facilities assigned by "CONSTRUCTION COMPANY". Any employee found with a positive level of illegal drugs and/or alcohol in his/her system could be ineligible for workman's compensation benefits or payment of medical expenses incurred based upon results of further investigation. Any employee involved in an accident which involves damage to "CONSTRUCTION COMPANY"'s property or to the property of others in excess of five hundred dollars ($500) shall also be subject to drug/alcohol/substance abuse screening, and further subject to those specific consequences listed above. If the employee refuses to submit to testing or examination, the employee will be immediately suspended from work without pay. As soon as reasonably possible after the suspension, the suspended employee will be given a hearing by a "Construction Company" personnel panel to present evidence why he/she should not be required to undergo testing or examination or should not be discharged for refusal to submit to testing or examination.

   Any employee involved in an accident which involves damage to "CONSTRUCTION COMPANY"'s property or to the property of others in excess of three hundred dollars ($300) and who is found by any such confirmatory tests and examinations to have illegal drugs and/or alcohol in their systems shall be required to reimburse "Construction Company" for the property damage to the full extent allowed by law.

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Any prescription drugs being taken by the employee will and should be noted at the time of testing. A positive result will automatically require the employee to consult with "Construction Company" management for follow-up procedures.

8. Employees must report ALL injuries immediately to their supervisor whether the injury requires medical treatment or first aid only.

9. From time to time, "Construction Company" reserves the right to perform periodic urine tests of employees who occupy the following safety-sensitive positions:
   All employees whose conduct on the job may affect their own safety or that of others, or whose work is at any time subject to government regulatory requirements, which include, among others, the following assignments and activities:

Welding and cutting	Power transmission and electrical distribution
Scaffolding	Hazardous energy control (lockout and tagout)
Cranes, derricks, rigging	Excavations
Marine operations, diving	Floating plant and marine activities
Confined space operations	Pressurized equipment and systems
Steel erections	Work platforms
Compressed air	Underground construction
Hazardous, toxic and radioactive	Demolition waste activities
Contract diving operations	Cofferdams
Hoists	Mechanized equipment
Elevators and conveyors	Caissons
Motor vehicle operation	Blasting and use of explosives

Managers and supervisors of the any of the above assignments or activities. Employees subject to the periodic testing program will be advised of the time and place of such tests.

Rehabilitation

Employees who test positive for any prohibited substance will be required to undergo a drug and alcohol evaluation performed through a "Construction Company"., health plan, Employee Assistance Program (EAP), or other company specified professional organization. Following that evaluation, the affected employee will be required to satisfactorily complete any recommended rehabilitation and/or detoxification program. "Construction Company" will refer employees to local mental health agencies and substance abuse counselors.

Following an employee's return to duty after testing positive for a prohibited substance, the employee will be required to undergo periodic urine testing and take part in any professionally recommended substance abuse counseling for one year. Failure to participate in any such reasonably recommended counseling or rehabilitation program, or failure to remain drug-free during the one year period following return to duty after a positive drug test will result in discipline up to and including termination.

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Participation in an EAP is confidential, except as provided in this paragraph. The EAP will maintain strict confidentiality concerning the fact and nature of the counseling or treatment, except when an employee has been referred to the EAP by a manager or supervisor because of poor or deteriorating job performance, or the supervisor's concern over possible substance abuse problems. In the case of such a supervisory EAP referral, the EAP may advise the manager or supervisor of the following information: the employee's level of cooperation, progress in treatment, or need for job accommodation during the course of counseling or treatment. In the case of an employee referred to the EAP because of a positive drug test, the EAP may report to "Construction Company" whether the employee has satisfactorily completed all recommended counseling or treatment. The fact that (prior to any positive substance abuse test) an employee voluntarily has sought or obtained EAP counseling or treatment for a substance abuse will not jeopardize employment or advancement, and, consistent with safety, "Construction Company" will take appropriate steps to accommodate the employee's counseling, treatment, and work needs. However, participation in an approved counseling or treatment program will not insulate employees from any appropriate disciplinary action for pre-existing or continued unacceptable performance or "Construction Company" rules violations.

Required Cooperation and Compliance with Policy

As a condition of employment with "CONSTRUCTION COMPANY", all employees must submit to, and comply with, required drug testing procedures. All employees are expected to fully comply with instructions issued pursuant to this program. Failure to do so can result in discipline up to and including termination, and employees refusing to submit to urine or blood testing as required will be considered in violation of this policy, and will be subject to disciplinary action up to and including termination. An employee who tests positive a second time following his or her return to work after completing a required rehabilitation program will be subject to discipline up to and including termination.

Collection and Testing Procedure

The initial drug screening shall be performed on-site utilizing the Multi - Panel Drug Test by Rapid Response. Should the initial drug screening results be positive using the Multi - Panel Drug Test by Rapid Response, the specimen shall be forwarded to and performed by a laboratory accredited under the National Laboratory Accreditation Program supervised by the National Institute on Drug Abuse.

The substances to be tested are those established by NIDA and the Department of Health and Human Services (DHSS); the testing methodology shall be those employed by NIDA and DHSS; and the levels of each drug and/or alcohol to be reported as positive are those adopted by NIDA and DHSS.
The costs of collection of the specimen and analysis of the specimen will be borne by "Construction Company".

Conclusion

Employee compliance with and adherence to this policy and program is a strict condition of employment. All employees are expected to comply fully and promptly with all instruction issued under the authority of or by virtue of this policy and program. An employee's failure to so comply may result in administrative action up to and including termination of employment, depending upon the particular situation, the employee's present job assignment, the employee's record with "Construction Company" and other relevant factors.

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This policy and all conditions of it shall apply to all employees on any "Construction Company" property and/or jobsite. This policy will be posted at all "Construction Company" jobsites.

NOTWITHSTANDING ANY OF THE ABOVE, THIS MEMO IS NOT A CONTRACT OF EMPLOYMENT AND EMPLOYMENT BY "CONSTRUCTION COMPANY"IS STRICTLY "AT WILL." "CONSTRUCTION COMPANY"AND/OR THE EMPLOYEE MAY TERMINATE THE EMPLOYMENT RELATIONSHIP AT ANY TIME.

_____

John Doe Dated: June 25, 2013
President and COO
"Construction Company"

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16
ACCIDENT INVESTIGATION

16.1 INTRODUCTION

Accident prevention is the number one goal of any organization. However, when an accident happens, proper investigation will help discover the accident causes, and implement corrective actions to eliminate the deficiencies (causes) in the safety program to prevent future accidents. This chapter will provide guidance based on industry best practices to:

- Develop an accident investigation program
- Prepare for an accident investigation
- Perform an accident investigation

For the purpose of this chapter, incidents are used to refer close calls or near misses, and accidents are used to indicate unplanned events that result in fatal and non-fatal injuries, and property damage.

16.2 MAJOR COMPONENTS OF AN ACCIDENT INVESTIGATION (AI) PROGRAM

Every construction company should have a formal accident investigation program with procedures in place for reporting all accidents and incidents involving their employees and the general public. At a minimum, the AI program should include:

1. Purpose of the program
2. Emergency response
3. Reporting procedures
4. AI Kit
5. AI procedures
6. Periodic review of AI program to keep it up to date

16.3 PURPOSE

The AI program should clearly state the reasons for performing an investigation. The purpose of an AI program is to:

- Demonstrate management commitment to safety
- Examine the facts and determine accident causes, and not to place blame on workers
- Educate employees and management about the deficiencies that caused the accident
- Take corrective actions that emerged from the investigation to prevent reoccurrence
- Make changes to the safety program as part of a continuous improvement process

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16.4 EMERGENCY RESPONSE

Each project should develop an emergency action plan (EAP) before commencement of work. Contractors should ensure they comply with all applicable regulations pertaining to EAPs. According to WAC 296-24-567, the following elements, at a minimum, shall be included in the plan:

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed
- Rescue and medical duties for those employees who are to perform them;
- The preferred means of reporting fires and other emergencies; and
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.

Chapter 17 of this Handbook provides more detailed information about jobsite emergency response and preparedness.

16.5 REPORTING PROCEDURES

What is the procedure to report accidents and incidents? Unreported accidents or incidents cannot be investigated. Employees sometimes do not report accidents due to fear of punishment, peer-pressure, etc. It is crucial that the project management take actions to promote good reporting from day one. When employees report accidents no matter how small, give positive reactions, respond promptly and get back to them with the actions taken. Furthermore, reporting accidents in case of an employee injury will help expedite medical care and any related workers' compensation. Hence, accident reporting is one of the most critical aspects of an AI program. Accident reporting typically comprises of internal reporting and external reporting.

16.5.1 External Reporting

Government regulatory agencies such as L&I's Division of Occupational Safety and Health (DOSH) requires employers to report certain accidents to them within a set timeframe. In addition, other government agencies such as environmental or transportation agencies will have similar requirements. Contractors should ensure they identify and comply with applicable regulatory reporting requirements.

It is best practice to ensure the program explicitly states "who" will make that phone call to these government agencies. Will it be the company safety director, project superintendent, or the project safety manager? In addition, insurance companies would like to be notified about certain injuries that will most likely trigger a worker's compensation claim. In some cases, it is best practice to report an accident or incident to the company's legal counsel or attorney if there is a potential for a lawsuit.

16.5.2 Internal Reporting

The AI program should clearly state project reporting requirements and communicate the requirements to the employees through site orientation and information signage at the site. The training should include the benefits of AI, reporting requirements, preserving the accident scene, and emergency response. Ensure reporting requirements are identified for both the company and project level.

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Questions to consider:

- What accidents and incidents (severity) should be reported (first aid, first-aid with offsite medical treatment, OSHA recordable, property damage, near misses, the general public related incidents and accidents)?
- Who should be notified (project vs. corporate, company CEO, the project owner, etc.)?
- What is the notification timeframe?

Note: The OSHA law prohibits employers from retaliating or discriminating against a worker for reporting an injury or illness.

It is best practice to require employees to report **all** accidents and incidents, no matter how minor, to their immediate supervisor (typically a foreman) immediately. Employee injuries that will or may need medical attention should be reported to the project superintendent immediately. Certain firms have also required the project to report to their corporate office or even their Chief Executive Officer (CEO) in case of OSHA recordable and lost-time injuries. Project owners sometimes contractually require contractors to report OSHA recordable injuries and any significant incidents or property damage to them within a set timeframe. Companies have found that making the project management report to the owner or CEO has positive impacts on injury prevention.

16.6 ACCIDENT INVESTIGATION (AI) KIT

What is an Accident Investigation (AI) kit? What are the items that should be part of an AI kit?
When an accident happens, in most cases it is too late to prepare for an investigation. As part of the project start-up procedures, it is best practice to assemble an AI kit also known as "grab-and-go" kit. Ensure at least 2 or 3 kits are strategically placed on the jobsite. When an investigator receives a call about an accident, s/he should be able to grab the AI kit and go to the accident scene immediately. An AI kit will contain items an investigator needs to secure the accident scene, collect evidence, and other relevant information. One can fill the kit with so many items, but some of the essential items that should be part of this kit include:

- Accident Investigation Forms
- Flashlights with extra batteries
- Traffic candlestick and high visibility "accident scene" barrier tape to cordon off the area
- Still Camera with fresh batteries
- 100 ft. tape measure
- Clipboard with writing pad, pens, and pencils
- Sturdy gloves
- First aid kit
- Digital voice recorder to dictate notes
- Bottled water
- Site emergency plan with contact numbers
- Identification tags to mark evidence
- Bio-Hazard Clean-up Kit

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16.7 ACCIDENT INVESTIGATION PROCEDURES

What is the accident investigation procedure? When developing your company's AI procedure, the following questions should be considered.

16.7.1 Investigator

Who should conduct the investigation? Obviously, this decision should be made before an accident occurs. The project superintendent along with the project safety manager should conduct the investigation since they will be most familiar with site construction operations and will most likely implement and follow-up on corrective actions. Depending on the severity of the accident additional members might be part of the AI team. For example, if an accident involves an electrical circuit breaker, it is best practice to engage the site electrical supervisor or contractor since s/he will be the subject matter expert. No matter who is responsible the potential investigators should be trained in the following:

- First aid/CPR
- Emergency response
- Reporting requirements
- Secure the scene to avoid contamination
- Collect evidence and facts including witness statements, pictures, measurements, etc.

Remember for serious accidents involving a notification to a regulatory agency, representatives from the concerned agency will be onsite to conduct an independent investigation as well.

16.7.2 *What* accidents should be investigated?

Some companies will have different magnitude of investigations depending on the accident type. For example, a minor first-aid accident might not need a full-fledged AI. It is best practice, however, to investigate all accidents at some level and follow-up with corrective actions

16.7.3 AI Major Steps

What are the major steps involved in an effective AI? The following 8-step accident investigation process is recommended. *ALL AI'S ARE FACT FINDING MISSIONS NOT FAULT FINDING.*

1. **Secure the accident scene**
    - Prevent additional accidents from occurring by ensuring there are no hazards in the scene.
    - Care for the injured worker by providing first aid and medical treatment. Notify emergency responders if needed.
    - Secure the accident scene to prevent evidence contamination; unaltered accident scene will help identify the accident cause correctly.

2. **Collect evidence**
    - With the accident scene secure, the investigator should start gathering evidence immediately. In some cases, it is best practice to report an accident or incident to the company's legal counsel or attorney if there is a potential for a lawsuit. The attorney might provide some advice on how to collect and save evidence belonging to subcontractors using chain of custody forms.

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- There are typically four sources of evidence:
  - *Photograph evidence* – take a picture of the entire scene, take pictures from all angles, and take several shots of the scene in close range along with photos of all physical evidence involved.
  - *Paper evidence* - collect all paper records associated with the accident:
    - Pre-task plan
    - Job hazard analysis
    - Training records of the associated employee
    - Inspection, maintenance records and operators manual for the associated equipment
    - Safety Data Sheets of any chemicals involved
    - Site safety meeting minutes for two weeks before and after the accident
    - Disciplinary records of employees involved
    - Incident report
    - Witness forms
    - Accident scene sketch showing the location of the injured employee, witnesses, equipment, etc.
    - Police reports
    - Fire department reports
    - OSHA investigation records
    - Jobsite daily work record
  - *People evidence* – interview and record witness statements from everyone who saw and were involved with the accident. In addition, interview everyone who were in the vicinity of the accident before, during, and after the accident. Furthermore, project superintendent, crew foreman, etc., should also be interviewed. Witnesses should be separated prior to starting the interview process, and witness interviews should be conducted with one witness at a time.
  - *Physical evidence* – review and collect equipment, tools, materials, and PPE, which were being used at the time of the accident. All evidence collected should be labeled accurately.
- Gathering evidence/facts from multiple sources will help the investigator re-create the accident sequence and determine why the accident occurred. Just collect the facts and do not analyze or arrive at any conclusion during this step of the investigation.

3. Develop the sequence of events based on the evidence collected

4. Analyze the evidence

- The investigator should now begin to examine the evidence to answer the questions:
  - Why did the accident occur?
  - How did the accident occur?
  - What unsafe act(s) or unsafe condition(s) contributed to the accident?
- At the end of this step, the investigator should be able to identify the causes of the accident. Most accidents have more than one cause.

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5. **Develop and implement corrective actions** – what does the investigator recommend to be done to prevent reoccurrence?
    - Develop individual corrective action for each cause identified in the accident investigation
    - Ensure that the recommendations are very specific – what should be done to avoid reoccurrence of the accident.
    - Identify who is responsible for assuring timely implementation and completion of corrective actions. For example, if a subcontractor's employee was injured and the faulty process that caused the accident is under the contractor control, the responsibility to change the process to eliminate the accident cause should be placed on the subcontractor's lead supervisor on site.

6. **Complete AI report**
    - Prepare an AI summary report that should include the following information:
        - Accident description – when and where the accident occurred; who was involved; what was involved, accident type and sequence of events.
        - Causes
        - Corrective actions and responsible parties
    - Submit a report to the people who have the greatest control over the work involved. Typically it is best practice to set a deadline for this report. For example, the report shall be completed and submitted to project management within five working days from the day of the accident.
    - Make sure all information in this report are accurate and are supported by facts and evidence, since when responding to lawsuits this report will be a major piece of proof used by the plaintiff attorney.

7. **Share lessons learned**
    - Review the corrective actions at the weekly safety meeting with all site employees.
    - Develop a summary of the accident and share it across the company since other projects within the company might have similar situations.

8. **Follow-up on the corrective actions implemented**
    - It is critical to follow-up on the recommendations. Anecdotal evidence suggests, in construction, follow-up actions are not implemented properly.
    - Has each of the corrective actions has been implemented correctly and completely?
    - Do all the corrective actions are working? Do they address the need to prevent an accident from happening again?

16.8 AI DOCUMENTATION

AI involves a lot of reporting forms. It is best practice to consider the Five Ls when creating accident report forms,[1] consider the five Ls (see sample near miss report form in Exhibit 16-1):

1 Williamsen, M. (2013). "Near-Miss Reporting – A Missing Link in Safety Culture." Professional Safety. P 46-40. May 2013

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- Literacy. Are forms easy to read and understand?
- Language. Does the company provide forms in multiple languages if necessary?
- Length. Are the forms short and to the point?
- Location. Are they easily accessible to workers?
- Logistics. Do they enable solutions?

What are the typical forms used as part of the AI process?

- *Employee accident report or Supervisor Statement* – This form is used to collect information about the incident and is usually filled out by the injured employee's immediate supervisor.
- *Witness Statement Form* – This form is used to record written statements from the witnesses.
- *Accident Investigation Form or Incident Review Form* – This form is typically utilized by the investigator to perform a systematic review of the accident, identify causes, and recommend corrective actions.
- *Medical Care Provider Return to Work (RTW) Recommendation Form* – This form is used by employers to communicate to the medical provider that they have a formal return to work program in place and will work within the restrictions recommended by the medical care provider.
- Some companies have developed and used forms such as:
  - Injured worker's statement
  - Near miss report
  - First-aid injury report
  - Property damage report
  - Vehicle accident report
  - Theft/vandalism report

16.9 AI PROGRAM REVIEW

Why should a company periodically review its AI program to keep it up to date? An accident investigation program is critical to the success of any construction safety program. As part of a continuous improvement process, the AI program should be continuously reviewed and changed to address any inefficiencies in the process or to include new industry best practices. At a minimum, a review of the AI program is recommended every two years.

Additional Resources, Readings, and References

- Division of Occupational Safety and Health (DOSH). L&I offers free workshops including Accident Investigation Basics. http://www.lni.wa.gov/Main/WorkshopsTraining/ (Accessed January 2015).

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Exhibit 16-1: Near Miss Incident Report Template

A near miss or a close call is an incident that has not resulted in any injury or illnesses. It is every worker's responsibility to report near misses. Please complete this report near miss incidents.

Project Name: _____	**Project ID:** _____
Employee Name: _____	**Company Name:** _____
Date: _____	**Time:** _____ **am / pm**
Incident Location: _____	
Description of near-miss incident:	
Immediate Action Taken:	
Suggestions to prevent reoccurrence:	
NEAR MISS INVESTIGATION:	
Causes:	

Corrective Actions Recommended:	**Date Completed**	**Signature**
1.		
2.		
3.		

File original in project safety records

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Exhibit 16-2: Accident Report Template

Project ID:	Project Name:	
Injured Employee's Name:	Occupation:	
Company Name:		
Accident Date:	Date Employee Reported:	Injury Time: am / pm
Accident Location:		
Witnesses of Accident (written statements must be attached):		
Witnesses Name	Phone#	Company
1		
2		
3		
Description of the Accident (include all details is possible, use additional sheets if necessary)		
Description of the specific nature of the injury (include specify body part(s) and type of injury)		
Was there property damage involved? ☐ No ☐ Yes [If yes, describe damage]		
OSHA Notified? ☐ Yes ☐ No ☐ Not Required		
Was Transportation to a medical facility for medical treatment required? ☐ Yes ☐ No Transported by Ambulance/Paramedics Transported or Self Transported to Clinic Others _____		
Did the Injured employee return to work? ☐ Yes ☐ No	What date and time?	
What is the current work status of the worker? ☐ Released to Full Duty ☐ Lost Time ☐ Modified Duty ☐ Hospitalized ☐ Unknown		
Describe the work restrictions?		
Supervisor Signature:	Date:	

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Exhibit 16-3: Witness Statement Template

Project ID:	Project Name:	
Injured Employee's Name:		Phone#:
Witness Name:	Company Name:	
Witness Occupation:		
Accident Date:	Date Employee Reported:	Injury Time: am / pm
Accident Location:		
Did you witness the event? ☐ Yes ☐ No		
What activity were you performing prior to the accident?		
Were any other workers in the immediate area at the time of the accident? ☐ Yes ☐ No If yes, who?		
Where were you located when the accident occurred?		
Describe fully how the accident occurred:		
Describe bodily injury sustained (be specific about body part(s) affected:		
What happened immediately after the accident?		

I am submitting this statement of my own free will. I have not been coerced or threatened in any way to submit this statement. To the best of my knowledge, all information in this statement is true. _____ (Initial)

Witness signature **Date**

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Exhibit 16-4: Example Accident Investigation Form (1-17)
(Used by Permission from PCL Construction Services, Inc.)

Investigation No. _____

Incident Investigation Report Form ABC

Seven Step Process

1. Secure the Scene
2. Risk Matrix Classification
3. Collect the Facts
4. Description/Develop the Sequence of Events
5. Determine the Cause(s)
6. Corrective Actions
7. Signoff and Final Report

STEP 1- SECURE THE SCENE

STEP 2- RISK MATRIX CLASSIFICATION

A B C ***Complete prior to investigation****

Frequency of Task*

Category	Term	Definition	
4	**Frequent**	Possibility of repeated events	(many times over the course of a week)
3	**Common**	Possibility of isolated events	(several times over the course of a
2	**Occasional**	Possibility of event occurring sometime	(likely in a year)
1	**Remote**	Event not likely to occur	(occasionally over a course of year)

Severity – Consequences*

Consequence Category		The possibility of the event consequences resulting in:			
		People	**Property**	**Environment**	**Public Image, Reputation & Disruption**
4	**Major**	Fatality	Impact >$100,000	Reportable/Damage to Environment	Government Intervention
3	**Critical**	Permanent, Long-Term Injury or Illness	Impact < $100,000 but > $50,000	Reportable Incident/Minimal Environmental Impact	Community Attention
2	**Serious**	Recordable Injury	Impact < $50,000 but > $ 10,000	Site Conditions Unacceptable	Senior Management Involvement/Project Shutdown
1	**Minor**	On-site FA Treatment	Impact < $10,000	No Impact	Individual or None

Frequency of Task

Severity	4	3	2	1
4				4
3			6	3
2		6	4	2
1	4	3	2	1

Risk Category		Definition	Level of Investigative Involvement/Instruction
"A"	High (8-16)	Class "A" Incident: a condition or practice with the potential to cause permanent disability, loss of life or body part, or extensive loss of structure, equipment or material.	**District HSE Manager;** DISTRICT MANAGEMENT (OFF-SITE) *May include corporate/regional HSE manager*
"B"	Medium (4-6)	Class "B" Incident: a condition or practice with the potential to cause serious injury or illness, resulting in temporary disability or property damage that is disruptive but not extensive.	**SUPERINTENDENT/CM/PM;** PROJECT MANAGEMENT (ON-SITE) *May include district management off site*
"C"	Low (1-3)	Class "C" Incident: a condition or practice with the potential to cause minor (non-disabling) injury or illness or non-disruptive property damage.	**AS DELEGATED BY SUPERINTENDENT;** PROJECT SUPERVISION *May include project management and/or district management*

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Exhibit 16-4: Example Accident Investigation Form (2-17)
(Used by Permission from PCL Construction Services, Inc.)

Classify the Type of Incident

Select one Injury Incident Fact Form for each person injured in the incident.
Select the Collect Environmental/Environmental Spill Facts form for incidents that include damage to the environment.
Select one Loss Incident Fact Form for each owner that suffered a loss.
A selection from the Not Recordable field is used to make a record of an alleged incident in SMC that is not included in SMC reports.

HSE-13-01-I Collect Injury Incident Facts	HSE-13-01-E Collect Environmental/ Environmental Spill Facts	HSE-13-01-L Collect Loss Incident Facts	Not Recordable
First Aid Medical Aid Modified Work Lost Time Fatality	Environmental Environmental Spill	Fire Vehicle Damage Equipment/Property Theft Equipment/Property Damage Third Party/Public	Client Classification Non-Occupational Report Only

STEP 3- COLLECT THE GENERAL FACTS:

Project Name*:					**Project No.*:**					
Client*:					**Incident Location:**					
Brief Summary of Incident*:										
Company Reporting Incident*:					**CCIP Company- US Projects Only*:** ☐ YES ☐ NO					
Reported To:					**Reported By:**					
Date & Time of Incident*: Day DD		Month MM		Year YYYY	**Time:** HH:MM ☐ AM ☐ PM					
Date & Time of Incident Reported: Day DD		Month MM		Year YYYY	**Time:** HH:MM ☐ AM ☐ PM					
Weather*: Indoors ☐	Overcast ☐	Raining ☐	Freezing Rain ☐	Clear ☐	Snowing ☐	Foggy ☐	Sunny ☐	Windy ☐	Underground Work ☐	Hot/ Humid ☐
Temperature: __ °F ☐ / °C ☐		**Wind Speed:** __ ☐ Mph ☐ Km/h			**Wind Direction:** NW ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐					
Lighting*: ☐ Daylight		☐ Darkness	☐ Artificial Light		☐ Dusk				☐ Dawn	
Witnesses*: ☐ YES ☐ NO					**If Yes, How many*?**					

Insert Collect Injury Incident Facts, Collect Loss Incident Facts, Collect Environmental /Environmental Spill Facts and Witness Statement here.	
HSE-13-01-I	Collect Injury Incident Facts
HSE-13-01-L	Collect Loss Incident Facts
HSE-13-01-E	Collect Environmental/Environmental Spill Facts
HSE-13-01-W	Witness Statement

* indicates a mandatory field in the SMC.

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Exhibit 16-4: Example Accident Investigation Form (3-17)
(Used by Permission from PCL Construction Services, Inc.)

STEP 4- DESCRIPTION

Describe the Incident*:

NOTE: If additional space is required to completely describe this incident, please add an additional page.

Develop the Sequence of Events*:

Use the information collected and determine the events prior to, during, and after the incident.
NOTE: If additional space is required to fully develop the sequence of events, please add an additional page.

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Exhibit 16-4: Example Accident Investigation Form (4-17)
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STEP 5- DETERMINE CAUSE(S):

Add Contributing Cause(s): Choose at least one Substandard Act and/or Condition and/or Hazard Standard that are the immediate or primary factors that contribute to an incident and lead to the determination of root causes.

Substandard Acts	Substandard Conditions
☐ Operating Equipment Without Authority	☐ Inadequate Guards or Barriers
☐ Failure to Warn	☐ Defective Tools, Equipment or Materials
☐ Failure to Secure	☐ Congestion or Restricted Action
☐ Travelling Too Fast or Rushing to Complete a Task	☐ Inadequate Warning System
☐ Making Safety Devices Inoperative	☐ Fire and Explosion Hazards
☐ Using Defective Equipment	☐ Poor Housekeeping / Disorder
☐ Compliance With Personal Protective Equipment Requirements	☐ Noise Exposure
☐ Improper Loading	☐ Radiation Exposure
☐ Improper Placement	☐ Temperature Extremes
☐ Improper Lifting and Hoisting	☐ Inadequate or Excessive Lighting
☐ Improper Position For the Task	☐ Inadequate Ventilation
☐ Servicing Equipment in Operation	☐ Presence of Harmful Materials
☐ Horseplay	☐ Inadequate Instructions / Procedures
☐ Under Influence Of Alcohol and/or Other Drugs	☐ Inadequate Preparation/Planning
☐ Using Equipment Improperly	☐ Inadequate Communications Hardware / Software Process
☐ Failure to Follow Procedures / Policy / Practice	☐ Road Conditions
☐ Failure to Identify Hazard / Risk	☐ Weather Conditions
☐ Failure to Check / Monitor	
☐ Failure to React / Correct	
☐ Failure to Communicate / Coordinate	

Contributing Cause(s), Inspection Hazard Categories and Standards Deficiencies:
Identify contributing causes from the Hazard Categories and Standard's list.

Hazard Category	Hazard Standard

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Exhibit 16-4: Example Accident Investigation Form (5-17)
(Used by Permission from PCL Construction Services, Inc.)

1 - GENERAL PROJECT REQUIREMENTS	
1 - Post policies	11 - Provide common area lighting
2 - Post government documents	12 - Provide appropriate task lighting
3 - Orient everyone before they go to the work site	13 – PCL employee name and company on hard hat
4 - Competent person lists developed	14 - Abate scratch / cut / impalement hazards
5 - Conduct inspections / audits	15 - Project HSE plan is available to workers
6 - Manage trade contractor HSE program	16 - Comply with project HSE plan
7 - Develop/post/implement emergency response plan	17 - Maintain project free of racist, sexist or hostile graffiti
8 - Post signage to establish storage location(s)	18 – Engineering drawings
9 - Post signage to identify special activity areas	19 - Other
10 - Post signage and identify restricted areas	
2 - PUBLIC SAFETY / SECURITY / SIGNAGE	
1 - Develop security plan	11 - MOT installed per plan & standards
2 - Visitor report to office signage	12 - MOT monitored / inspected per schedule
3 - Post safety/PPE signage	13 - Flaggers face traffic
4 - contact information posted	14 - Monitor MOT devices
5 - Site security established	15 - Implement vehicle site authorization process
6 - Maintain perimeter security	16 - Implement tool/equipment control plan
7 - Post No Trespassing signage	17 - Implement material control plan
8 - Post emergency contact list	18 - Implement key control plan
9 - Maintain safe access and egress with exit signs if route is not obvious	19 - Implement visitor orientation/control system
10 - Maintenance of traffic (MOT) plan	20 - Other
3 - OCCUPATIONAL HEALTH	
1 - Appropriate first aid kits and log accessible with CPR mask and gloves	12 - Maintain worker awareness of hazardous materials and controls
2 - Identify first aid stations	13 - Identify SDS location and inventory of hazardous material
3 - Label potable/non potable water sources	14 - Provide an SDS for material on site
4 - Provide drinking water, cups and a trash receptacle	15 - Label containers with material id, hazard warnings and controls
5 - Provide adequate toilets	16 - Provide adequate waste containers
6 - Where contaminants may be harmful, provide hand washing facilities	17 - Use proper lifting technique
7 - No eating or drinking in a contaminated area	18 - Use material handling equipment for heavy loads
8 - Maintain an effective vermin control program	19 - Control silica dust
9 - Provide hearing protection where noise levels exceed 84 DBA	20 – Review SDS for PPE requirements
10 - Post signs warning of laser in use	21 - Other
11 - Protect workers from exposures exceeding PEL/TLVs	

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Exhibit 16-4: Example Accident Investigation Form (6-17)
(Used by Permission from PCL Construction Services, Inc.)

4 - ENVIRONMENTAL	
1 - Environmental checklists/scope of work completed	10 - Identify hazmat storage locations
2 - Develop / implement site specific environmental action plan	11 - Develop/implement the project HSE waste management plan
3 - Develop a storm water, erosion & sedimentation control plan	12 - Separate hazardous materials by class
4 - Implement / maintain the storm water, erosion and sedimentation control plan	13 - Recycle per the project HSE plan
5 - Develop/implement a mold response procedure	14 - Implement dust control plan
6 - Provide 110% secondary containment at fuel and hazardous liquid storage	15 - Maintain adjacent streets free of mud/site debris
7 - Provide adequate spill cleanup kits	16 - Prevent rain/snow contamination at secondary containment vessels
8 - Develop/implement spill response procedure and team	17 - Other
9 - Establish and contain concrete washout	

5 - PERSONAL PROTECTIVE EQUIPMENT	
1 - Wear appropriate eye protection	11 - Wear fall protection harness/lanyard
2 - Wear a face shield	12 - Attach retractable device snap hook directly to harness d-ring
3 - Wear a hard hat	13 - Wear harness d-ring centered in the back and at shoulder height.
4 - Wear hard hat with welding face shield	14 - Inspect fall protection PPE before each use
5 - Provide appropriate hearing protection	15 - Adjust PPE to fit for its intended use
6 - Wear appropriate gloves	16 - Wear only manufacturer approved headgear under hard hat
7 - Wear appropriate footwear	17 - Provide PPE training to workers
8 - Wear appropriate clothing	18 - Eye wash & showers are required where workers handle acid batteries
9 - Wear fire retardant clothing	19 - Wear high VIZ vests/clothing when required
10 - Wear appropriate properly adjusted flotation device	20 - Other
6 - FIRE PROTECTION / PREVENTION	
1 - Firefighting equipment is in good condition & accessible	13 - Store flammables away from egress routes / exits
2 - Personnel trained to use the equipment	14 - Clean up / dispose of combustible trash
3 - FE size and class is appropriate for hazard	15 - Maintain access for fire department
4 - Travel distance to FE </= 100'	16 - Keep weeds and grass from becoming a fire hazard
5 - 1 FE / 3000' of protected building area	17 - Store flammable liquids in approved containers
6 - FE in offices/conexes	18 - Install 20# ABC FE @ >25' &<75' of outdoor flammable liquid storage
7 - Perform FE annual inspection/service	19 - Segregate non compatible materials which create a fire hazard
8 - Document monthly FE inspection	20 - FE on vehicles/cranes/equipment
9 - FE located on each floor at the stairway landings	21 - Implement hot work permit program
10 - Install / energize permanent firefighting equipment ASAP	22 - Store flammable wastes in fire resistant containers
11 - Smoke in designated areas	23 - Other
12 - Post appropriate no smoking signs	

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Exhibit 16-4: Example Accident Investigation Form (7-17)
(Used by Permission from PCL Construction Services, Inc.)

7 - MATERIAL HANDLING / STORAGE	
1 -Post signs/barriers when dropping waste through holes in deck	7 - Remove nails from used lumber before stacking
2 - Clean-up scrap and waste as work progresses	8 - Store cylindrical materials in racks or blocked to prevent rolling
3 - Equipment/material is stored in a stable/secure condition	9 - Storage areas are free of trip, slip, fire, explosion and vermin hazards
4 - Post safe load limits on storage racks, elevated floors and decks	10 - Establish a CAZ with monitor when dropping material outside a building
5 - Keep route clear for movement of materials/people	11 - Other
6 - Store material far enough back from the edge (6' min) so it can't fall off	
8 - HAND & POWER TOOLS	
1 - Maintain hand and power tools in a safe condition	10 - Properly dispose of unused powder actuated tool charges
2 - Use guards provided by manufacturer	11 - Loaded powder actuated tools shall not be left unattended
3 - Guard moving or rotating parts	12 - Crib or block a load immediately after jacking it up
4 - Point of operation guarding keeps the operator safe	13 - Use tools and equipment as the manufacturer intended
5 - Keep wooden handles of tools free of splinters and tight in the tool	14 - Tools and equipment will be inspected daily and prior to use
6 - Electric power tools shall be double insulated or grounded	15 - Tag defective tools / equipment and return them for repairs
7 - Secure air supply at hose and tool connections	16 - Store tools/equipment per project standard
8 - Install safety device to reduce air pressure in case of hose failure	17 - Other
9 - Shut off equipment when refueling, servicing or maintaining	
9 - WELDING AND CUTTING	
1 - Transport/store cylinders upright with valve closed and cap on	11 - Move or protect flammables & combustibles from hot work
2 - Secure cylinders to keep them upright	12 - Prevent sparks and slag from falling onto combustibles or people
3 - Separate fuel and oxygen by 20' or a fire barrier per requirements	13 - Provide a fire extinguisher dedicated to the hot work operation
4 - Do not store fuel gas cylinders in unventilated spaces	14 - Provide a fire watch long enough to ensure no fires occur
5 - Protect cylinders from sparks, hot slag or flames	15 - Shut off the gas at the cylinder when torch is unattended
6 - Train workers in the safe use of fuel gases	16 - Provide sufficient mechanical ventilation to exhaust fumes
7 - Inspect hoses, torches and regulators at the beginning of the shift	17 - Wear sufficient PPE for the hot work performed
8 - Within 10' of the stinger the cable will be free of nicks or repairs	18 - Flashback arrestors are in place
9 - Repair cable with exposed conductors before use	19 - Other
10 - Erect arc welding shields to protect other workers	

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Exhibit 16-4: Example Accident Investigation Form (8-17)
(Used by Permission from PCL Construction Services, Inc.)

10 - ELECTRICAL	
1 - Enclose sparking / arcing electrical parts	15 - Extension cords will be three wire type and designed for hard usage
2 - Manufacturer label on electrical equipment is legible	16 - Don't run extension cords through holes or conceal cords in ceilings or walls
3 - Lock door to unattended electrical rooms with live panels	17 - Energized extension cords will have a grounded plug in a plug receptacle
4 - Post signs restricting access to qualified persons at electrical rooms	18 - Don't hang extension cords with staples, wires or nails
5 - Maintain the polarity of cords & equipment	19 - Keep walking/working areas clear of cords/cables/hoses
6 - All circuits must include ground fault circuit interrupters	20 - Extension cords shall be connected to plugs with strain relief
7 - Portable electric generators more than 5KW shall have GFCI circuits	21 - Nicked, worn or frayed cords/cables shall not be used
8 - Site assured grounding conductor program is implemented/ records filed	22 - Electrical gear and accessories in wet locations will be weatherproof
9 -Wires on poles will be at least 10' above grade or deck	23 - In hazardous locations electrical gear must be rated for the hazard
10 - The path to ground shall be permanent and continuous	24 - Post warnings/wear FRP when arc flash hazards exist
11 - Temporary lighting must be on a separate circuit and hard wired	25 - Inspect temporary power per schedule
12 - Protect light bulbs with cages or sleeves	26 - Maintain clear access to circuit breakers/service components at all times
13 - Don't hang temporary lights from the electric cord	27 - Other
14 - Protect cords/cables/hoses from pinch points/ equipment/ traffic	
11 - SCAFFOLD ERECTION	
1 - Trained scaffold erectors will be supervised by a competent person	13 - Scaffold uprights shall be plumb, level and braced to prevent swaying
2 - 100% fall protection is required for scaffold erectors @ > 6' exposure	14 - Fully plank decks with no more than 1" gaps between planks
3 - Construct the scaffold as the manufacturer / designer intended	15 - Wood planks overhang supports by 6" min
4 - Scaffolding will be designed by a registered P. E. when required	16 - Do not cantilever planks over supports more than 12"
5 - Do not use damaged parts to erect a scaffold	17 - Brace scaffold with push/pull ties at the horizontal member closest to 4:1
6 - Install access for the erection crew as the scaffold is erected	18 - Free standing towers height cannot exceed 3 times their width
7 - Erectors shall not stand on or climb cross braces	19 - Rolling scaffold height cannot exceed 3 times the width
8 - Provide scaffold platform access if the change in elevation is =/> 2'	20 - Caster stems, screw jacks and wheel stems shall be secured
9 - Provide cleats on ramps that are steeper than 1:8	21 - Rolling scaffolds shall be braced horizontally to prevent racking
10 - The minimum scaffold platform or walkway surface is 18" (46 cm) wide	22 - Repair, brace or replace damaged scaffold components
11 - Use adequate mudsills and fasten base plates to them	23 - Other
12 - Unstable objects shall not be used to support scaffolds	

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Exhibit 16-4: Example Accident Investigation Form (9-17)
(Used by Permission from PCL Construction Services, Inc.)

12 - SCAFFOLD USE	
1 - Workers will be trained to recognize scaffold hazards	10 - Scaffold planks should not deflect more than 1/60th of their span
2 - Retrain workers when conditions change or they appear to need it	11 - Fall protection is required on scaffolds if workers could fall 6' or more
3 - A competent person will inspect and tag the scaffold at the start of the shift	12 - Fall protection will be in place before work starts
4 - Cross braces shall not be used as a means of access	13 - Do not remove guardrails w/o wearing fall protection PPE
5 - Do not overload scaffolds	14 - Prevent objects from falling off scaffolds and striking workers below
6 - Do not use unstable objects (i.e. buckets) as work platforms	15 - Do not rest/hang equipment or material on guardrails
7 - Do not use ladders on a scaffold	16 - Lock the wheels when working on a mobile scaffold
8 - Secure/support a scaffold equipped w/ screens against wind loads	17 - Other
9 - Debris shall not be allowed to accumulate on scaffold/AWP decks	
13 - CRANES / HOISTS / LIFTS	
1 - Annual inspection certificate on site	10 - The entire crane is a continuous conductor and grounded
2 - Crane operators shall possess a valid operating certificate	11 - Do not hoist workers without an approved plan
3 - Authorize a signal person and post crane hand signals used	12 - The worker hoist plan must conform to the standard
4 - Operate/inspect/maintain crane per manufacturer instructions	13 - Do not exert any horizontal pull at any angle to the crane jib
5 - Maintain the crane equipment log and crane operators log on the crane	14 - Loads will not be left suspended when the crane is not attended
6 - Post warnings and load charts where operator can see them	15 - Tag lines shall be used unless their use creates an unsafe condition
7 - Prevent worker access to the swing radius of the rear of the crane	16 - All containers that may be hoisted must have the capacity marked on them
8 - If loads must fly over workers, effectively warn them	17 - Other
9 - Maintain adequate distance from power lines	
14 - VEHICLES AND EQUIPMENT	
1 - Develop/implement a preventive maintenance plan	11 - Do not move unstable loads with the fork truck
2 - Document the equipment inspection before use on each shift	12 - Vehicles must have service & parking brakes, brake lights & horn
3 - Obtain the manufacturers' approval before modifying equipment	13 - If visibility is low all vehicles must have 2 headlights & 2 tail lights
4 - Equipment manual/name plates/markings must be in place/legible	14 - All vehicles must have a back-up alarm or only back up with an observer
5 - Each equipment operator will be trained, evaluated & certified	15 - Vehicles with cabs will have a distortion free view
6 - Do not stand under the loaded or empty elevated forks	16 - The operator is authorized to operate the equipment on site
7 - No passengers allowed on fork trucks unless there is a seat and seat belt	17 - Wear the seat belt
8 - If leaving the fork truck, set brake, lower the forks, put it in neutral	18 - Prevent workers from falling into/onto dangerous equipment
9 - Chock tires if on an incline/at dock/otherwise required	19 - Inappropriate use of cell phone while operating vehicles/ equipment
10 - All traffic regulations shall be observed	20 - Other

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Exhibit 16-4: Example Accident Investigation Form (10-17)
(Used by Permission from PCL Construction Services, Inc.)

15 - EXCAVATIONS	
1 - Complete a JHA before starting underground work	13 - Spoil piles, materials and equipment will be at least 3' back from edge
2 - Remove or support surface objects which may become unstable	14 - Protect workers from falling objects / sloughing dirt / stones
3 - Locate underground utilities before excavation starts	15 - Excavation inspection checklist completed before entry
4 - Locate utilities by hand when within 3' feet of estimated location	16 - Prevent cave-ins in excavations 5' deep or more
5 - Underground utilities shall protected, supported or removed	17 - Soil analysis documented
6 - Provide safe egress within 25' of workers in an excavation =/> 4'	18 - Class C soil sloped 1 1/2 to 1
7 -The incline angle of an egress ramp must allow workers to walk out upright	19 - Class B soil sloped at 1 to 1
8 - Install barricades around excavations	20 - Class A soil sloped at 3/4 to 1
9 - Fall protection is required when exposed to a 6' or greater fall	21 - No workers allowed under loads lifted by digging equipment
10 - Test the atmosphere when hazardous gases could be expected	22- Substantial barricade
11 - Do not work in an excavation holding water	22 - Other
12 - Prevent surface water from draining into the excavation w/ berms	
16 - CONCRETE & MASONRY	
1 - Determine the structures load capacity and then don't exceed it	6 - Install reshoring per engineered drawings
2 - Prevent impalement from workers falling onto or into rebar	7 - Brace or guy reinforcing steel to prevent overturning or collapse
3 - Engineered formwork/shoring drawings will be on site	8 - Establish a CAZ before starting to lay block walls
4 - Inspect shoring prior to, during and immediately after concrete pour	9 - Brace CMU walls over 8' high until support structures are installed
5 - Properly install and secure shore posts	10 - Other
17 - STEEL ERECTION	
1 - Implement written erection and hoisting sequence plan	5 - Provide overhead protection for workers active below erectors
2 - Controlled access zone for erectors only	6 - Perimeter guarding inspected/accepted by GC
3 - Erector fall protection required @ 6' (2M) or more	7 - Connectors training records for procedures used are on site
4 - Falling object protection: Secure material and tools aloft	8 - Other
18 - DEMOLITION	
1 - Complete/implement a written demolition plan prior to starting work	5 - Only workers essential to the demolition are allowed in the area
2 - Cut off or relocate and protect live utilities	6 - A competent person will inspect for hazards as work progresses
3 - Test for and remove hazardous materials before starting demo	7 - Post warning signs/provide PPE where live circuits may be hidden
4 - Provide and secure covers on floor openings	8 - Other

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Exhibit 16-4: Example Accident Investigation Form (11-17)
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19 - LADDERS	
1 - Provide 2 ladders/25 workers when ladders are used for access/ egress	11 - Barricade the ladder in doorways and high traffic areas
2 - Keep ladder access clear to permit free passage	12 - Ladders shall not be moved, shifted or extended while occupied
3 - Job built ladders conform to applicable standards	13 - Open stepladders and lock the spreaders before use
4 - Ladder rungs shall be parallel and uniformly spaced	14 - Do not stand or sit on the top or the top step of a step ladder
5 - Use ladders for the purpose they were designed	15 - Inspect ladders before use and tag if in bad order
6 - Ladder side rails extend 3' (min) above the landing surface	16 - Face ladder and maintain 3 point contact when climbing ladder
7 - Maintain ladders free of slip hazards	17 - Do not carry materials up or down a ladder
8 - Set up angle for manufactured ladders 4:1 and job built 8:1	18 - Train and retrain workers when necessary in ladder use
9 - Set up ladders on stable, level surface	19 - Store ladders per project standard
10 - Secure (tie off) the ladder at top landing	20 - Other
20 - CONFINED SPACE	
1 - Address project confined space hazards in orientation	14 - File records of the training on site
2 - Post danger signs at permit required confined spaces	15 - Training: authorized attendants know their duties
3 - Develop/implement a written confined space permit program	16 - Training: authorized entrants know their duties
4 - Document process determining non-permit required confined spaces	17 - Training: entry supervisors know their duties
5 - Implement continuous forced air ventilation	18 - Provide one attendant outside while the permit space is occupied
6 - Provide proper equipment to entrants	19 - Evaluate challenges and select an appropriate rescue team
7 - Testing of permit space atmosphere witnessed by entrants before entry	20 - Provide training/practice for the rescue team
8 - Supervisors / entrants are trained to use the gas monitor	21 - If feasible facilitate non-entry retrieval rescue
9 - Complete & post the permit & pre entry checklist at the entry portal	22 - Rescue teams conduct practice drills annually (min)
10 - Terminate and file the permit at the completion of the task	23 - Document the review of the annual site confined space program
11 - Document problems on permit	24 - Shut off fuel gas source outside the confined space when not in use
12 - Monitor the space during the task	25 - Remove torches and hoses at the end of the shift
13 - Train the team members to perform their duties	26 - Other

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Exhibit 16-4: Example Accident Investigation Form (12-17)
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21 - LOCKOUT TAGOUT	
1 - Establish a LOTO plan for each piece of equipment	13 - Document LOTO training
2 - Conduct LOTO training for each piece of equipment	14 - Review the LOTO procedure before each implementation
3 - If a piece of equipment is capable of being locked out, it must be	15 - The LOTO sequence of equipment shutdown will be followed
4 - An attendant must guard a piece of equipment that is only tagged out	16 - Use LOTO device(s) to hold isolating devices in the safe position
5 - LOTO devices will be provided by the employer	17 - Stored energy: relieve all potential or residual energy
6 - LOTO devices shall not be used for other purposes	18 - Verify that isolation/release of stored energy has occurred
7 - LOTO devices: durable, standardized, substantial & identifiable	19 - Inspect the equipment before restarting
8 - Audit LOTO procedures at least annually	20 - Inform affected employees before machine startup
9 - Audit each employee using LOTO annually to verify training retention	21 - Each authorized worker removes his own lock
10 - Document annual audits of LOTO program and worker retention	22 - All employers shall inform each other of their respective LOTO programs
11 - Train authorized users of the LOTO program	23 - Group LOTO shall provide protection equal to individual LOTO
12 - Provided awareness training to workers affected by LOTO	24 - Other
22 - PROCEDURES: PSI, JHA, INFECTION, ACCESS ZONES	
1 - Develop Construction Hazard Assessment	9 - Comply with asbestos abatement control procedures
2 - Develop Job Hazard Analysis (JHA)	10 - Comply with lead based paint abatement procedures
3 - JHA communicated & signed off by project management & workers	11 - Comply with biological/infection control procedures
4 - Implement JHA/SWP/construction plan	12 - Comply with cadmium control procedures
5 - Workers and supervisors trained in the proper completion of PSI	13 - Limited access zones may only be occupied by authorized workers
6 - Conduct PSI at the start of the shift and when tasks/conditions change	14 - Establish a limited access zone for falling object protection
7 - PSI is signed by workers	15 - Other
8 - Review / initial PSI after breaks and lunch	
23 - RIGGING	
1 - Inspect rigging at start of shift and as used during the day	8 - Use the right number/spacing of U-bolt wire rope clips
2 - Defective rigging equipment shall be removed from service	9 - The U-bolt goes on the "dead end" of the cable
3 - Know the weight of the load and use adequate rigging	10 - Rigging will be protected from kinks/sharp edges
4 - Remove rigging from work area and store properly when not in use	11 - Keep hands and fingers away from between the sling and the load
5 - Capacity tags attached to all rigging	12 - Rigging will be done by trained qualified workers
6 - Makeshift rigging will not be used	13 - Other
7 - Ends of wire rope will be covered or blunted	

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Exhibit 16-4: Example Accident Investigation Form (13-17)
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24 - STAIRWAYS	
1 - Provide a stair or ladder at elevation breaks of 19" or more	8 - Hand/stair rails are required at 4 rises or 30"
2 - Keep single stairway access and egress open or provide other access	9 - Handrails and stair rails must support 200# imposed down or outward
3 - Provide fall protection at stairways before opening for use	10 - Handrail height is between 36" & 37" to the top of the rail
4 - Temporary stairs: provide a landing 30" long and 20" wide every 12' of rise	11 - Handrails shall provide an adequate handhold that may be grasped
5 - Stairways will be free of snag, puncture or laceration hazards	12 - Unprotected sides of stair landings will have a guardrail system (42" +/- 3")
6 - Eliminate slip/trip conditions on stairs	13 - Other
7 - Temporarily fill pan stairs full width and depth before use	
25 - FALL PROTECTION SYSTEMS	
1 - Top of top rails shall be 42" +/- 3" from the deck	15 - Adjust harness with D ring above shoulder blades and centered
2 - Top rails will support 200# with < 2" deflection	16 - Personal fall protection: a harness, 2 lanyards and a 5000# anchorage
3 - Top rails must be a minimum of 1/4" wire rope and every flagged 6'	17 - Snap hooks: 1/D-ring, not snapped directly to webbing, rope or wire rope
4 - Midrails are 1/2 way between the top rail and the deck	18 - Lifelines are engineered/inspected/used per plan
5 - Screens shall extend from the top rail to the deck	19 - Vertical lifelines: use softeners at sharp edges
6 - Screens/midrails will support 150# pressure down or out	20 - Anchorages shall be capable of supporting 5000# (22.2 kN)
7 - 3 1/2" toe boards with no more than 1/4" gap below or 1" gap between	21 - Rig fall protection to prevent a free fall of > 6' or striking surface below
8 - Toe boards will support 50# pressure down or out	22 - Use a lanyard with and rig positioning devices to prevent a fall >2'
9 - Openings in screens will prevent anticipated material from falling	23 - Warning line systems must be at least 6' back from roof edge
10 - Guardrails are free of puncture, snag or laceration hazards	24 - Warning lines will be flagged and between 34" and 39" above deck
11 - End guardrails at terminal post if projection is hazardous	25 - Leading edge warning line is between 6' and 25' back from leading edge
12 - Covers will support 2X the anticipated load	26 - A warning line parallel to hazard ties to guard rails at both ends
13 - Holes are covered and covers are secured to prevent displacement	27 - A CAZ line is between 39" & 45" and flagged
14 - Covers are marked with a circle and an "X"	28 - Other
26 - FALL PROTECTION	
1 - Worker fall hazard recognition/control training records filed	11 - Install fall restraint system at material landing zones
2 - Conduct fall protection retraining when required	12 - Provide fall protection at holes
3 - Confirm walking working surfaces will support imposed loads	13 - Provide an offset guardrail or gate at ladder access
4 - Develop/implement fall protection plan when exposed to a 6' fall	14 - Fall protection required at wall openings (>30"X18") < 39" above deck
5 - Install fall protection where fall hazards exist before beginning work	15 - Precast erection & leading edge work qualify for fall protection plans
6 - Inspect PPE before each use	16 - Provide/implement a leading edge fall protection plan
7 - Document formal inspections of fall PPE	17 - Protect workers from falling objects
8 - Store fall PPE properly	18 - Plan and practice fall rescue plans
9 - Do not tie off to guard rail systems	19 - Abate slip / trip conditions
10 - Wear fall protection when removing guardrails	20 - Other

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Exhibit 16-4: Example Accident Investigation Form (14-17)
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27 - MARINE OPERATIONS	
1 - Post barge/crane load limits within operator view	6 - Maintain gangway free of slip / trip hazards
2 - Secure mobile crane to barge	7 - Maintain barge deck in safe condition
3 - Revise crane capacity chart for barge	8 - Provide fall protection on deck load
4 - Provide safe barge access	9 - Provide Life ring and ladder access to barge
5 - Provide adequate dock and gangway lighting	10 - Other
28 - RESPIRATOR PROGRAM	
1 - A site specific respirator plan is required if workers use respirators	13 - Store respirators to protect them from damage and deformation of face piece
2 - Review respirator hazards for the voluntary use of dust masks	14 - Inspect the respirator before each use
3 - Evaluate the extent of the respiratory hazard, the chemical state and its form	15 - Repair or discard damaged / defective respirators
4 - Select an appropriate respirator to control the hazard	16 - Compressed (supplied air) respirator hoods will be supplied with Grade D air
5 - Provide medical evaluation for workers wearing respirators and file clearance	17 - Monitor the supplied air to ensure it meet Grade D standards
6 - Provide fit testing for negative air pressure respirators	18 - All filters, cartridges and canisters will be color coded and labeled
7 - Wear appropriate respirator	19 - Provide initial training to users and annual refresher training
8 - Facial hair is not allowed if it interferes with the respirator seal	20 - Document the annual program evaluation for implementation and effectiveness
9 - Perform a user seal check each time the respirator is put on.	21 - Recordkeeping: medical clearance, fit testing, respirator type, dates
10 - Do not remove the respirator in the hazardous area	22 - The site specific respirator plan is filed on site.
11 - Clean and maintain the respirator as required	23 - Other
12 - Do not share a respirator unless it has been cleaned	
29 - AERIAL WORK PLATFORMS	
1 - Obtain the manufacturers permission before modifying an aerial lift	9 - Establish a controlled access zone to protect workers from falling objects
2 - Document AWP inspections prior to use with form	10 - Fall protection PPE must not allow worker to strike the ground
3 - AWP: Only authorized persons shall operate aerial lifts	11 - Lower / retract the AWP when traveling
4 - AWP: Do not tie off to adjacent poles, structures or equipment	12 - A rescue plan must be in place when AWP are in use
5 - Keep your feet on the aerial work platform deck	13 - Hook chain / latch access gate to AWP
6 - Tie off to the attachment provided in the basket	14 - Equipment operator's manual / inspection checklist on AWP
7 - Do not exceed the load limit while working in an aerial lift	15 - Other
8 - Adhere to Procedure to exit / access an elevated AWP	

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Exhibit 16-4: Example Accident Investigation Form (15-17)
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Root Cause(s): Select the most basic cause that when corrected will prevent the likelihood of recurrence.

☐ **Orientation and Training**	☐ **Communication Systems**
☐ Not Required ☐ Inadequate ☐ Not Established ☐ Not Current ☐ Not Available ☐ Not Compliant ☐ Not Understood	☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Understood ☐ Not Compliant
☐ **Hazard Identification and Control**	☐ **Inspection and Audits**
☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Communicated ☐ Not Enforced ☐ Not Understood ☐ Not Compliant	☐ Not Established ☐ No Action Plans ☐ Inadequate ☐ Not Communicated ☐ Inadequate Frequency ☐ Current Form/ Checklist Not Used ☐ No Closure ☐ Preventive Maintenance Inadequate ☐ Not Trended
☐ **Security/Emergency Response**	☐ **Environmental Management**
☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Communicated ☐ Not Enforced ☐ Not Understood ☐ Not Compliant	☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Communicated ☐ Not Enforced ☐ Not Understood ☐ Not Compliant
☐ **Standard Operating Procedures Practices and Legislation**	☐ **Trade-contractor Management**
☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Communicated ☐ Not Enforced ☐ Not Understood ☐ Not Compliant	☐ Not Required ☐ Inadequate ☐ Not Established ☐ Not Compliant ☐ Not Available ☐ Pre-qualification/Selection ☐ Not Understood
☐ **Engineering**	☐ **Procurement**
☐ Not Required ☐ No Current Standards Available ☐ Not Available ☐ Not Understood ☐ Not Compliant ☐ Inadequate	☐ Not Established ☐ Not Timely ☐ Not Available ☐ Improper Selection ☐ Inadequate ☐ Inadequate or No Specifications ☐ Not Compliant
☐ **Site Specific Safety Plan**	☐ **HR/PD**
☐ Not Established ☐ Inadequate ☐ Not Available ☐ Not Current ☐ Not Understood ☐ Not Compliant	☐ Inappropriate Hire ☐ Not Competent ☐ Inappropriate Placement ☐ Not Available
☐ **Leadership and Administration**	
☐ Inadequate Accountability ☐ Inadequate Planning ☐ Lack of Discipline ☐ Schedule Pressure ☐ Lack of Enforcement ☐ Poor Execution ☐ Inadequate ☐ Not Communicated ☐ Lack of Resources	

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Exhibit 16-4: Example Accident Investigation Form (16-17)
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STEP 6- ADD CORRECTIVE ACTIONS:

Specific Measureable Accountable Realistic Timely Effective Reviewed

What are the corrective actions for substandard acts and conditions?	Assigned To*:	Target Date*:	Date Completed:
1. Substandard Act/Condition:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
2. Substandard Act/Condition:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
3. Substandard Act/Condition:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			

What are the corrective actions for hazard categories/standards deficiencies?	Assigned To*:	Target Date*:	Date Completed:
1. Hazard Category/Standard:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
2. Hazard Category/Standard:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
3. Hazard Category/Standard:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			

What are the corrective actions with a root cause?	Assigned To*:	Target Date*:	Date Completed:
1. Root Cause:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
2. Root Cause:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			
3. Root Cause:		DD/MM/YYYY	DD/MM/YYYY
Corrective Action*:			

Insert Notes to Incident:

Note	Created By:	Created On:

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Exhibit 16-4: Example Accident Investigation Form (17-17)
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Documents to consider are:

☐ Photos	☐ Certifications	☐ Inspections	☐ Training Records	☐ HSE Field Meeting Minutes
☐ Drawings/Blueprint	☐ Sketches	☐ Timecards	☐ HSEOPs	☐ Vendor Agreements
☐ JHAs/PSIs	☐ CHAs	☐ Permits	☐ Schedules	☐ Purchase Orders
☐ Daily Log	☐ Contracts	☐ Witness Statement	☐ Insurance Certificate	

STEP 7- INSERT SIGNATURES:
FAX / EMAIL IMMEDIATELY AND FORWARD ORIGINAL TO HSE DEPARTMENT

Lead Investigator*:	Print	Signature	**Date:** DD/MM/YY
Investigation Team Members*:	Print	Signature	**Date:** DD/MM/YY
	Print	Signature	**Date:** DD/MM/YY
	Print	Signature	**Date:** DD/MM/YY
Project Superintendent*:	Print	Signature	**Date:** DD/MM/YY
Project Manager*:	Print	Signature	**Date:** DD/MM/YY
District/General Manager*:	Print	Signature	**Date:** DD/MM/YY

Additional Management Comments: (if required)

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17
CONSTRUCTION SITE EMERGENCY MANAGEMENT

17.1 INTRODUCTION

In spite of proper jobsite safety pre-planning, construction sites face the possibility of numerous jobsite emergencies. Examples of events that can cause jobsite emergencies can include:

- Workplace fatalities (work-related, worker suicide, heart attack)
- Severe multiple injury accidents
- Workplace violence
- Structural collapses
- Bomb threats
- Fire and explosions
- Hazardous chemical releases
- Inclement weather/natural disaster scenarios (e.g., earthquakes, floods, hurricanes, tornadoes)

17.2 EMERGENCY ACTION PLAN (EAP)

Contractors should ensure they comply with all applicable regulations pertaining to EAPs. According to WAC 296-24-567, the following elements, at a minimum, shall be included in the plan:

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed
- Rescue and medical duties for those employees who are to perform them
- The preferred means of reporting fires and other emergencies
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan

17.3 EMERGENCY MANAGEMENT BEST PRACTICES

The primary objective of this section is to help employers prepare for the emergencies their jobsites are most likely to encounter, using industry best practices. Contractors should ensure they comply with all applicable regulations pertaining to EAPs.

17.3.1 Assign EAP Responsibility

The EAP should be developed, overseen, frequently reviewed and updated by the controlling contractor. The EAP should be comprehensive in nature to deal with all types of emergencies that can be expected. The controlling contractor should include emergency response related requirements in their contract with their subcontractors. The contract should call out the provision of emergency response equipment, identification of qualified first aid personnel, and participation in EAP training/drills. The EAP should be reviewed at the pre-construction meetings with the subcontractors and their tiers.

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17.3.2 Designated Site Emergency Coordinator (SEC)

The project should establish a chain of command to minimize confusion during emergencies. Prior to the start of construction operations, the controlling contractor should designate a Site Emergency Coordinator (SEC), who has the authority for making decisions during emergencies. Typically the Project Superintendent will be designated as the primary SEC. However, it is impossible for the primary SEC be onsite at all times. Hence, it is recommended to select and train a sufficient number of secondary SECs. At any given time when work is taking place on the site, one of the SEC should be available on site. The SEC should be responsible for all pre-emergency planning tasks before the commencement of any work on the site. The SEC should be responsible for developing, frequently review, and update the site's EAP. The SEC should review changing site conditions in relation to the EAP and update it if needed after completion of:

- Substructure (e.g., concrete slab on grade is completed)
- Superstructure (e.g., building top-out)
- Exterior skin
- Interior finishes
- Access/egress changes

Some of the other SEC responsibilities are addressed in each of the sections below.

17.3.3 Identify the various types of potential Site Emergencies

The SEC in collaboration with the site supervision, and the owner or client in an existing facility should first determine the anticipated types of site emergencies. Emergencies can vary from project to project based on various factors such a location, project type, etc. For example, a contractor building a 50-story building with a tower crane should plan for medical emergencies situations involving the tower crane operator (heart attack) or a potential tower crane failure. Similarly, a contractor working in the Midwestern Untied States should plan for tornados. A few examples of emergencies that can be triggered by specific construction operations can include:

- Trench collapse
- Formwork collapse
- Confined space-related incidents
- Electrical shocks or burns
- Power line contact
- Crafts suspended from fall arrest systems
- Incidents involving the general public

17.3.4 Develop a Construction Site Logistics Map (CSLM)

A CSLM is typically required for large or complex construction sites, with the primary objective to assist with site logistics, but it will also be a great communication and planning tool during emergency situations. Using the sitemap, include the following key components in the CSLM:

- Site address
- Internal and external traffic flow (truck routes, pedestrian path, etc.)
- Construction vehicle and craft parking
- Site fencing
- Access gates

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- Temporary project-related facilities including job trailers, garbage dumpsters, recycling bins, lunch tent, and sanitary facilities
- Staging/lay down areas
- Material storage area including flammable/combustible materials and compressed gas cylinder storage
- Material handling equipment including cranes and their swing radius, construction hoists, and concrete pump truck locations
- Emergency phone location
- Main power supply disconnect location
- Emergency vehicle access
- Emergency evacuation routes
- Emergency assembly areas
- Emergency meeting point, where the responders will meet the site SEC or designee
- Location of emergency equipment and supplies including first aid kit, fire extinguisher, eye-wash, emergency shower, Automatic External Defibrillator (AED) equipment, potable water, and blood-borne pathogen kit.
- Major utility lines (underground and overhead)
- Firefighting equipment including standpipes and hydrants
- Emergency shelters for events such as a tornado, high wind, etc.

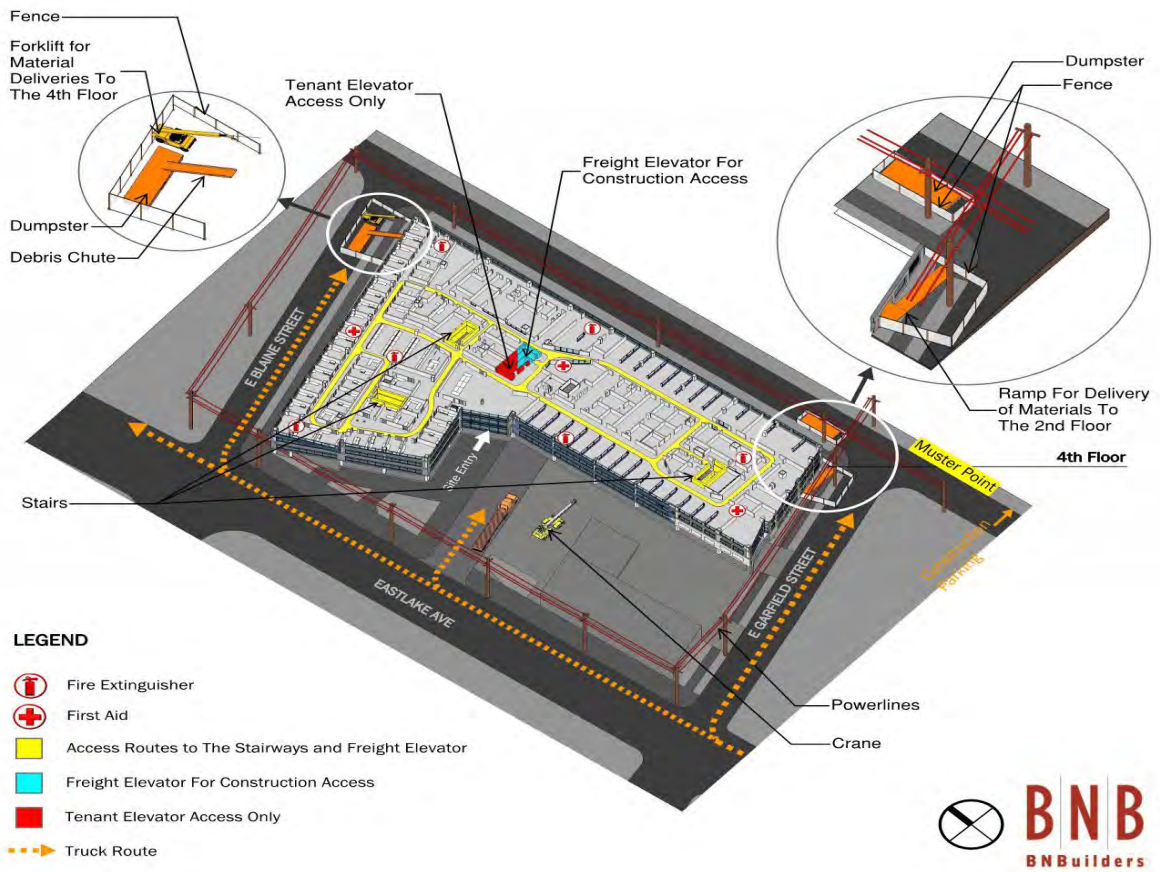

Figure 17-1 Example Construction Site Logistics Plan (Picture Courtesy BNBuilders)

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17.3.5 Train the workers on the EAP and CSLM

The CSLM along with the site EAP should be reviewed with the workers during site orientation, or even posted at the orientation location. The EAP should be reviewed with the workers whenever the site conditions change in relation to the EAP. The weekly site safety meetings and daily tool box meetings can be used for this training.

17.3.6 Identify Emergency Assembly Area

Emergency assembly area is a predetermined location or locations, where site personnel will gather in case of an emergency. The assembly area should be determined and identified in the EAP and the CSLM. All employees should be advised of these emergency assembly points at their new employee safety orientation, and again when any change in location is made. Assembly areas may include parking lots, staging areas, etc. The emergency assembly area should:

- Be equipped with an "emergency assembly area" signage
- Be located away from the site entrance/egress points
- Be sufficiently illuminated
- Be kept clear of debris, materials, and equipment
- Not be a parking space for equipment or staging for materials
- Be frequently inspected by the SEC to ensure it is clear

17.3.7 Procure and Maintain Emergency Equipment and Supplies

The SEC should ensure the following emergency equipment and supplies are available on the site and are in good working condition. The equipment and supplies should be strategically placed across the site as the project progresses. The SEC should be responsible for inspecting and maintaining this equipment per manufacturer recommendations and regulatory requirements. For example, a monthly and annual inspection of fire extinguishers is required. Many times workers use fire extinguishers to put out minor fires but never report it to their supervision. A discharged fire extinguisher will be of no help during emergencies. Also, some supplies come with an expiration date. The site emergency equipment and supplies should include at a minimum:

- Specialized personal protective equipment
- Rescue equipment
- Flashlights
- Emergency notification alarm systems such as air horns
- Eyewash stations
- Emergency shower
- Sufficient number of First Aid kits
- Adequate number of Bloodborne pathogen kit
- Fire Extinguishers – in sufficient quantities and classes (A, B, C, D, K) depending on the site hazards
- Portable Automatic External Defibrillator (AED)
- Fuel-powered generators
- Food and water (shelter in place)

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17.3.8 Procure and Maintain Communication Equipment

One of the critical components of an EAP is having the appropriate communication equipment on site. The SEC should determine what communication equipment is needed and have them available on site such as weatherproof two-way radio, cell phones, and air horns. The SEC should also consider the potential failure of these equipment during an emergency. How will the project communicate if the phone lines are down? What are the different offsite communication equipment available such as nearest landline telephone, cell phone, etc.? These communication equipment are essential during emergencies to communicate to the site workers, and also with external agencies such as corporate office, police, Red Cross, ambulance, and fire department.

17.3.9 Establish Emergency Escape Procedures and Routes

The SEC should identify escape procedures (for all anticipated site emergencies) and escape routes of evacuation. In the case of renovation work taking place within a building, emergency exits must be adequately marked, kept clear, and doors should be unlocked. It might be essential to collaborate with the owner or client while working on existing operating facilities such as hospitals, manufacturing facilities, airports, etc., to ensure everyone is on the same page with emergency escape procedures. In addition to the structure being built, job site trailers should also be included in the EAP. Post exit signs above exit doors and keep exit areas clear.

17.3.10 Establish Warning (Alarm) Systems

A good job site emergency alarm system should be established that is distinctive and recognizable as a medical emergency signal, an evacuation signal or to perform actions as designated in the EAP. An alarm should be audible above normal construction site noise. Examples of alarm systems used by construction companies:

- Three short blasts of the air horn are used for medical injuries
- One long blast of the air horn is used for other evaluations such as fire, etc.
- Use existing owner/client alarm system

17.3.11 Establish Evacuation Procedures

The EAP should include evacuation plans for the various types of emergencies expected on the project. The evacuation plans should include special procedures that the employees should follow before evacuation such as shutting down utilities or securing equipment that can pose a hazard to emergency responders, or create further damage to people and property. When in doubt workers should be trained to evacuate.

17.3.12 Develop Emergency Reporting and Response Procedures

The SEC should include proper reporting procedures for various emergency procedures in the EAP. The reporting procedures might vary depending on the emergency. For an onsite serious medical emergency (life threatening injuries), the reporting procedure for your workers will be something similar to below:

- Call 911 immediately – All workers should be prepared to share the following information with the dispatcher:

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- Site address
- Emergency meeting point
- Caller name and phone number
- Location of the incident within the site - On large projects it is best practice to number each floor, stairtowers, elevators, hoists, etc., so workers can share a precise location with the dispatcher.
- Incident type

- Notify your immediate supervisor right away either by phone or radio who will notify the SEC or his designee
- Make sure the area is safe, if unsafe leave the area immediately – do not risk your safety
- Render first aid as necessary to the victim

Train the employees during site orientation on how to distinguish between routine first aid cases and when emergency (911) calls are to be made. Ensure, alternate phone numbers, are identified in case the 911 system is inoperable or overwhelmed.

17.3.13 Establish a Procedure to Account for Employees After Evacuation

All site personnel should stop work, secure their work area/equipment, and congregate at the emergency assembly upon hearing the emergency alarm for evacuation. Instruct the workers, not to leave the assembly until directed by the SEC. It is important that all site personnel have been accounted for after an evacuation. It is a challenging task on construction sites because of the number of subcontractors performing work at any given time. A procedure should be developed in advance for accounting site personnel during the evacuation. It is best practice to ensure all the subcontractors on the site keep a daily personnel list using their daily work record or job diary. This list can be used by the contractors to check names against workers gathered in an emergency assembly area. After which, the subcontractor representative should report to the SEC/general contractor with the names and the expected locations of the missing personnel. Ensure the site have employees with multilingual skills or sign language to help with translation in an emergency.

For security, legal, and public relations needs, consider the following guidelines for employee conduct during an evacuation or emergency:

- No cell phone use except for company business
- No cameras or other recording mediums to be used
- Only a designated company spokesperson will engage outside interests (i.e. media)
- Only leave the evacuation area upon direction of the SEC

The SEC or designee should remain on the site after the site has been evacuated (if deemed safe) to assist emergency responders. The SEC or designee will advise them of the nature and location of the emergency, and explain any ongoing or potential hazards. In the event of a medical emergency, the project should identify an individual in advance, and train that person to meet and direct emergency service vehicle to the emergency scene.

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17.3.14 Identify and train personnel with rescue and medical duties

The project should try to create an emergency response team if possible, comprised of the primary and secondary SECs. It is best practice to pick one member from each subcontractor on site with varying expertise (e.g., electrical, crane, etc.). Select members who are physically capable of performing emergency response duties. These members should be trained in the use of fire extinguishers, first aid and CPR, AED, evacuation procedures, emergency equipment shutdown procedures, and other rescue equipment. Each subcontractor on the site should have at least one person designated as their first aid responder. Readers are encouraged to review the "Best Practices Guide – Fundamentals of a Workplace First-Aid Program" developed by OSHA[1]. It is a best practice that at least the site supervision, Foreman and above are trained in first aid, CPR and the use of AED.

17.3.15 Publish Emergency Contact Information

As part of the EAP, the site should create an Emergency Contact List that shall be kept current. The emergency contact list should be posted throughout the job site in prominent locations. The list should include the following information and contacts:

1. Site Contacts
    - o General Contractor Site Supervision and Safety
    - o Subcontractor Lead Supervisors and Safety
    - o Site Emergency Coordinator (SEC) and backup
    - o Site Emergency Response Team (if applicable)
    - o Site Nurse (if applicable)
    - o Project Owner Representatives
2. Fire
3. Police
4. Medical
    - o Ambulance
    - o Occupational Medical Clinic
    - o Hospital
    - o Urgent Care Clinics
    - o Poison Information Center

The following information can be developed and maintained at the job site that can be used during the crisis.

5. Corporate office contacts
    - o IT personnel
    - o Yard/warehouse personnel
    - o Corporate/Legal Counsel
    - o Corporate Spokesperson

1 Occupational Safety and Health Administration (OSHA). Best Practices Guide: Fundamentals of a Workplace First-Aid Program. https://www.osha.gov/Publications/OSHA3317first-aid.pdf

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6. Employee Assistance
    - Grief Counseling
7. Utility Companies – electric, gas, phone, water, sewage, traffic signal repair
8. 24-hr Security firms
9. American Red Cross
10. Government agencies
    - DOSH
    - OSHA
    - EPA
    - DOT
    - MSHA
    - HazMat
11. Regular transportation
12. Medical transportation services

17.3.16 Share the site EAP with local responder

Once the EAP is complete, the SEC should contact the local police, fire, and ambulance service to set up a pre-planning meeting with them at the job site. Share the Construction Site Logistics Map (CSLM) with them. Ensure that the responders become familiar with your job site including:

- Access routes
- Project work hours, schedule, and main contacts
- Evacuation procedures
- Anticipated types of site emergencies
- Rescue type (confined space, tower crane, trench collapse)
- Hazardous materials storage area
- Closest hospital locations

Remember not all fire stations are equipped with equipment and expertise to respond to all types of rescues. It is better safe than sorry to plan these high-level rescues, such as tower crane rescue and identify how long will it take for trained rescue personnel to reach your site.

17.3.17 Conduct Emergency Drills

The site EAP should be rehearsed before construction operations begin. An emergency drill should take place to ensure the plan is working and fixing any inefficiencies. Construction site changes every day and its activities are fast-paced; hence an emergency drill is recommended at least twice a year when there is a major change in conditions in relation to the EAP.

17.3.18 Maintain good housekeeping

One of the best preparation for emergency response is to maintain an organized job site including good housekeeping and proper access/egress (not obstructed) to work areas – at all times. During an emergency response, these two factors matter a lot for a timely response to the injured worker.

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17.3.19 Be Ready to address the media

It is critical to plan to address the media during a crisis. The site should designate a spokesperson to coordinate all contact with the media and other external entities that might be interested about the emergency. Ensure the designated spokesperson is trained on how to communicate with the media. Make sure there are adequate backup spokesperson readily available to address the media if needed.

Additional Resources, Readings, and References

- OSHA's Principal Emergency Response and Preparedness Requirements and Guidance - www.osha.gov/Publications/osha3122.pdf
- OSHA's Emergency Action Plan Expert System - www.osha.gov/SLTC/etools/evacuation/expertsystem/default.htm
- Best Practices Guide – Fundamentals of a Workplace First-Aid Program developed by OSHA - www.osha.gov/Publications/OSHA3317first-aid.pdf

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18
EMPLOYEE RECOGNITION PROGRAM

18.1 INTRODUCTION

This chapter provides guidance to contractors on how to implement a successful employee recognition program to improve project safety performance. Typically the two things that come to mind when discussing employee recognition are progressive discipline and incentives.

18.2 CREATING A DISCIPLINE POLICY IN CONSTRUCTION

Construction firms have used a progressive disciplinary procedure as a safety performance improvement tool for years. Employees who violate any applicable federal, state, or local safety regulations, company policies, and owner requirements may be subjected to progressive discipline. Within traditional company's discipline policies, the word "discipline" is often interpreted in the employee's mind as a form of punishment for violating a safety rule and the resulting consequences ranges from a verbal warning to immediate termination from the project. Typically a three-step progressive disciplinary process is used for all employees violating safety rules and regulations pertaining to the project:

- **First Violation** = Verbal Warnings. Usually, a verbal warning involves an informal discussion between a supervisor and the employee about the unsafe behavior. This discussion provides a teaching opportunity for the supervisor, and also a good chance for the employee to correct the behavior. The supervisor typically gets assurances from the employee that it will not happen again. A verbal warning should be documented in the project daily work record or a separate form.

- **Second Violation** = Up to three-day suspension from project and supervisor receives verbal warning. A second violation involves the issuance of a written safety violation notice to the employee with specifics about the unacceptable behavior or safety policies violated. It may also include the employee's direct supervisor receiving a verbal warning. Some companies set some timeline such as,*"a second violation within six months of the first violation will result in an automatic 3-day suspension without pay."* The written notice documents the fact that crafts were given the opportunity to correct their behavior, if not additional actions might be taken including termination.

- **Third Violation** = Termination of employment or removal from the project for subcontractor employee. It may also include the employee's direct supervisor receiving a three-day suspension. Sometimes a contractor's direct employee or subcontractor employee might be terminated with a "permanent ban" (ineligibility for future employment on all Projects) for serious violations. This also involves the issuance of a written safety violation notice to the employee with specifics about the unacceptable behavior or safety policies violated.

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- **Zero Tolerance.** Most companies have a list of zero tolerance violations where the employee is terminated from the project and/or employer immediately. Zero tolerance items involve unsafe behavior or condition that could lead to serious injuries, death, property damage, or major business interruptions. Examples of zero tolerance items include but is not limited to:

    1. Fall Protection
    2. Confined Space
    3. Trenching and Shoring
    4. Energized Electrical Work (EEW)
    5. Employees willfully creating a hazardous condition
    6. Employees purposely causing an injury to another person
    7. Employees failing to report incidents
    8. Possession of firearms, unless allowed by the jurisdictional authority
    9. Bomb threats
    10. Unauthorized access/modification to a red flagged (Danger) area
    11. Violation of the Lock Out/Tag Out procedures
    12. Operating equipment without proper authority or qualifications
    13. Failure to utilize proper sanitary facilities

A sample progressive disciplinary action matrix is provided as an Exhibit in 18-1. Other items to consider as part of a progressive disciplinary policy are:

- The company should create a written progressive disciplinary policy. Poorly written policy can lead to confusion and potentially lawsuits for violating employee rights. Allow some flexibility in the policy so employers can have some discretion in enforcing this policy.
- Train all employees on the policy during project site orientation. Include the policy in the employee handbook or similar documents, since it makes it easier for employees and supervisors to refer them.
- Train all supervisors in the means and methods to enforce the policy. The supervisor training should include ways to confront the violator, how to be consistent in the judgment, how to re-train/teach them, and documentation procedures.
- A disciplinary action should take place immediately after all the facts are known.
- Document all disciplinary measures (see Exhibit 18-2 and 18-3 for example form and log).
- Re-train all employees receiving a disciplinary action.
- Maintain the worker's information anonymous, discuss the violation in the weekly safety meeting.

Even though companies use the progressive disciplinary program, human factors in behavioral science suggest that to have a truly effective safety culture, a paradigm shift is needed. The shift needed comes with using a synonym definition of the same word, and that is "teach." Following this thought then, as project management, the supervision role coincides with the root word of discipline - "disciples", further defined as "teacher."

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18.3 DISCIPLINE (TEACHING) PARADIGM SHIFT

In deferring back to discipline under the "teacher" thought process, when it is required due to a serious or imminent danger safety infraction, following the best practices listed below will help make the process more effective.[1]

- Make sure the teaching opportunity occurs **Soon** after the incident. Waiting until the end of the shift lessons the impact of the teaching moment and employees may not learn from their actions.
- Make sure the teaching opportunity is **Certain** – The employee needs to understand what specific behavior resulted in the consequence. Discipline is not effective when administered for "poor attitudes," or lack of "common sense." Be specific!
- Make sure the teaching opportunity is **Significant** – Consequences do not change behaviors unless the employee perceives them as important. The significance of a consequence is determined by the receiver (verbal warning, a mug or hat, being sent home).
- Make sure the teaching opportunity is **Sincere** – Appropriate motives for administering discipline an awarding positive recognition are important to the effectiveness of a consequence. Be fair to all employees and be consistent. You should not reprimand one person and ignore others for an action that is done by many. On the same note, you should not discipline someone for an action on Monday and walk past it on Friday.

Again, improving the recognition program in the workplace is one of the easiest ways to reduce losses. The process is simple, especially once you've made recognition a habit.

18.4 EMPLOYEE RECOGNITION

On the other end of the spectrum is a positive recognition policy. Coinciding with this shift in traditional thought, employee recognition becomes a critical component to the point where discipline, as it is known today, may become nearly unnecessary. It is simple, when workers are made aware of their expectations and spontaneously recognized in a positive way by project management, there becomes a direct correlation to reductions in traditional discipline - coinciding with overall reduction in injury rates. After all, isn't that the main goal in the first place?

When asked the question "What's the most common supervisor response to good or safe work?"

The typical action is to ignore it simply![2]

How many times do we walk by someone doing something the correct way without saying a word?[3]

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1 Stoll, L (2013). Discipline and Recognition. Risk Management Blog. http://mysafetynews.com/discipline-and-recognition/ (Accessed December 4, 2014).

2 Stoll, L (2013). Discipline and Recognition. Risk Management Blog. http://mysafetynews.com/discipline-and-recognition/ (Accessed December 4, 2014).

3 Stoll, L (2013). Discipline and Recognition. Risk Management Blog. http://mysafetynews.com/discipline-and-recognition/ (Accessed December 4, 2014).

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By simply changing our daily interactions with people and starting to focus on the good rather than the bad, we can reduce unsafe behaviors thereby improving productivity, profit and people's attitudes that reduces both the need for discipline and again, gives the incentive to perform work safe – thus reducing the opportunity for injury. This is not to suggest teaching opportunities will never exist, but creating a culture where employees are recognized in a way that fosters willingness on the employee's part toward positive recognition – whatever that looks like, reduces the likelihood discipline will be needed.

"We are all motivated in different ways – some by internal rewards such as a sense of accomplishment, helping others or doing a good job whereas others through external rewards such as receiving a monetary or non-monetary (i.e. recognition by co-worker). Rewarding employees does not have to be time-consuming or expensive. Often, the simplest acts of rewarding go a long way to improving supervisor-employee relations. Below are some examples of how rewarding can be easy and effective:[4]

- *Name posted on bulletin board, written up in the newsletter*
- *"Safety Hero" certificate for complying*
- *An entry into employee's file (performance appraisal)*
- *Safety bucks. When you catch someone doing something right*
- *Formal recognition by the owner (not mid-level manager)*
- *A simple "Thank-you" as you walk past!"*
-

Construction companies should also consider the following best practices when developing their recognition/incentive programs:

- Never tie your recognition to lagging indicators such as the number of days without a recordable or lost time injury. It can lead to underreporting and could lead to many accidents going uninvestigated. This could lead to major incidents in the future.

- Provide an incentive or recognize employees using leading indicators such as:
  - Crew recognition of the good development and implementation of their pre-task plan.
  - Crew recognition for their good housekeeping practices identified using management inspections.
  - Crew recognition for "zero" unsafe acts or conditions associated with the crew.
  - Individual recognition for development and implementation of innovative safety practices or procedures.

- As with discipline, recognize your employees promptly.

- Recognize employees with an appreciation lunch rather than tying lunches to milestones such as days without injuries, which again can lead to underreporting.

4 Stoll, L (2013). Discipline and Recognition. Risk Management Blog. http://mysafetynews.com/discipline-and-recognition/ (Accessed December 4, 2014).

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18.5 REGULARLY RECOGNIZE AND REWARD AND YOU'LL RARELY HAVE TO REPRIMAND[5]

Combining these two schools of thoughts (recognition and discipline) into a Best Management Practice (BMP) can perhaps be better described through the "Carrots or Sticks" scenario.

The expression "carrot or sticks" refers to a system of recognition and discipline that will result in desired behaviors. The expression is best known for the example of a farmer dangling a "carrot" from a stick in front of a donkey so the donkey will move forward and pull a cart. Dangling the carrot from the stick motivates the donkey to work. Sticks, in the traditional sense, can be used to discipline the donkey by swatting it if the carrot no longer serves as a motivator to perform; however, in the paradigm shift model, discipline is now used as a teaching and learning opportunity.

5 Stoll, L (2013). Discipline and Recognition. Risk Management Blog. http://mysafetynews.com/discipline-and-recognition/ (Accessed December 4, 2014).

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Exhibit 18-1: Example Progressive Disciplinary Action Matrix

Focus Point / Incident	1st Violation	2nd Violation	3rd Violation	Note
Worker	Verbal & Written Notice	3 Days Off	Removed From Projects For One Year	
Worker's Direct Foremen	Written Notice	Written Notice	3 Days Off	3 Worker Layoffs = Removal from Projects for one year
Worker's Direct Superintendent	Written Notice	Written Notice	Written Notice to Sub/Prime Superintendent and President of Subcontractor/Company	3 Worker Layoffs = Days Off for Superintendent
Prime Contractor's Superintendent	Written Notice	Written Notice	Written Notice to President of Prime Contractor Company	3 Worker Layoffs = Days Off for Superintendent

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Exhibit 18-2: Example Written Safety Violation Form Template

Project Name: _____ Project ID: _____

Project Location: _____

Employee Name: _____ Last 4 of SSN: _____

Did employee go through new employee orientation? Yes No When? _____

Employer: _____

Employee's Direct Supervisor: _____

Details of Safety Violation (include location of infraction, policy violated, date, time):

Previous History (describe of earlier verbal warning if applicable):

Type of Violation:

First Written Warning Violation

First Written Warning Violation with ____ days ineligible to work on this project

Second Written Warning Violation (termination from this project)

Permanent Termination or Permanent Debarment from all company projects.

Warning Issued By: _____ Title: _____

Employee Signature:_____ Date: _____

CC: Employee
Employee's Director Supervisor
Company Safety Department

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Exhibit 18-3: Worker Verbal/Written Warning Log

PROJECT NAME:			PROJECT NUMBER:		
THIS LOG IS CONFIDENTIAL. IT SHALL BE SECURED AND ONLY UTILIZED FOR PROJECT MANAGEMENT					
DATE	TIME	WORKER'S NAME	COMPANY	DESCRIPTION OF VIOLATION	WARNING BY

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19
RETURN TO WORK PROGRAM MANAGEMENT

19.1 INTRODUCTION

Returning injured workers back on the jobsite, even in a limited capacity, carries significant benefits for the affected employee and the employer. The employee benefits include higher morale and minimal income loss, and return to regular duty faster, and the company benefits include lower workers compensation claim costs, and reinforces commitment to worker's well-being. A win-win situation for everyone. Many employers, especially smaller contractors, are unprepared to deal with returning their employees to the jobsite. This chapter provides step-by-step best practices to implement an effective RTW program.

1. Create a written RTW policy that shows employer's commitment to return an injured worker to work as soon as possible and offer light-duty or transitional jobs during the injured worker's recovery process.

2. Designate an RTW coordinator within the company (or project) to oversee the program. In most cases, this task will be managed either by the safety manager or claims manager.

3. Identify the roles and responsibilities of all parties who will be involved in the RTW process, including workers, supervisors, medical providers, and insurance carriers.

4. Develop regular job functions for each trade that the company employs, ahead of time. It should include the specific routine job functions, physical demands of the tasks, and the approximate time spent on each task per day. For example, a structural concrete contractor should have regular job description/functions for laborers, finishers, and carpenters. It is also a best practice to establish "modifications" for various job categories to allow injured workers to return to work while recovering.

5. Consult with the company legal counsel before finalizing your RTW policy. The Americans with Disabilities Act (ADA) and the Family and Medical Leave Act (FMLA) may impact RTW policies, and it could vary from state to state. Most contractors perform work in multiple states. Hence, this is an important step, to ensure the company complies with all applicable state and federal disability laws while dealing with disabled workers.

6. Communicate the company's RTW policy to the workers using the site orientation training. Explain the benefits of returning to work early and the opportunities available to them during recovery.

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7. Train site supervisors and managers (foreman and above) about the company RTW policy and how to return their workers to the job as soon as possible. Obtain a commitment from Project Managers and Project Superintendents about the RTW program.

8. Establish an injury reporting system for the jobsite. Encourage workers to report all injuries immediately no matter how minor, even if the injury did not require offsite medical attention. In most cases the earlier the employer, medical provider, and the insurance carrier, starts working with the affected employee, the earlier the worker can recover and return to work.

9. Set up a medical facility near the project. Choose a medical provider who understands the construction industry, the diverse trades involved, their tasks and the physical demands required to complete the tasks and the post-injury management process. Meet with the provider in advance and educate them about the company's RTW options for an injured worker. Note in some states employers cannot direct employees to the medical facility of their choice; beware of these employee rights. See chapter 9 of this handbook for more information.

10. Set up the jobsite for an efficient accident response. Accident response includes providing immediate assistance to the affected worker and transporting the worker offsite for medical treatment.

11. Assemble an accident response packet that includes accident investigation forms, RTW forms, regular job function description, and insurance information that the worker can take to the medical provider.

12. Start the accident investigation to find out what happened, why it happened, and what should be done to make sure the accident does not reoccur. Refer to Chapter 16 of this handbook for more information on how to conduct an accident investigation.

13. Transport the worker to the medical facility, in most cases, the workers' immediate supervisor or project safety manager will accompany the worker. Inform the injured worker's family members to keep them in the loop. It can be used as an opportunity to reinforce the company's commitment to the employee.

14. Notify the company's workers compensation insurance company as soon as possible. Some companies have an internal claims manager, in that case, notify that person. A timely notification will allow the insurance carrier to assist both the affected employee and the employer.

15. Provide the worker's regular job functions to the treating physician and discuss your company's RTW policy (see Exhibit 19-1 for example).

16. Obtain a work release from the medical provider before the employee returns to work, that clearly specifies the information about restrictions on the job and at home. Remind the employee to comply with the limitations. The restrictions may limit certain activities (e.g., no lifting anything over 20 pounds, cannot stand more than 3 hours in a day, etc.). It might also sometimes limit the number of hours a worker can work on the site. Sometimes the restrictions might require the employee to

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be transferred to the corporate office setting or a warehouse. For example, Labor and Industries uses an activity prescription form (APF), as a best practice in occupational medicine. The form communicates an injured worker's physical restrictions and ability to work as well as the provider's treatment plans (see Exhibit 19-2 for example).

17. Maintain contact with the injured employee to ensure proper recovery. Follow up with your injured employee within 24 hours of the injury. Assure him or her of your company's commitment to their well-being. Assess the worker's understanding of the treatment he or she received, and respond quickly and appropriately to questions about future treatment plans or other general questions. Always be considerate of the employee's rights to privacy and confidentiality. Ensure the worker is going to the doctor for a follow-up appointment. Most jobsite injuries will result in worker released to restricted work immediately. Research and evaluate possible transitional duty.

18. Understand the challenges of the construction sites. Many projects last less than a year, with many crews only onsite for a few weeks to few months. For example, an excavation crew might only be on site for a few weeks. What happens if one of the workers get hurt, and by the time the employee is ready to return to work, the project is completed, and the contractor does not have any meaningful work for the worker? The contractor should consider alternate employment options for cases where an on-site RTW option is not feasible.

19. Develop an RTW plan based on the worker's medical restrictions and make an offer to work. It is best practice to involve the worker in creating the RTW plan. Check with the worker's trade union, if applicable, to ensure the company complies with the collective bargaining agreement (see Exhibit 19-3).

20. Return the worker to the jobsite after the worker accepts the offer and document the offer. Support the worker's return to the site. It is critical that the worker adhere to the medical restrictions so that the worker does not aggravate the injury. Construction sites are hazardous and present many challenges to even healthy workers. Hence, workers on transitional duties should be very careful. Try to return the employee to the same crew the worker was part of before the injury. Always maintain contact with the worker until released to full duty.

Additional Resources, Readings, and References

- Washington State Department of Labor and Industries, "Help Your Employee Return to Work" - http://www.lni.wa.gov/ClaimsIns/Insurance/Injury/LightDuty/
- See the sample claims management program from BNBuilders presented in Exhibit 19-4, which provides sample letters.

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Exhibit 19-1: Example Physical Demands Job Analysis for Laborer

(Used by permission from BNBuilders)

Job Title: Union Laborer	**Client:** John Doe
DOI: 1/24/15	**Claim #:** AU xxxxx
Company: BNBuilders	**Phone:** (206) xxx-xxxx
Supervisor:	**Contact:** Pete Campbell

DESCRIPTION OF ESSENTIAL TASKS: Laborer maintains jobsite in clean condition. Sweeps areas and picks up loose materials. Hauls garbage cans to dumpster. Uses shovel to grade dirt after backhoe digs trenches. Chips concrete with chipping gun. Drills holes in concrete with Roto-hammer. Places concrete with a pump hose. Position will be inside building or entrance to the site. Receives deliveries and organizes site materials. Picks up materials, when needed. Flags trucks entering site and provides security for closing and locking gates. Rigs materials and signals crane.

PHYSICAL DEMANDS

Based on an 8 Hour Work Day

Overall, this job is classified as:

- Not Applicable	- Seldom (1 - 10% of the time)
- Occasional (10 – 30% of the time)	- Frequent (30 - 70% of the time)
- Constant (Over 70% of the time)	* Denotes Estimates

TASK	FREQUENCY	COMMENTS
Sitting	Occasional	
Standing	Occasional	
Walking	Occasional	
Driving	Occasional	
Lifting	Occasional	Up to 50 lbs.
Carrying	Occasional	20 lbs. tools and garbage cans
Pushing/Pulling	Occasional	Up to 10 lbs. max force.
Climbing	Occasional	Access upper floors
Stairs	Twice	Up to 2 times a day. Upper floors
Ladders	Occasional	
Working at heights	Occasional	
Balancing	N/A	
Bending at waist	Occasional	
Twisting at waist	N/A	
Crouching	N/A	
Kneeling/Squatting	Occasional	

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Reaching –below knees	Occasional	
--above shoulder	Occasional	
Repetitive hand movement		
Repetitive arm movement		
Handling/grasping	Occasional	
Power pinch		
Pinch grasp		
Fine finger manipulation	Seldom	
Foot controls	Occasional	To drive car and forklift
Talking	Frequent	Within normal limits
Hearing	Occasional	Within normal limits
Seeing	Frequent	Within normal limits

ENVIRONMENTAL FACTORS

- **Whole body vibration:** On forklift
- **Upper extremity vibration:**
- **Above or below normal temperatures as part of the job:** Outdoors
- **Percentage of time spent each day:** 50% Indoors; 50% Outdoors
- **Types of vehicles/equipment, machinery, or tools used on the job:**
- **Safety Equipment:** Radio, telephone, computer, fire extinguisher, Air horn, traffic flag, broom.

We are willing to modify this position, on a temporary transitional basis, by eliminating and/or adjusting physical demands to accommodate this individual's needs. In order to do this, we are willing to provide more breaks, and provide shorter hours until the claimant can return to full-time employment.

PHYSICIAN'S RELEASE FOR WORK
FOR PHYSICIAN'S USE ONLY

_____ I agree that the above named injured worker can perform the physical activities described in the job analysis and can return to work on_____.

_____ I agree that the above named injured worker can perform the physical activities described in the job analysis on a part-time basis for ____ hours per day. The worker can be expected to progress to regular duties in ____ weeks/months.

_____ I agree the injured worker can perform the described job but only with modifications noted below. **Please note modifications in Comments section below if claimant is not capable of functioning at maximum levels listed in the Job Analysis.**

_____ I disagree that the injured worker can perform the physical activities described in the job analysis based on the following physical limitations.

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COMMENTS:

Physician's Signature	Date
Physician's Name	Number

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Exhibit 19-2: Example Activity Prescription Form (APF)

State Fund Claim:
Department of Labor and Industries PO
Box 44291 Olympia WA 98504-4291
Fax to claim file: 360-902-4567
Self-Insured Claims: Contact the Self Insured Employer (SIE)/Third Party Administrator (TPA)
For a list of SIE/TPAs, go to www.Lni.wa.gov/SelfInsured

Activity Prescription Form (APF)
Billing Code: 1073M (Guidance on back)

Reminder: Send chart notes and reports to L&I or SIE/TPA as required. Complete this form only when there are changes in medical status or capacities, or change in release for work status.

General info

Worker's Name:	Patient ID:	Visit Date:	Claim Number:
John Doe	123456	02/09/2015	AT00001
Healthcare Provider's Name (please print):		**Date of Injury:**	**Diagnosis:**
Michael Jordan PAC		02/09/2015	Right MCL Sprain 844.1

Required: Work status

☐ Worker is **released** to the job of injury (JOI) without restrictions (related to the work injury) as of (date): ___/___/___
(If selected, skip to "Plans" section below)

☒ Worker **may perform modified duty**, if available, from (date): ___/___/___ to* ___/___/___ (*estimated date)
☐ If released to modified duty, may work more than normal schedule
☐ Worker **may work limited hours**: _____ hours/day from (date): ___/___/___ to* ___/___/___ (*estimated date)
☐ Worker **is working** modified duty or limited hours

☐ Worker **not released to any work** from (date): ___/___/___ **to*** __/___/___ (*estimated date)
☐ **Poor prognosis for return to work** at the job of injury at any date

Required: Measurable Objective Finding(s) (e.g., positive x-ray, swelling, muscle atrophy, decreased range of motion)
Swelling and ligament laxity to the Rt. MCL
Medical joint-line tenderness

Required: Estimate what the worker can do at work and at home unless released to JOI

How long do the worker's current capacities apply (estimate)?
☐ 1-10 days ☒ 11-20 days ☐ 21-30 days ☐ 30+ days ☐ permanent
Capacities apply all day, every day of the week, at home as well as at work.

Worker can: (Related to work injury) A blank space = Not restricted	Never	Seldom 1-10% 0-1 hour	Occasional 11-33% 1-3 hours	Frequent 34-66% 3-6 hours	Constant 67-100% (Not restricted)
Sit					✓
Stand / Walk			✓		
Perform work from ladder		✓			
Climb ladder		✓			
Climb stairs		✓			
Twist					✓
Bend / Stoop	✓				
Squat / Kneel	✓				
Crawl	✓				
Reach Left, Right, (Both)					
Work above shoulders L, R, (B)					
Keyboard L, R, (B)					
Wrist (flexion/extension) L, R, (B)					
Grasp (forceful) L, R, (B)					
Fine manipulation L, R, (B)					
Operate foot controls L, R, (B)					
Vibratory tasks; high impact L, R, (B)	✓				
Vibratory tasks; low impact L, R, (B)	✓				

Lifting / Pushing	**Never**	**Seldom**	**Occas.**	**Frequent**	**Constant**
Example	*50 lbs*	*20 lbs*	*10 lbs*	*0 lbs*	*0 lbs*
Lift L, R, (B)	___ lbs	✓ lbs	___ lbs	___ lbs	___ lbs
Carry L, R, (B)	___ lbs	✓ lbs	___ lbs	___ lbs	___ lbs
Push / Pull L, R, (B)	___ lbs	✓ lbs	___ lbs	___ lbs	___ lbs

Other Restrictions / Instructions:

Employer Notified of Capacities? ☒Yes ☐No
Modified duty available? ☒Yes ☐No
Date of contact: ___/___/___
Name of contact: _____
Notes:

Note to Claim Manager:
Patient is able to drive forklift on jobsite

☐ May need assistance returning to work
New diagnosis: _____
Opioids prescribed for: ☒ Acute pain or ☒ Chronic pain

Required: Plans

Worker progress: ☐ As expected / better than expected ☐ Slower than expected (*address in chart notes*)
Current rehab: ☐ PT ☐ OT ☐ Home exercise ☐ Other (e.g., Activity Coaching) _____
Surgery: ☐ Not Indicated ☐ Possible ☐ Planned Date: ___/___/___ ☐ Completed Date: ___/___/___

☒ Next scheduled visit in: ___days 2 weeks or Date: ___/___/___
☐ Treatment concluded, Max. Medical Improvement (MMI)
Any permanent partial impairment? ☐Yes ☐No ☐Possibly
If you are qualified, please rate impairment for your patient
☐ Will rate ☐ Will refer ☐ Request IME
☐ Care transferred to: _____
☐ Consultation needed with: _____
☒ Study pending: MRI Possible MCL Tear

Req: Sign

☒ Copy of APF given to worker ☒ Discussed three key messages on back of form with patient

Signature: _____ ☐ Doctor ☐ ARNP ☒ PA-C
02/09/15 Date
(123) 345-6789 Phone

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Exhibit 19-3: Sample employee/Supervisor Job assignment agreement

(Used by permission from BNBuilders)

I understand that Dr. _____ has released me to return to work, provided that I do not exceed the following physical limitations: (Write in limitations established by the treating physician. Attach dated copy of physician's restrictions JHA)

_____

_____

_____

_____

_____

_____

_____

_____

Worker: I agree to work within these restrictions. In the event that I am given an assignment that falls outside these restrictions or that is causing any difficulty in the performance of these duties or given an assignment beyond these restrictions, I will notify my supervisor immediately. I will not violate the restrictions, as I understand them. I will work cooperatively with my supervisor(s) to prevent re-injury or aggravation of my present physical condition.

Supervisor: I agree to assign only work within physician's restrictions noted above. If the worker is observed doing any job task that falls outside these restrictions, I will immediately talk with the worker to resolve these problems. I will not violate the restrictions as understood. I will work cooperatively with the worker to prevent re-injury or aggravation of the worker's present physical condition.

We agree to notify the appropriate company contact if further assistance is needed.

_____ _____

Employee Signature Supervisor Signature

_____ _____

Effective Date Review Date

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Exhibit 19-4: Example Claims Management Plan

(Used by Permission from BNBuilders)

1. Policy Statement

BNBuilders values the safety, health, and well-being of all our employees. Our company policy is to provide safe and healthful working conditions for all operations and to follow the laws and regulations associated with the safety and health of our employees.

If you become injured on the job while in the course of your employment with BNBuilders and need medical attention, we will be directly involved with assisting you in getting what you need from the moment of your injury or illness. Your supervisor will take you, or assign a staff member to take you to the doctor or hospital; assist you with filing a company incident report; filing an Industrial Injury Claim, if needed; and be involved in the subsequent accident investigation to identify and eliminate any hazards which may have been associated with your injury or illness. In the event of a claim, we will maintain close contact with you, your doctor, and the Department of Labor & Industries until your Industrial Insurance claim is closed.

No one knows their jobs better than our employees do. Therefore, it is our expectation that when an employee experiences a work-related injury, that employee will fully participate in the recovery, rehabilitation, and return to work process as a full partner in this effort.

As a condition of employment, I understand and agree to adhere to the above company policy. I also agree to report all injuries and unsafe or hazardous conditions to my supervisor immediately.

**(A copy of this policy can be signed by the employee on the date of hire and placed in the employee's personal file along with the completed orientation checklist)*

_____ _____

Employee's Signature Date

_____ _____

Company Representative's Signature Date

2. Modified Work Overview

- Modified return to work following an Industrial Insurance injury is an important component of our Claims Management Plan and is a priority to BNBuilders. The benefits of this program are rapid return to work for our employees and reduced Industrial Insurance injury claim costs for the employee as well as the company as a whole.
- If for any reason you are unable to do your regular job because of a work-related accident or illness, we will require a release from your doctor for you to return to any type of work. We have a job description of your job of injury, which your doctor can use as a preliminary tool to release you back to work.

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- All employees are encouraged to participate in the process of identifying tasks that could be integrated into a temporary work assignment for injured employees. If you notice the work that needs to be done but seems get put on the shelf for a later time, please let your supervisor know about it. Additionally, if you have ideas about how you could do your regular job with temporary modifications, please talk to your supervisor.
- Modified work begins the date the doctor releases you to it. Once your doctor has approved modified work, a meeting will be scheduled for you to meet with company representatives to clearly outline the specific jobs you are released to do. A "Return to Work" agreement outlining the details of your modified work will be completed and signed by all parties. Modified work plans will last for two weeks and be re-assessed at two-week intervals to adjust your work duties as approved by your doctor. If you have any difficulties during this transitional work period, we encourage you to talk to your supervisor immediately. Our goal is to assist you in returning to your regular job as soon as your doctor deems it is medically suitable for you.

We consider our employees to be our most valuable asset at BNBuilders. We will do everything possible to assist you in your return to your regular work activities.

3. **Management Responsibilities:**
   - As a top priority, management is committed to, supports, and enforces a strong safety program and through action, words and role modeling maintains a company culture of **safety first**.
   - Management will support and enable supervisors, company representatives, and injured employees to take the action required to fulfill the program steps developed and to assist in a positive manner with the return to work process.

4. **Supervisor Responsibilities:**
   - Supervisors will act as the communication link between management and injured employees.
   - Supervisors will encourage and support all their employees to think and act safely on the job and to participate in all activities involving safety. Supervisors will regularly communicate with all their respective employees regarding their responsibility to keep themselves and their co-workers safe.
   - Supervisors will report near misses (incidents not resulting in injury) and incidents resulting in injury/illness with or without a claim filed by completing the company's internal incident report. Supervisors will encourage and support their respective employees to do the same.
   - In the event of a work-related accident/injury, supervisors are responsible for taking their injured employees to the medical provider of their choice. If for some reason a supervisor is unable to do this, the supervisor is responsible for designating someone to take the employee to the doctor/hospital.
   - The supervisor or their designee is responsible for assisting the injured employee with completing the accident report provided at the doctor's office/hospital, and obtaining the claim number to report back to the company representative who is managing the claim.
   - Supervisors are expected to be thoroughly informed about their employee's medical condition following a work-related injury/illness and are expected to be knowledgeable about their employee's medical status throughout the recovery process. Supervisors will work collaboratively with the employee and other key company personnel to identify and coordinate the details of

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the employee's return to work on a modified/transitional basis until such time that the employee is medically able to return to their job of injury.
- In collaboration with other key company personnel, supervisors will participate actively in the accident investigation process for any incidents involving their direct reports.
- Supervisors will work in concert with their direct reports to identify temporary work assignments that could result in good opportunities for a modified return to work.

5. Employee Responsibilities:

- **All work-related injuries must be reported immediately to supervisors** whether or not medical attention or wage replacement options are involved.
- An internal company incident report will be provided to injured employees and must be completed as soon as possible following an accident/illness and returned to the immediate supervisor. The company will then conduct an accident investigation in order to identify and correct any existing safety and health hazards resulting.
- If an injured employee should experience problems with their recovery, be dissatisfied with medical treatment providers, or need help understanding the Industrial Insurance system, Kim McKay, Claims Consultant for BNBuilders is available to provide written information, assistance and/or support.
- Injured employees are asked to honor management requests to seek second opinions prior to surgery or when treatment does not appear to be effective.
- Employees are expected to fully participate in the process of identifying and/or developing an appropriate return to work options that are considered to be medically suitable by the employee's doctor.
- Employees are expected to accept temporary, modified, and/or transitional work once the specified duties have been approved by their doctor.

6. Claims Management Procedure:

Steps to follow the 1st day of an inquiry or as soon as possible!

1. The employee's supervisor will go with or will designate someone to take our injured employee to the designated clinic.
2. We will give the doctor a letter from our company, which states BNBuilders intent to assist our employee in returning to work. **Along with the letter, we will include a job description of the job of injury to help the doctor to identify temporary job restrictions, if applicable, and return to work status.**

3. At the time of first medical treatment, we will get the claim number from the Report of Accident form. **We will need this claim number on all documentation from here on out. If the employee for some reason has to go to the first doctor's appointment unaccompanied, it will be the employee's responsibility to call the employer immediately following the medical appointment to report the Industrial Insurance claim number assigned to his/her new claim.**
4. Complete **Employer's portion of the Report of Accident form electronically** at the L&I Claims & Account Center.

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5. Our company will establish an individual claim file to keep copies of ALL paperwork relating to the claim.
6. **The company claims representative will organize a "1st Day Packet" to send to the Dept. of Labor & Industries**, which will include the following items:
   -Job description for job of injury (preferably signed by doctor, but send without doctor's signature if not available)
   -Employee's work history (i.e. copy of original job application)
   -Current payroll records (including wages)
   -Copy of company's internal incident report
   -Copy of company's accident investigation report, if available
   -Claim number will be written on the upper right corner of EACH PAGE
7. The company will mail copies of the above documentation to:
   - Department of Labor & Industries, Claims Section, P.O. Box 44291, Olympia, WA 98504-4291

     And to:
   - AGC Retro, Kim McKay, Claims Consultant for, PO Box 12629, Olympia, WA 98508-2629

   A copy of every page we send to L&I will be retained in our company's working claim file for our employee.

8. If the doctor does not approve the job description, revisions will be made to the job better to accommodate our employee's physical restrictions in a temporary job for our employee during their recovery period.

   The company will monitor the progress and status of the claim via the L&I Claims & Account Center, paying special attention to the employee's most recent medical documentation, especially as it affects the employee's return to work status. If updated medical documentation is needed, the company will request it via secure access message to the claim manager for the claim.

9. **The company will maintain regular contact with the injured employee** (at least once a week by phone).
10. THIS PROCESS WILL BE REPEATED until we determine whether or not our employee can return to the job of injury or needs further services. **We will keep the claim moving and be proactive at every opportunity!**
11. The company will investigate the industrial accident within 24 hours of the incident to identify potential hazards and revise safety procedures if necessary.
12. The company will send a **FORMAL JOB OFFER LETTER** to the employee after the doctor approves return to work on any level.
13. The company will review and improve our claims management plan and make changes we feel may be needed and/or appropriate to our company. This review process will take place on an annual basis or more often as needed.
14. The company will contact Bob LeMay (206) 515-2832, a Risk Management Consultant at the Dept. of Labor & Industries to discuss the claim and return to work issues as needed.

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"Dear Doctor" Letter

BNBuilders
2601 4th Ave #350
Seattle, WA 98121

Date:

Doctor's Name:

Address:

City, State, Zip Code

RE: *Worker's Name* _____

Claim # _____

Dear Dr. _____:
BNBuilders is committed to assisting our injured employees in returning to work as soon as possible. Attached is a job description for the position of . This position is for (*restricted/light duty, transitional work, job of injury job, modified version job of injury, new job, etc.*).

Please review and respond to the job description, outlining any needed modifications. If our employee is not able to work, please indicate what physical restrictions prevent return to work at this time. This position is currently available and we are waiting for your approval.

We would appreciate your faxing the job description to us at (206) 382-3440 at your earliest opportunity. If you have questions or concerns, please call me at (206) 382-3443. Thank you for your assistance with our employee's return to work.

Sincerely,

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Formal Job Offer Letter

BNBuilders
2601 4th Ave #350
Seattle, WA 98121

Date:

Date:

Doctor's Name:

Address:

City, State, Zip Code

RE: *Worker's Name* _____

Claim # _____

Dear _____:

Your doctor has released you for modified work, which he/she feels you are able to do until you can return to your regular job. Therefore, we would like to offer you the temporary, modified duty job of . Attached is a copy of the job description approved by your doctor.

Please report to your immediate supervisor for your modified duty job on *(insert date)* at *(insert time)*. Your pay will be $_____ per _____ *(hour/month)*. Loss of Earning Power (LEP) benefits may apply if your restricted duty wage is less than your regular wage.

As you improve, the physical demands of the job may change, as approved by your doctor. Usually, a modified duty assignment lasts anywhere from a few days to several weeks, depending on your medical condition.

Your signature below indicates that you have reviewed this offer. Please return this signed job offer agreement to me by *(insert date – 10 to 14 days from date of letter)*. A self-addressed, stamped envelope is enclosed for your convenience.

Should you have any questions about this job offer, please contact me at *insert phone number*.

Sincerely,

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Employee's Name

Date of Letter

CHECK ONE:

I accept this job offer: _____ I do not accept this job offer:_____

_____ _____

Employee Signature Date

Enclosures: Approved Job Description

Employee's Claim File

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Job Assignment Agreement

"Return to Work Agreement"

Employee: _____ *Claim #:* _____

Start Date: _____ *End Date:* _____

Per our modified return to work process, this agreement marks the beginning of Insert Employee's name modified work assignment.

The job description approved by the doctor is attached. It is very important that only those approved tasks be performed. _____ is authorized only to do the tasks specifically identified as approved by the doctor. You are requested to bring an updated Return to Work form with you after every doctors visit.

Welcome back to work. We are excited that we can provide this benefit to your and want to make your recovery as comfortable as possible. If you have any difficulties during this assignment period, please talk to your supervisor immediately.

We will plan to meet on the periodically to discuss treatment, progress and the next steps associated with your return to work.

Employee: _____ *Date:*_____

*Supervisor:*_____ *Date:*_____

*BNB Company Representative:*_____ *Date:*_____

Enclosures: *Job description approved by a doctor*
Job offer letter

CC: *Company claim file*
Doctor's Name
L&I Claims Manager
Employee's Name
Supervisor's Name

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Pre-existing Condition Records request

2601 4th Ave #350
Seattle, WA 98121

Date:

L&I Claims Manager
Dept. of Labor and Industries
PO Box 44291
Olympia, WA 98504-4291

RE: *Worker's Name* _____

Claim # _____

Dear Claim Manager. _____:

The doctor indicated there was a pre-existing medical condition; please obtain a medical release from the injured worker in order to procure the prior treatment records from the appropriate physicians.

Once you receive the prior medical treatment records, please send them to the attending physician on this claim and ask the doctor to identify when the worker has reached pre-industrial injury status.

Once pre-injury status has been reached, please ask the physician to segregate any permanent impairment as pre-injury and post–injury.

Thank you for your cooperation and assistance.

Sincerely,

Pete Campbell BNBuilders CHSO

Cc: AGC Retro

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20
CONSTRUCTION WORK-RELATED MUSCULOSKELETAL DISORDERS (WMSDS)

20.1 INTRODUCTION

- A construction laborer was using a rotary hammer, after a period his wrist began to hurt and reported to his supervisor (sprained wrist).
- Two reinforcement bar workers lifted a pallet with concrete dobies when one of them felt a sharp pain in his lower back (back strain).
- A drywall carpenter was installing 5/8" standard (4' by 8') drywall sheeting for an entire day. Close towards the end of the day, his back began to get stiff and sore, but he continued to the point of not being able to lift (back sprain).
- The worker was installing an HVAC ductwork, twisted his back wrong and felt a sharp pain (cervical strain).
- A concrete finisher was finishing a concrete slab with a hand trowel when he experienced pain in his right forearm (forearm injury).
- An electrical worker experience numbness and pain on both his hands. He went to the doctor for a checkup (carpal tunnel syndrome both hands).

What do these injuries have in common? These injuries are examples of Work-related Musculoskeletal Disorders (WMSDs). A WMSD, commonly referred as soft tissue injury, is an injury that affects the muscles, tendons, nerves, or ligaments. WMSDs are caused suddenly or can be aggravated by repeated exposure over a long period, of a combination of job site risk factors that include, but not restricted to:

1. Repetitive motions (frequency of tasks)
2. Force (push/pull/lift)
3. Awkward positioning (overhead work/ kneeling/squatting)
4. Exposure to vibration
5. Contact stress (contact stress happens due to prolonged contact, with sharp edges and hard surfaces such sharp edges of tools, equipment, etc.)
6. Cold temperature

What else do these injuries have in common? They are all preventable through the use of appropriate equipment, work methods, and training.

WMSDs are a tremendous concern to the U.S. construction industry, which accounts for the highest frequency of all non-fatal occupational injury claims. A recent report by Washington Labor and In-

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dustry's Safety and Health Assessment and Research for Prevention (SHARP) Program, analyzed the Washington State Workers' Compensation (WC) claims from 2002 to 2010. Overall, there were 409,711 compensable claims and 176,033 of them (43%) were for work-related non-traumatic musculoskeletal disorders of the back, upper extremity (shoulder, elbow, hand/wrist) and knee (WMSDs) in Washington State. The report states that overall, the construction industry continues to be a high-risk industry for WMSDs in workers in Washington State.[1]

WMSDs prevention does not get much attention from employers compared to other physical hazards (e.g., fall prevention). Why? How many times have you seen WMSD risk factors identified during safety audits? Is it because there is no construction safety standard requiring construction employers to implement WMSD controls? Companies should understand the WMSDs are hurting their bottom line through injury claims and also decreased productivity from workers who continue to work while being in pain. In addition, the construction workforce is aging, every construction employer must take precautions to minimize the risks to protect their #1 resource, the workers. It can be achieved with the implementation of an effective site WMSDs prevention program.

20.2 PURPOSE

The objective of this chapter is to provide general management best practices guide for construction contractors on how to eliminate or minimize the risks associated with work-related musculoskeletal disorders in construction sites. A majority of the information outlined in this document should be part of the employer's Accident Prevention Program (APP). The employer should at least refer to their WMSD prevention program in their APP if they have it as a separate program.

20.3 SUPPORT

Obtain project owner and general contractor/construction manager (CM/GC) management commitment to implement an effective project-level WMSD prevention program. An effective program requires that the project management including site supervision is committed to the process. They should demonstrate their commitment by allocating necessary resources to ensure the success of the program (e.g., training, support for corrective actions, etc.).

20.4 CONTRACTS

Include site WMSD program requirements in the contracts. All pre-construction or pre-award meetings should include a review of the program requirements which will provide a more complete and accurate bid-basis for subcontractors.

20.5 HISTORICAL DATA REVIEW

Review subcontractor injury and illness data (OSHA 300 log and insurance claims) as part of the safety pre-qualification to identify WMSD risks associated with each subcontractor. Require them to develop a Corrective Action Plan (CAP) to prevent reoccurrence of those injuries before commencement of work on the site. Set concrete goals.

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1 Work-Related Musculoskeletal Disorders of the Back, Upper Extremity, and Knee in Washington State, 2002-2010 (Summary). http://www.lni.wa.gov/Safety/Research/WhatsNewSharp/Default.asp#WMSD (Accessed July 10, 2015)

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20.6 RISK ASSESSMENT

Establish a system for analyzing construction tasks to identify WMSD risk factors and controls during (1) pre-construction, (2) during construction, and post-construction.

a. *Pre-construction* – Use Job Hazard Analysis (JHA) and Site Specific Safety Plan (SSSP) to perform pre-construction WMSD risk assessment and control. Ensure a WMSD prevention plan is an important component of the SSSP.

b. *During Construction* – Observe and assess site operations using site safety survey (inspections), pre-task planning, and the craft feedback, to identify risk factors and eliminate or control them as early as possible. Remember most times WMSDs does not get much attention during inspections and in pre-task plans. Hence, some companies perform a standalone WMSD risk factor survey that involves:
   i. Review of pre-task plans to ensure all WMSDs risk factors and controls are identified
   ii. Simple observations of the tasks to recognize risk factors not identified during pre-construction assessment
   iii. Ensure effective implementation of the risk controls identified in pre-task plans

   It is also recommended to have a just-in-time review of work plans as conditions change, such as moving from one phase of the project to another, or when weather conditions create additional risks.

c. *Post-construction* – Record (using pictures) any best practices or lessons learned from the project into a database, so that it can be transferred to future jobs or current jobs within your company.

20.7 SUBCONTRACTOR MANAGEMENT

Require subcontractors (contractually) to examine "all" their tasks, tools used, work procedures, workstations, and equipment operation, and carry out WMSD risk factor assessment and mitigation before commencement of work. The risk factor evaluation and mitigation measures should be incorporated into the JHA that is specific for that scope of work. Subcontractors should submit their JHAs prior to commencement of work. Emphasize the importance of WMSDs risk factor control during the pre-mobilization meetings. Review all JHAs/SSSPs to ensure it has adequately identified the risk factors and associated control measures.

20.8 CONTROLS

WMSD risks should be mitigated using the following controls in this order with engineering being the most effective and PPE is the least effective control.

a. Engineering Controls to implement physical change to eliminate or reduce hazards (e.g., reduce the size of chain link fence rolls to reduce the weight to limit force exertion).
b. Administrative Controls to establish efficient procedures or processes such as job rotation, work pacing, and work breaks. (e.g., some activities to consider for rotational work are hammering nails while building forms, troweling concrete, etc., to limit exposure time)

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c. Personal Protective Equipment to protect against WMSD risks (e.g., a knee pad for workers whose activities involve prolonged kneeling on hard surfaces such as concrete).

20.9 TRAINING

Train all site personnel, including supervisors and managers that should include at a minimum:

- Recognition of WMSD risk factor using Pre-task Plans (PTPs)
- Control of WMSD risk factors (proper use of control measures)
- Recognition of signs and symptoms of WMSDs & proper procedures for reporting
- Procedures to get involved with the program

20.10 PROGRAMMATIC BEST PRACTICES

Consider the following list of programmatic best practices developed based upon the experience of major construction contractors. Depending on company and/or project size, adoption of one or more of these practices that are feasible should help minimize WMSD risk factors.

a. Development and delivery of trade-specific ergonomics training program based on a formalized review of the company's WMSD-related claims, with the help of ergonomics consultants. This training should be in addition to project-specific orientations.

b. Formation of an ergonomics committee at both the company- and project-level, comprised of trade-diverse members trained on how to identify WMSDs risks and control them.

c. The addition of a full-time ergonomics coordinator position to identify and correct WMSD risk.

d. Involvement of crafts in the WMSD prevention program. Construction crafts involvement is critical to the success of the WMSD prevention program mainly when recommending WMSD mitigation measures. They know the work better than anyone else, they are in a better position to provide solutions. Furthermore, it will improve the craft acceptance of the mitigation measures. One project implemented an ergonomic improvement suggestion program to record employee suggestions and award gift certificates to workers whose recommendations resulted in innovative solutions.

e. Establishment of a trade-specific customized stretching and strengthening program. Seek the guidance of an expert in this field such as an occupational therapist or physical therapist. Please note that many ergonomists do not have the training necessary to develop a stretch and flex program. A consultant will visit your workplace and observe your crafts and analyze the company's claims history to develop custom programs. For example, a concrete company will have different disciplines such as laborers, carpenters, finishers, and office workers. Based on this, the consultant will develop customized stretches. Stretching sessions, is typically 10-15 minutes, are recommended at the start of the shift and before performing any strenuous tasks. Remember stretching should never be a stand-alone program, but a part of the comprehensive WMSD prevention program. Stretching sessions, has other

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benefits as well such as team building, communication, increased worker morale, and safety planning. In addition, supervisors can use stretching sessions to identify any workers who are in pain, exhibiting signs and symptoms of WMSDs (see Exhibit 20-1).

Figure 20-1 Workers Performing Stretching Exercises (Courtesy Hensel Phelps Construction)

f. Implementation of WMSDs related medical management program for each project. Seek the assistance from your insurance provider to select a physician or a clinic near the project to help with early diagnosis and treatment. Construction workers do not report WMSDs because they think the minor muscle aches will go away after a while. As discussed earlier in this section, train the workers and supervisors so they can recognize WMSD symptoms early and report them. The project should encourage workers to receive employee reports of WMSD symptoms that should result in a medical evaluation. This can help reduce the severity of the injury (and claims) and minimize the likelihood of permanent disability or damage.

g. Establishment of a workplace wellness program. Certain physiological and even mental conditions that can be a confounding factor for soft tissue injuries such as diabetes, obesity, smoking, physical conditioning, age, stress, etc. For example, a Duke University Medical

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Center analysis found that obese workers filed twice the number of workers' compensation claims, had seven times higher medical costs from those claims and lost 13 times more days of work from work injury or work illness than did nonobese workers.[2] Hence, a workplace wellness program will develop healthier crafts and reduce the chances of WMSDs.

20.11 TOOLS

Provide employees, supervisors, and safety/ergonomic committee with reference tools for increasing their knowledge of WMSD risk assessment and mitigation measures. Some resources are listed below:

- Alliance Program Construction Roundtable: Prevention of Strains, Sprains and Material Handling Injuries in Construction.
- National Institute of Occupational Safety and Health (NIOSH): Simple Solutions: Ergonomics for Construction Workers – provides practical ideas to help reduce the risk of repetitive stress injury in common construction tasks.
- Laborer's Health & Safety Fund of North America: Ergonomics and Construction – The Smart Move - Provides general information about ergonomics and construction.
- The Construction Solutions web – Designed for owners, contractors, & workers, Construction Solutions, is a database of work hazards, & practical control measures to reduce or eliminate hazards.
- Washington State Department of Labor and Industries Ideas Bank – A searchable collection of ideas that may help you reduce exposure to awkward postures, high hand force, repetitive motions, lifting, vibration and other risk factors for work-related musculoskeletal disorders (WMSDs) in your workplace.

20.12 CONTINUOUS IMPROVEMENT

Conduct follow-up assessment and WMSD prevention program evaluation. After implementation of the WMSD prevention program, it is important to conduct periodic assessments including feedback from crafts to ensure the potential risk level was reduced to an acceptable level. The evaluation should also focus on the effectiveness of the program's education, training, etc. Any shortcomings should be corrected as part of a continuous improvement process.

An effective WMSD prevention program will result in a safe work environment with an improved work quality, productivity, and worker morale; and an enormous reduction in injury-related costs.

Additional Resources, Readings, and References

- SHIP Grant Project, "Stretch & Flex: A Multimedia Intervention to Reduce Work-Related Musculoskeletal Injuries in the Construction Industry." Integrity Safety Services, Inc.; Performance Ergonomics, LLC. AGC of Washington. The project resulted in the following great tools that contractors can use.

1. Stretch & Flex Video

2 Duke Medicine News and Communications. http://corporate.dukemedicine.org/news_and_publications/news_office/news/10044 (Accessed November 18, 2014)

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2. Stretch and Flex Poster
3. Quick Reference Card
4. Stretch and Flex Training Presentation

- Washington State Department of Labor and Industries Ergonomists – Employers may request an ergonomics consultation at their work site in Washington State. A consultation can help you identify hazards for musculoskeletal disorders and means to reduce them. http://www.lni.wa.gov/safety/SprainsStrains/gethelp/default.asp

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Exhibit 20-1 Example Stretch and Flex Program_Page_1

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Gary Merlino Construction Company, Inc.

LUMBAR SIDE BEND STRETCH

Raise your arm up over your head and reach toward the opposite side until a stretch is felt. Hold for 20 seconds.

LUMBAR EXTENSION STRETCH

With your hands on your hips, lean backward until a stretch is felt. Hold for 20 seconds.

SHOULDER EXTENSION STRETCH

Reach both hands behind your body until a stretch is felt in the chest or shoulders. Hold for 20 seconds.

THORACIC FLEXION STRETCH

Grasp both hands together and reach them outward while allowing your upper back to curve forward. Hold for 20 seconds.

WRIST FLEXION STRETCH

Using your opposite hand, pull hand upward until a stretch is felt in the upper forearm. Hold for 20 seconds.

WRIST EXTENSION STRETCH

Using your opposite hand, pull hand downward until a stretch is felt in the lower forearm. Hold for 20 seconds.

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Exhibit 20-1 Example Stretch and Flex Program_Page_2

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CALF STRETCH

Place one foot in front of the other. Make sure to keep your back heel down and knee straight while you move your hips forward. When you feel a stretch in the back of your calf, stop and hold for 20 seconds.

HAMSTRING STRETCH

Place your feet shoulder width apart with legs straight while you bend forward at the waist until a stretch is felt in the back of your thigh. Hold for 20 seconds.

NECK CIRCLES

Rotate your head slowly around in a circle. Repeat this action 5 times and then change directions for 5 additional repetitions.

Why Do We Stretch?

- Stretching prepares your body for physical work. It is a wake up call for your muscles.
- Flexibility is increased. Not just at work but all the time.
- Your circulation is promoted. Your muscles need oxygen from blood to operate at peak performance.
- Stretching removes lactic acid from your muscles. Lactic acid contributes to fatigue.
- Stretching encourages team building. Enjoy it – and the benefits from the results.

Guidelines

- Before you begin stretching, make sure you begin with your body in neutral position. Stand relaxed with your feet shoulder-width apart, with knees slightly bent and abdomen contracted.
- Hold each stretch for a count of 20 seconds.
- Do not bounce while you are stretching.
- Breathe in a relaxed manner and don't hold your breath. It is important that oxygen is getting to your blood and muscles.
- Do the stretches at your own rate – don't compete.
- Stretch just beyond the point of natural tension. Avoid straining while you are performing these stretches.
- Make stretching a daily habit.

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21
SAFETY INSPECTIONS

21.1 PURPOSE

Safety inspections are a significant hazard identification tool on a construction site, which will help prevent accidents by correcting those hazards. This chapter is intended to provide step-by-step best practice guidance to contractors to develop a new or improve an existing site-specific inspection program.

The following are the objectives of the safety inspection program:

- Reduce the risk of injury or loss to project personnel, property or the quality of work products through the identification and elimination of safety and health deficiencies.
- Provide an ongoing, systematic monitoring mechanism to measure compliance with relevant regulatory or contract standards.
- Involve the project team members in safety and health inspection and surveillance.
- Identify areas of potential risk and loss.
- Identify opportunities for safety and health education and training.
- Check and audit past training and skill development.
- Identify and develop positive attitudes to safety and health.

21.2 DEFINE PROGRAM PURPOSE

Define and communicate the purpose of the site's safety inspection program to all workers through site orientation. The workers should realize and be confident that inspections are not to "get them," but is a proactive accident prevention measure. The primary goal of safety inspections should be to identify and correct (a) unsafe conditions, (b) unsafe acts, and (c) deficiencies in the Site Specific Safety Plan (SSSP). Include safety inspections as one of the major elements of the Site Specific Safety Plan (SSSP). See chapter 12 of this handbook for more information about the development of an SSSP.

21.3 IDENTIFY INSPECTION NEEDS

The SSSP should identify the project-specific inspection needs by reviewing:

- Project contract requirements (e.g., Does the owner require special inspections?)
- Applicable regulatory requirements (e.g., DOSH competent person scaffold inspection)
- Company's accident history from similar projects (e.g., WMSD risk factors inspection)
- Manufacturer recommendations for all equipment and tools on the site (e.g. Annual crane inspections)

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21.4 DEVELOP INSPECTION RECORDING TOOLS

Develop safety inspection tools such as checklists and forms to record the inspection findings (see Exhibit 21-1 for example). Checklists are typically created by making a list of site-specific hazards (unsafe acts/conditions). It is an excellent tool for inspection of specific items such as:

- Construction equipment inspections (e.g., scissor lift, concrete pump truck, crane)
- Emergency equipment and supplies (e.g., fire extinguisher, first aid kit)
- Personal Protective Equipment (e.g., Full-body harness)
- Trade- or task-specific inspection (e.g., excavation inspection or landscape contractor)
- Health hazards measurement and testing (e.g., measurement of noise exposure)
- Inspection checklist or form focusing on fall, struck by, caught in or between and electrocution hazards

Beware, since checklists consist of pre-determined hazards or items to inspect, there is a potential that inspectors could miss "unrecognized" hazards not listed on the list. Also, since these checklists are generic, ensure you modify these checklists to fit your specific jobsites. Use open-form inspections for general site-wide inspections (see Exhibit 21-2 for example). Contact entities such as your company's workers' compensation insurance carrier, industry associations (e.g., AGC), labor unions, DOSH; who can provide free pre-made safety inspection checklists for construction.

21.5 PLAN FOR INSPECTION

Identify individuals who will conduct safety inspections, the frequency of inspections, and level of formality of these inspections. Ensure that those identified to conduct inspections are adequately trained to recognize hazards. Safety inspections can be classified into formal and informal inspections.

- *Informal* – Inspections that are conducted by all site personnel including craftsmen as part of their job responsibilities throughout the day. Typically, informal inspections do not involve documentation such as forms or checklists. However, they do play a crucial part of an SSSP by helping to identify safety issues on a daily basis.
- *Formal* – Inspections that are conducted by certain individuals or entities, which are scheduled at regular intervals. It typically involves the use of inspection tools for recording inspection findings. The frequency of formal inspections can vary from weekly to annually, depending on the potential for injury or damage, (or) regulatory requirements associated with the jobsite, a specific task, or equipment. For example, electrical hot work might require frequent inspections of the work area.

Based on industry best practices, depending on project-specific factors, the following inspections and timeline is recommended for "general" site inspections (see Table 21-1).

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Table 21-1: Safety Inspection Frequency and Level of Formality

Who should conduct inspections?	Frequency?	Formality?
Workers & field supervisors (e.g., superintendents, foreman)	Daily	Informal
Project management (e.g., project managers (PM)	Monthly	Formal
Owner representative (e.g., owner PM, safety)	Monthly	Formal
Contractor(s) top management	Quarterly	Formal
Site Safety Committee	Bi-weekly	Formal
Site safety professionals	Weekly	Formal
Site safety professionals	Daily	Informal
DOSH consultation walks	As-needed	Formal
Insurance loss control experts (random)	Quarterly	Formal
DOSH compliance audits	*	Formal
Regulatory agency mandated inspections	**	Formal
Manufacturer or underwriter mandated inspections	***	Formal
Tools and Equipment	Before use	In/formal

*Depends on imminent danger, fatality/catastrophe, complaints/referrals, and programmed
**Refer all applicable standards and regulations
***Refer operators manual

Note: The site inspection requirements should be communicated to all subcontractors through pre-bid and pre-construction meetings and the contracts.

21.6 ASSEMBLE INSPECTION KIT

Safety inspectors should be set up for success with an inspection kit. The kit may include, depending on the project, clipboards, inspection checklists, forms, pens, flashlights, camera, tape measure, electrical testing equipment, and monitoring/sampling devices (i.e. sound level meter, light meter). However, paper-based inspections might become history in a few years. Many companies are using a software called "apps" installed on portable electronic devices such as smartphone or tablet computers to conduct safety audits and inspections (see Figure 21-1). These safety inspection apps even come with a feature to take pictures during the inspection and add them to the report and email a copy of the full report to selected subcontractors. Some apps can measure sound and light levels, and also provides a quick reference of standards and regulations on your fingertips – making inspections more efficient. Refer Section 8 of this handbook for more information on smartphone apps application in safety management.

21.7 TRAIN THE INSPECTORS

New supervisors or safety committee members, may have never conducted an inspection. Hence, it is important to train the inspectors on the following topics:

- Proper inspection techniques – proper preparation, conducting the inspection and follow-up for corrective actions

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- Addressing workers performing unsafe acts
- Common site hazards and controls
- Familiarity with applicable standards and regulations
- Familiarity with company/site policies including the requirements of the SSSP

21.8 CONDUCT THE INSPECTIONS AND RECOMMEND CORRECTIVE ACTIONS

The inspector should take adequate time to conduct a thorough review of the entire jobsite. Depending on the jobsite, it might take an hour to 4 hours to complete an effective inspection. Most safety issues can be fixed during the inspection by working with the foreman in charge of the work area or workers associated with the issue. Try to correct the cause of the unsafe condition or act, to prevent reoccurrence. Some items might require disciplining workers, which will trigger the site's progressive discipline program. Hence, safety issues that were not or cannot be fixed during the inspection (e.g., worker operating scissor lift without training), should be noted on the inspection form along with other details (i.e. work location, concerned subcontractor).

At the end of the inspection make a separate list of safety issues with your proposed solutions and attach a deadline for each corrective action. Distribute the "action list" to the concerned subcontractor's key supervisors as soon as possible, and require them to fix it before the deadline. Note activities or tasks that are posing imminent danger conditions should be stopped, and the safety issue should be fixed immediately.

Figure 21-1: Safety Professional Performing Scaffold Inspections using I-pad (Courtesy Hensel Phelps Construction)

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21.9 FOLLOW-UP FOR CORRECTIVE ACTION

Did the proposed solutions were implemented? Inspections are useless if the safety issues identified are not fixed. The inspector should periodically check to see the progress towards the corrective action until the safety issues are resolved.

21.10 FILE THE INSPECTION FORMS

Once all safety issues are resolved, make a note on the form that should include (a) what corrective action was taken and (b) when and who completed the action. Keep a copy in the jobsite file. It is called closing the loop. It is a very important step, especially when responding to a lawsuit related to that jobsite. It will demonstrate the company's due diligence in maintaining a safe and healthy work environment, and compliance with its safety program.

21.11 IDENTIFY TRENDS

Inspections are one of the most common safety leading indicator that can predict accidents by showing "trends" in unsafe acts and conditions. For example:

- 80% of the workers observed were not wearing appropriate gloves. Is there a problem with the project's glove policy?
- 60% of the scissor lifts operating on site did not have a spotter. Is there an enforcement issue with spotter requirements?

Reviewing the inspection reports for trends and addressing them promptly will prevent accidents.

21.12 SHARE LESSONS LEARNED WITH ALL SITE PERSONNEL

Hazard trends identified during inspections offer an excellent training opportunity. Communicate the inspection results and trends to the workers at all-hands or mass safety meetings. Review inspection results at the safety committee meeting as well. Encourage site supervisors to share them during their pre-task plan meetings. It will allow workers to watch for these hazards and unsafe work practices, and report them immediately to their immediate supervisor.

21.13 RECORD AND SHARE BEST PRACTICES

The number of contractors on a jobsite will vary from 1 to more than 100 depending on the size of a project, each implementing various safety inspection best practices. On certain projects workers might suggest innovative inspection practices, if they were successful, make sure it is carried over to another project. Consider the following list of programmatic best practices developed based on the experience of major construction contractors.

21.13.1 Worker Safe Behavior Observation (WSBO) Program

The WSBO is a leading indicator metric that generates a weekly WSBO project score (0-100), with the help of the following steps:

1. Observe worker behaviors who are part of the crew or work area for a short period. Make a minimum of 30 observations per week to get a meaningful sample.

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2. Calculate a WSBO score, which is the ratio of workers with safe behavior to the total number of employees observed (e.g., 80% of crew members were safe). Set project goal, for example, the average WSBO score goal for the project is 95.
3. Record and tabulate the "frequency" of the nature of unsafe behavior (e.g., no safety glass) from all observations for that week.
4. Analyze trends and implement corrective actions.
5. Continue the process to check the effectiveness of the corrective actions and identify new trends, if any.

21.13.2 Monthly Management Inspection (M2I) Program

The M2I is another leading indicator metric that generates a weekly M2I project score for each subcontractor or the project as a whole, with the help of the following steps:

1. Create a standard safety inspection form.
2. Require a monthly audit by the project manager to ensure compliance with project safety requirements and applicable regulations. In addition to a job walk, the audit should include a review of accident reports, safety inspections, site recordkeeping, etc.
3. Start the Audit with a score of 100. Deduct points for each non-compliance items. Add points (extra credit) for items that are above and beyond requirements.
4. Compute the net score.
5. Use the M2I score to reward subcontractors with superior performance and require subcontractors with an inferior score to provide corrective actions.
6. Track and make efforts to improve M2I score.

21.13.3 Safety Management by Walking Around (SMBWA)

The SMBWA is a management inspection technique that involves the project managers of the owner, general contractor and subcontractors walking around on the jobsite, directly observing the site operations. Management should engage their workers in conversations, and receive feedback about the effectiveness of the site safety program, and try to resolve any deficiencies promptly. During these walks, the managers should "recognize safe behaviors" and coach to "modify unsafe behavior." The SMBWA technique shows management commitment to worker safety and builds employee morale.

Additional Resources, Readings, and References

- Oregon OSHA Sample Inspection Checklists: http://www.orosha.org/standards/checklists.html
- Texas Department of Insurance Sample Construction Safety Inspection Checklist: Construction Safety Inspection Checklist: http://www.tdi.texas.gov/pubs/videoresource/cklgenconstru.pdf

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Exhibit 21-1: Example Project Safety Inspection Closed Form

(Used by Permission from GLY Construction)

Superintendent: _____ Date: _____

Foreman: _____ Job Name: _____

GLY Employees: _____ Job #: _____

Sub Employees: _____ Project Mgr: _____

COMPLIANCE			CONTRACTOR	COMMENTS
Yes	**No**	JOB OFFICE REQUIREMENTS		
		Substance Abuse Testing		
		Posting Requirements		
		Signage		
		MSDS Manual		
		Safety Training (Hire-in Booklet)		
		Tool Box Meetings		
		Daily Logs		
		Job Hazard Analysis		
		Flex & Stretch		
		LEED Recycle Log		
Yes	**No**	TOOLS		
		Power Tools, Wiring & Grounding		
		Protective Equipment		
		Safety Devices		
Yes	**No**	PERSONAL PROTECTIVE EQUIPMENT		
		Personal Clothing		
		Goggles or Face Shield		
		Hard Hats		
		Protective Clothing		
		Body Harness & Lanyard		
Yes	**No**	COMPANY POLICY		
		Hard Hats		
		Eye Protection		
Yes	**No**	FIRE PROTECTION		
		Extinguishers on Site		
		Fire Watch or Extinguishers		
		Tested & Inspected Extinguishers		
Yes	**No**	MATERIAL HANDLING EQUIPMENT		
		Ladders		

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		Scaffolding		
		Man Lifts		
		Fork Lifts		
		Equipment Checklist		
Yes	**No**	HOUSEKEEPING		
		Aisles & Stairs		
		Floors		
		Storage & Piling of Material		
		Lighting & Ventilation		
Yes	**No**	SAFE PRACTICES		
		Hazardous Material Containment		
		Working under Suspended Loads		
		Removing Machine Tool Guards		
		Handrails & Guardrails		
		Floor Openings Covered & Marked		
		Access & Ramps		
Yes	**No**	FIRST AID/CPR		
		Certified Provider on site		
		First Aid Kits		
		First Responder Kit		
		Injuries & Illness Reported		
Yes	**No**	EXCAVATION		
		Preconstruction Meeting & Plan		
		Slopes & Depths		
		Protection		
		Ladders & Egress		
Yes	**No**	CRANES		
		Engineering		
		Crane Certifications		
		Secured Access		
		Qualified Operators		
		Inspections		
Yes	**No**	FALL PROTECTION		
		Precon Meeting & Plan		
		Leading Edge		
		Openings		
		Rails & Toe Boards		
		Perimeters		

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Yes	No	SUBCONTRACTORS		
		Safety Manuals		
		Fall Protection Plan		
		Violation History		
Safety Manager/Safety Specialist Signature:				
Site Supervisor Signature:				

COMMENTS:

Copy to: Project Superintendent; GLY Safety Department

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Exhibit 21-2: Example Safety Inspection Open Form

Project Superintendent: _____ Date: _____

Inspection Conducted by: _____ Job Name: _____

Submitted to: Job Number:

Note: Ensure all identified safety concerns are addressed appropriately promptly depending on the severity of the concern.

No	Location	Safety Concern	Recommended Corrective Action	Responsible Contractor	Due Date	Status
1						
2						
3						
4						
5						

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22
SAFETY PERFORMANCE MEASUREMENT

22.1 PURPOSE

The purpose of this chapter is to provide a list of standard safety performance measures that can be used to measure and improve contractor safety performance. The chapter also provides some guidelines for implementing two leading indicator metrics.

22.2 SAFETY PERFORMANCE INDICATORS

Construction companies are always implementing new risk control strategies to improve their company's safety performance. However, many do not have an adequate process in place to measure the effectiveness of its risk control strategies. Are these strategies helping improve its safety performance? Are there any deficiencies that need to be corrected to prevent accidents and injuries? Safety programs cannot be successful if it does not have a continuous improvement process in place to periodically "check" its effectiveness and recommend solutions to make it even better.

Safety performance indicators will help contractors to check whether their hazard / risk control strategies are working. There are two common types of safety performance indicators used by the construction companies: (a) lagging indicators and (b) leading indicators. Proper selection of lagging and leading indicators to measure their safety performance is critical to the success of the contractor's safety program. Effective performance measurement should be capable of measuring compliance and safe/unsafe acts and behaviors.

22.3 LAGGING INDICATORS

Lagging indicators are reactive safety performance measurements that are made after an accident, injury, or illness. They are also called downstream or trailing indicators.[1] Lagging indicators are the most common performance metrics used by construction companies to determine their risks and assess the effectiveness of their company's safety programs. Even though, lagging indicators does help identify some program deficiencies since the contractor has already suffered a loss, the use of lagging indicators to help improve safety programs has been questioned lately. Example lagging indicators that contractors can consider measuring their past safety performance include:

- OSHA Total Recordable Incident Rate (TRIR)
- OSHA Days Away, Restricted or Transferred Incident Rate (DART)
- Number of days lost per lost time injury
- First Aid Injury Rate (FA)
- Workers' Compensation Experience Modification Rate (EMR)

1 Hinze, J. (2005) "A Paradigm Shift: Leading To Safety" *4th Triennial International Conference, Rethinking and Revitalizing Construction Safety, Health, Environment and Quality.* Port Elizabeth – South Africa.

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- Average cost per indemnity claim
- DOSH citations or inspections with findings

22.4 LEADING INDICATORS

Leading indicators are proactive safety performance measurements that demonstrate the effectiveness of existing safety management systems before an accident, injury, or illness. They are also called upstream indicators.[2] It will help predict future performance by identifying weaknesses or deficiencies in the contractor's program. Leading indicators are useful tools to assess construction site risks associated with current activities and implement corrective actions immediately before the accident; injury or illness can occur.

Examples of leading indicators, listed under various categories, that contractors can consider using to measure safety performance include:

- Accidents Related
  - Percentage of near misses investigated and documented
  - Percentage of incidents reported late
  - Percentage of JHAs changed as a result of accident investigation corrective actions

- Safety Meetings Related
  - Percentage of pre-bid meeting conducted and documented
  - Percentage of pre-construction meeting conducted and documented
  - Percentage of weekly mass safety meeting conducted and documented
  - Percentage of safety committee meeting conducted and documented
  - Percentage of workers on site attending the mass safety meeting

- Safety Planning Related
  - Percentage of daily pre-task planning meetings completed and documented
  - Quality of the pre-task plans completed
  - Percentage of daily job hazard analysis completed and documented
  - Quality of the job hazard analysis completed
  - Percentage of site-specific safety plan completed
  - Quality of site-specific safety plan
  - Safety considered during safety look-ahead schedule
  - Additional pre-planning for high-risk evolutions

- Safety Inspections Related
  - Number of the job site safety inspections completed with ZERO violations
  - Number of the job site audits performed with performance and documentation in compliance
  - Subjective evaluation of the quality of the job site housekeeping

2 Hinze, J. (2005) "A Paradigm Shift: Leading To Safety" *4th Triennial International Conference, Rethinking and Revitalizing Construction Safety, Health, Environment and Quality.* Port Elizabeth – South Africa.

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- Percentage of unsafe behaviors observed
- Percentage of Personal Protective Equipment (PPE) compliance
- Number of unsafe conditions observed
- Percentage of safety violations corrected within a day of identification

- Safety Training Related Compliance
  - Percentage of workers who completed new employee orientation
  - Number of orientations with contractor or owner management participation
  - Percentage of workers with OSHA 10-hr certification
  - Percentage of supervisors with OSHA 30-hr certification
  - Percentage of supervisors with First Aid/CPR certification

- Employee Involvement
  - Worker Safety Perception Survey measuring safety culture
  - Percentage of worker safety suggestions addressed within a week of reporting
  - Number of management project site walks focusing exclusively on safety performance

- Safety Performance Evaluation
  - General contractors evaluated and recognized based on leading indicators (incentive contracts)
  - Subcontractors evaluated and recognized based on leading indicators (incentive contracts)
  - Supervisors evaluated and recognized based on leading indicators
  - Workers evaluated and recognized based on leading indicators

22.5 SELECTION AND IMPLEMENTATION

Incorporating lagging and leading indicators into a contractor safety program should include the following critical steps:

- Educate management at all levels about the importance of safety performance measurement. Obtain their commitment and support to implement a safety performance measurement program at both company and project levels.
- Secure all necessary resources to implement the program: funding, personnel, equipment, and other materials.
- Establish scope and purpose of the program.
- Identify roles and responsibilities – who will champion this program at the company level? Who will be responsible at the project level?
- Hold those responsible for driving the program accountable.
- Select the different types of indicators that your company will measure. It is recommended to have a balance of both lagging and leading indicators.
- Develop an implementation plan that addresses the need, timeline, and tools for measurement. Ensure all indicators are measurable, quantifiable, accurate and reliable.
- Train and educate all personnel involved.
- Set benchmarks to the measure of success for each indicator.

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- Develop a distribution or reporting system to share and communicate the progress of the program with the management.
- Develop a plan to test the effectiveness of these indicators in measuring company/project safety performance, and whether it meets your company threshold or goal.
- Implement corrective actions if thresholds are not met.

A sample safety performance measure for the project along with goals is presented in Table 22-1. The project team can use similar reporting tool every month or quarter and come up with corrective actions accordingly.

Table 22-1: Example Leading & Lagging Indicators Project Comparison for AB Company

Leading Indicators	Goal/ Threshold	Science Building	Goal Met (Y/N)	Corrective Actions?
Unsafe Conditions: % of safety violations corrected within a day of identification)	90%	95%	Y	
Pre-task Plan (PTPs): % of crews completing PTPs	100%	75%	N	
Orientation: Percentage of workers who completed new employee orientation	100%	90%	N	
Training: Percentage of supervisors with OSHA 30-hr certification	50%	60%	Y	
Behavior: % of unsafe behaviors	0%	10%	N	
Lagging Indicators				
OSHA Total Recordable Incident Rate (TRIR)	4.0	5.2	N	
OSHA Days Away, Restricted or Transferred Incident Rate (DART)	1.0	0.5	Y	
First Aid Injury Rate (FA)	8.0	12.0	N	

22.6 SAMPLE PROGRAM DEVELOPMENT GUIDELINES

Two example checklists presented in the Exhibits 22-1 and 22-2 provides guidance for contractors interested in implementing a Worker Safety Behavior Observation (WSBO), and Pre-Task Plan (PTP) review leading indicator program.[3]

Additional Resources, Readings, and References

- **Construction Industry Institute (CII)**
  - Leading Indicators for Safety: https://www.construction-institute.org/scriptcontent/more/284_1_v1-1_more.cfm
  - Project Health Indicator Tool: https://www.construction-institute.org/scriptcontent/more/ir220_2_more.cfm

3 Rajendran, S. (2013). "Enhancing Construction Worker Safety Performance Using Leading Indicators." *Periodical on Structural Design and Construction*, ASCE, 18 (1), 45-51.

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- **United Kingdom (UK) Health and Safety Executive (HSE)**
  - Developing process safety indicators. Available on HSE website for free download http://www.hse.gov.uk/pubns/priced/hsg254.pdf
- **The Center for Construction Research and Training (CPWR)**
  - Performance Metrics: http://www.cpwr.com/research/performance-metrics

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Exhibit 22-1: Worker Safe Behavior Observation (WSBO) Leading Indicator Program Development Checklist[4]

Checklist Item	Yes	No
The contractor has a need to implement a WSBO leading indicator program.		
The upper contractor management, including executive's support has been secured.		
All necessary resources to implement the WSBO program have been secured: funding, personnel, equipment, and other materials.		
The purpose and scope of the program have been established.		
The WSBO program will be reviewed during Contractor and subcontractor new employee orientation.		
A written WSBO program has been developed and were readily available to employee review upon request.		
The program outlines the roles and responsibilities of upper management, program owner, observers, and subcontractor management.		
The program outlines the observer training requirements that also defines the competence needed for WSBO observers (The observers should, at a minimum possess the knowledge of contractor safety program and all applicable OSHA guidelines and the ability to correct unsafe behaviors).		
The trainers are competent to train observers. The trainer competence should be defined in the written program. The training is provided in language trainees will understand.		
The program outlines guidelines for the design and development of the WSBO measurement tool – a WSBO card or form. The measurement tool contains the following as a minimum: (1) date and time, (2) observer name and company, (3) location, (4) number of workers' part of the crew being observed, (5) number of workers with safe behavior, (6) number of workers with unsafe behavior, (7) the nature or type of unsafe or safe behavior, and (8) corrective action taken by the observer. Unsafe acts listed on the card/form are tailored to the contractors' line of work or industry.		
The program outlines the observation procedures. Observers should make an observation only for a brief moment (approximately 10 seconds) to verify whether the crew members are performing safe or unsafe behavior (Observers should not stand and stare at the workers, since it might make workers nervous about being watched and portrays observers as safety cops). For example, Figure 1 shows a picture of a worker with improper fall protection.		
A minimum of 30 observations is made every week (varies based on the project site).		
The WSBO output is quantified by using a "score" for each observation and "frequency" measurement for the nature of the unsafe behavior. The WSBO score is the ratio of workers with safe behavior to the total number of workers observed, multiplied by 100.		

4 Rajendran, S. (2013). "Enhancing Construction Worker Safety Performance Using Leading Indicators." *Periodical on Structural Design and Construction*, ASCE, 18 (1), 45-51.

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The WSBO score is used to assess the severity of the worker behavior on various projects. For trend analysis, the scores are plotted using line graphs weekly or monthly to evaluate safety performance. A sample WSBO score trend analysis is presented in Figure 2 for a hypothetical contractor on three different projects, overall company performance, and the contractor's goal.		
The frequencies of the various unsafe behaviors are plotted on a bar graph weekly or monthly to evaluate trends. A sample WSBO unsafe behavior frequency analysis is presented in Figure 3. In this example, the contractor should focus its intervention efforts on hearing protection.		
The WSBO program outlines a requirement to set quantified WSBO score objectives. For example, ABC contractor's goal is to maintain a WSBO score of 90 or above. These objectives should be set, reviewed and modified at appropriate intervals to reflect efforts to achieve continual improvement.		
The program outlines the process to introduce safety performance improvement and risk reduction based on "frequency" trends of unsafe behaviors. For example, on ABC contractor's job sites 35% of workers were not compliant with eye protection. The objective should be set to improve this situation and assign resources to achieve established objectives.		
The program outlines the process of communicating WSBO results to the contractor and subcontractor management and all employees. Communication forums include site safety meetings, newsletters, subcontractor coordination meetings, safety committee meetings, and management meetings.		
On multi-employer worksites, the contractor has a process in place to communicate individual company WSBO results to appropriate subcontractors.		
The program outlines a requirement of corrective action plans for subcontractors with WSBO scores < 50.		
A process is in place to incorporate the program requirements in subcontractor contracts to help them budget resources for the WSBO program.		
The program outlines data entry and recordkeeping requirements for the measurement tools.		
The program outlines incentives to subcontractors or projects with superior WSBO scores.		
The program outlines process to review and evaluate the WSBO program every year.		

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Exhibit 22-2: Pre-task Plan (PTP) Quality Leading Indicator Program Development Checklist[5]

Checklist Item	Yes	No
The contractor has a need to implement a PTP review leading indicator program.		
The upper contractor management, including executive's support has been secured.		
All necessary resources to implement the PTP quality review program have been secured: funding, personnel, equipment, and other materials.		
The purpose and scope of the program have been established.		
The purpose and scope of the PTP quality review program are reviewed during Contractor site orientation for all workers. The goal of the PTP review leading indicator program is to prevent injuries/incidents by ensuring that all tasks are planned and implemented per the plan. This helps identify any trends in deficiency and implement suitable intervention methods.		
A written PTP quality review program has been developed and is readily available for employee review upon request.		
The program outlines the roles and responsibilities of upper management, program owner, reviewers, and subcontractor management.		
The program outlines the reviewer training requirements that also define the competence needed for PTP reviewers. The reviewers should, at a minimum possess the knowledge of contractor safety program and all applicable OSHA guidelines. The reviewer should also have the ability to identify hazards and recommend control measures based on work tasks.		
The trainers are competent to train reviewers. The trainer competence should be defined in the written program. The training is provided in language trainees will understand.		
The program outlines guidelines for the design and development of the PTP review measurement tool – a PTP review card or form. The measurement tool contains the following as a minimum: (1) date and time of review, (2) location, (3) task name or description, (4) PTP adequate or inadequate, and (5) the nature deficiency if the PTP was inadequate.		
The program outlines the review procedures. Reviewers should randomly select a PTP from the work site and thoroughly review the plan for adequacy. Reviewers should provide constructive criticism and not blame workers for a poor PTP. This should be considered an educational opportunity.		
The PTP review is quantified by using a "score" for each review and "frequency" measurement for the nature of PTP deficiency. Adequate PTPs should receive a score of 100, and inadequate PTPs will receive zero. For trend analysis, the scores can be plotted using line graphs weekly or monthly to evaluate progress.		

5 Rajendran, S. (2013). "Enhancing Construction Worker Safety Performance Using Leading Indicators." *Periodical on Structural Design and Construction*, ASCE, 18 (1), 45-51.

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The various PTP inadequacies should also be quantified by listing the critical steps for a good PTP in the review card or form: (1) perform the PTP at the work area, (2) identify tasks to be performed in a sequential order, (3) identify the potential hazards associated with each task, (4) identify the control measures for each hazard, (5) review the PTP with crew members, (6) crew members signs the PTP, (7) post PTP in the work area, (8) follow the plan, (9) stop work if there is a change of conditions and make appropriate changes to the PTP, and (10) discuss all changes with the crew members. Figure 4 shows an example of an inadequate pre-task plan. This plan was prepared for lifting equipment off the truck bed and set it inside a building. The plan does not address the essential steps, hazards, and its control measures. The frequency of these deficiencies can be plotted on a bar graph weekly, or monthly to evaluate trends (see Figure 5, for example).		
The program outlines the process to retrain crews with inadequate PTPs.		
The program outlines a requirement to set quantified PTP score objectives. For example, ABC contractor's goal is to maintain a PTP score of 95 or above. These objectives should be set, reviewed and modified at appropriate intervals to reflect efforts to achieve continual improvement.		
The program outlines the process of communicating PTP review results to the contractor and subcontractor management and all employees. Communication forums include site safety meetings, newsletters, subcontractor coordination meetings, safety committee meetings, and management meetings.		
On multi-employer worksites, the contractor has a process in place to communicate individual company PTP results to appropriate subcontractors.		
The program outlines a requirement of corrective action plans for subcontractors with PTP scores of less than 75.		
A process is in place to incorporate the program requirements in subcontractor contracts to help them budget resources for the PTP program.		
The program outlines recordkeeping requirements for the measurement tools.		
The program outlines incentives to subcontractor or projects with superior PTP scores. For example, the crew or subcontractor with the best PTP will be rewarded at the safety meeting.		
The program outlines the process to review and evaluate the WSBO program every year.		

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23
CONSTRUCTION SITE ENVIRONMENTAL MANAGEMENT

23.1 PURPOSE

Construction site operations have a high potential for impacting the environment. Contractors who fail to control site-related environmental exposures can cause harm to the environment and public health. To protect the environment and the public, there are many environmental standards and regulations that impact construction operations at the federal, state, and local levels. Failure to comply with these requirements can result in enforcement action by regulatory agencies and can also cause employee and public injuries. Furthermore, contractors can be held liable for pollution-related damages resulting in third-party bodily injury and property damage, which can damage their reputation and public image. Therefore, the identification and control of the construction-related environmental risks should start as early as the design phase.

This chapter provides construction contractors some tips to identify and control construction site environmental exposures. *Note, simply being unaware of your environmental regulations does not relieve you of your environmental liability.*

23.2 PROJECT ENVIRONMENTAL POLICY

Develop a project environmental policy to show a commitment to protect the environment. Most projects integrate it with worker safety and health, to create a "Site Environmental, Safety, and Health Policy." Ensure this policy is communicated to all site personnel through site orientation and posting it on the safety bulletin board.

23.3 ENVIRONMENTAL COORDINATOR

Designate an Environmental Coordinator (EO) for the project that will help achieve regulatory compliance for the project, and ensure all mitigation measures are properly implemented. The project safety manager assumes this role on medium-scale projects. On large and environmentally complex projects, a full-time environmental manager can be included as part of the project staffing. The project superintendent or project engineer should be the designated environmental representative on small projects. Subcontractors must also provide a designated representative for dealing with environmental issues. At a minimum, the EO should have the knowledge of the site-specific construction activities and associated environmental exposures.

23.4 PRE-CONSTRUCTION SURVEY

Perform an environmental risk assessment and identify all potential environmental exposures and its impacts related to the site's pre-existing conditions. Consider the following items when evaluating pre-existing site conditions:

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- Identify any environmental contaminants, pollutants, or hazardous waste onsite
- Look for existing underground tanks or pipelines with the potential to cause environmental damage
- Evaluate features of adjacent properties that could pose environmental risks to the contractor
- Test soil and water for contamination
- Check if the site is environmentally contaminated (brownfield). If so, will the project scope include remediation?
- Check for the presence of toxic mold onsite if work involves the renovation of existing buildings

See Exhibit 23-1 for an example project environmental checklist from PCL Construction Services, Inc. This is one of the most comprehensive environmental checklists and would be a great tool for smaller contractors to use as a starting point.

23.5 RISK ASSESSMENT

Perform a detailed environmental risk assessment and identify all potential environmental exposures and its impacts associated with all construction operations including vendors, suppliers, and visitor activities, which will arise at some point during the life of the project. The assessment should consider any adjacent property within or near the work area that could be vulnerable to environmental damage. Some of the common sources of environmental risks associated with construction site operations (including subcontractor activities) include but not limited to:

- Disturbance to vegetation
- Rupture of underground tanks or pipelines
- Discovery of contaminated soil
- Spills and leaks of contaminants, pollutants, or wastes from on site operations (e.g., Hydraulic line damage of an excavation equipment)
- Spills and leaks of contaminants, pollutants, or wastes during transportation (e.g., Release of hazardous waste due to road accident)
- Air emissions and chemical releases from chemicals and HVAC systems
- Toxic mold
- Construction noise
- Disturbance of lead or asbestos-containing materials
- Dust (asbestos, silica, etc.)
- All disposal risks such as improper disposal of both hazardous and non-hazardous waste at jobsites
- Contaminated waste (e.g., disposing of pressurized aerosol cans in the garbage dumpster)

23.6 INSURANCE

Examine and identify any coverage gaps in your insurance policies (commercial general liability, business auto, and other related insurance policies) as far as providing protection against the pollution-related liability. All subcontractors and their tiers should be required to carry adequate coverage for risks associated with their operations and require them to add the GC as additional insured.

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23.7 DESIGNING FOR THE ENVIRONMENT

Review the environmental risks identified in step 23.4 and try to eliminate or minimize them through project design by specifying environmentally friendly materials. For example, choose less hazardous and more environmentally friendly products.

23.8 SITE ENVIRONMENTAL MANAGEMENT PLAN (SEMP)

Develop an SEMP integrated into the Site Specific Safety Plan (SSSP) to prevent or minimize any construction effects on the environment. The SEMP should identify all environmental risks, detailed mitigation measures, and procedures to implement them. The SEMP should include at a minimum the following elements:

a. Site Environmental Policy
b. Roles and Responsibilities
c. Permitting Requirements
d. Applicable Regulatory and Owner requirements (federal, state, local, and site-specific requirements called in owner contracts)
e. Site Specific Risks and Controls
    - *Erosion and Sedimentation Controls* – to prevent environmental impacts caused by soil erosion and sedimentation.
    - *Solid Waste Management Plan* – to manage solid wastes associated with onsite construction activities (e.g., concrete, wood, scrap metal, glass, drywall, general trash, etc.). Implement a procedure in place to classify solid waste as hazardous or non-hazardous.
    - *Hazardous Material Controls* – to establish procedures for the procurement and management of hazardous materials (e.g., adhesives, paints and thinners, solvents, lead, pesticides, refrigerants coolants such as Freon, etc.). Set up an approval process for any hazardous materials to be brought onsite, and have a policy in place to limit the inventory of materials to the time frame (e.g., one week).
    - *Hazardous Waste Management Plan* – to manage the generation, transport, storage or disposal of any regulated hazardous waste such as used oil, spent solvents, PCBs, asbestos, paint wastes, thinners, etc.
    - *Air Pollution Controls* – to prevent or minimize air pollution associated with construction activities.
    - *Waste Water Management* – to manage all construction related wastewater such as truck wheel wash, concrete washout, equipment cleaning, dewatering, cleaning of painting equipment, etc.
    - *Spill Prevention and Response Plan* – response plan to spills of chemical, fuels, and other substances.
f. Environmental Performance Metrics
g. Environmental Training
h. Inspection Requirements
i. Environmental Incident Reporting and Investigation
j. Emergency Responses
k. Continuous Improvement

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23.9 REGULATORY AGENCY RELATIONS

Schedule an onsite meeting with local environmental regulatory agency representatives and go over the project scope and share the SEMP. Apply and obtain "applicable" environmental permits and licenses for the site (e.g., general stormwater permit, the Joint Aquatic Resources Permit Application (JARPA), etc.).

23.10 SUBCONTRACTOR SELECTION

Include environmental performance factors as part of the subcontractor safety pre-qualification process. Refer to chapter 3 of this handbook for more information about subcontractor selection.

23.11 CONTRACTS

Share the SEMP and communicate site environmental requirements for the project with potential bidders through a request for proposals (RFP) and pre-bid meetings, so contractors can allocate resources appropriately in the bid. The EO should be involved during the project proposal phase, contract management phase, pre-award and pre-mobilization meetings to ensure that the site environmental expectations are clearly defined and communicated to help the project avoid enforcement action. Include site environmental requirements in the contracts. All pre-construction or pre-award meetings should include a review of all environmental standards and regulations, as well as an explanation of project-specific requirements that are above and beyond compliance. Subcontractors should be contractually required to examine their activities and carry out an environment risk assessment before commencement of work.

23.12 ENVIRONMENTAL CONTRACTORS

Select a hazardous waste transporter, treatment or disposal contractor. Ensure they have the appropriate permits, licenses, and necessary insurance coverage.

23.13 ENVIRONMENTAL EQUIPMENT

Procure all environmental control related equipment and supplies such as spill response kits, hazardous waste storage shacks/containers, emergency response equipment, and personal protective equipment.

23.14 TRAINING AND EDUCATION

Train workers and supervisors on the general site environmental risk factors and associated mitigation measures, as part of the site's new employee orientation. Identify and conduct any special training required as part of the project environmental requirements (e.g., hazardous waste operations). Ensure all training records are maintained on site and are readily accessible. The training should also include proper environmental incident reporting procedures and emergency action plan.

21.15 IMPLEMENTATION OF SEMP

Implement the Site Environmental Management Plan (SEMP). Advise all supervisors to consider "environmental risks" as part of their daily pre-task planning.

23.16 ENVIRONMENTAL PERFORMANCE MONITORING

Develop environmental performance metrics (objectives) similar to worker safety, to improve project environmental performance. The site can measure environmental performance using total points ob-

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tained in a weekly site environmental inspection. For example, the inspection results can be a score from 0 to 100 to reflect the environmental compliance of the construction site. Each inspection starts with a score of 100. One point is deducted for a minor non-compliance item (e.g., gap in silt fence), and two points should be deducted for a major violation (e.g., missing catch basin filter). At the end of each inspection, the net scores should be computed and recorded. The project can set a goal to a score of 90 every week. Any deficiencies identified during the inspection should be fixed right away. The inspection should focus on the effectiveness and condition of the following environmental controls, but not limited to:

- General project housekeeping
- Construction site entrance cleanliness (e.g., dirt on the road)
- Dust suppression
- Erosion control blankets
- Filter strips
- Mulching
- Silt fencing
- Sediment traps
- Condition of concrete washout areas
- Concrete batch plant
- Equipment fueling area controls (designated area) and containment systems (e.g., berms and dikes)
- Equipment cleaning area
- Equipment maintenance (condition of hydraulic lines and emission control systems)
- Visual inspection of dumpsters to check for waste contamination
- Spill kits
- Hazardous waste containment and cleanup
- Bulk storage area
- Material use and recycling

23.17 INCIDENT REPORTING AND INVESTIGATION

All personnel should be required to report any and all spills or incidents that occur on site immediately to the site EO or their immediate supervisor. All environmental incidents should be documented and investigated to determine the cause and prevent reoccurrence. See Exhibit 23-2 for an example spill incident form. Ensure the project has the contact numbers of relevant jurisdictional environmental agencies for reporting of environmental incidents. Please refer to the contents of an emergency response in chapter 17 of this handbook.

23.18 PROGRAM REVIEW

Require the project management to perform a quarterly audit to review the overall effectiveness of the site SEMP, identify and correct any deficiencies.

23.19 RECORDS RETENTION

Retain all records, reports, permits, self-inspection forms, as part of the project archive.

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Additional Resources, Readings, and References

- U.S. Environmental Protection Agency (EPA) – *Managing Your Environmental Responsibilities: A Planning Guide for Construction and Development* - http://www.epa.gov/compliance/resources/publications/assistance/sectors/constructmyer/myerguide.pdf
- Zurich® - *Construction Environmental Best Practices* - *http://www.zurichna.com/internet/zna/sitecollectiondocuments/en/knowledge%20center/whitepapers/construction/construction_env_best_practices.pdf#page=1*
- U.S. Environmental Protection Agency (EPA). Green Buildings. http://www.epa.gov/greenbuilding/index.htm
- Construction Industry Compliance Assistance (CICA). http://www.cicacenter.org/. CICA is your source for plain language explanations of environmental rules for the construction industry. This information is provided free of charge by the National Center for Manufacturing Sciences in partnership with The Associated General Contractors of America (AGC). Funding for this project has been provided by the U.S. Environmental Protection Agency and AGC.

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 1)
(Used by permission from PCL Construction Services Inc.)

Environmental Checklist

District Name: Print Project Name: Print

Chief Estimator: Print Initials: _____

Date of Review: DD/MM/YY

INSTRUCTIONS

- This "Environmental Checklist" has been compiled to assist the chief estimator and project management team(s) define an Environmental Scope of Work.
- When completed, this "Environmental Checklist" must be attached to the "Environmental Scope of Work Form" for distribution.
- The project manager is responsible to review this information with project management team and modify (if necessary) to facilitate field operations.

1. Available Information Regarding the Site

		YES	NO	N/A
a.	**Reports/Assessments and other pre-existing information.**			
	Has an Environmental report/Phase I/II report been included with the contract?	☐	☐	☐
	Is the date of the report acceptable? (data current enough to still be utilized?)	☐	☐	☐
	Are there clearly defined conclusions and recommendations?	☐	☐	☐
	A list of clear conclusions and recommendations:			
	Was the Phase I/II assessment completed in accordance with any standards or protocols (i.e. CSA or ASTM)?	☐	☐	☐

Reference Note(s): _____

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 2)
(Used by permission from PCL Construction Services Inc.)

			YES	NO	N/A
b.	**Contract**				
	Does the bid document identify or indicate the presence of any on-site environmental contaminants, pollutants or hazardous waste?		☐	☐	☐
	Reference Note(s): _____				
	Have any environmental enforcement or clean-up actions been initiated by the EPA at or near the proposed projectsite?		☐	☐	☐
	Reference Note(s): _____				
	Is the site on the Government's: • National Contaminated Sites List (Canadian) National Priorities List (US)		☐ ☐	☐ ☐	☐ ☐
	Reference Note(s): _____				
c.	**Document**	***Possible Information Sources:***			
	• Aerial photographs?	Local libraries, private companies, the federal government, certain provincial/state or federal government directories	☐	☐	☐
	Reference Note(s): _____				
	• Property use records?	Insurance companies, municipal, provincial/state or federal government directories	☐	☐	☐
	Reference Note(s): _____				
	• Records of previous ownership, such as title transfer documents?	Provincial/state land registries, title search companies	☐	☐	☐
	Reference Note(s): _____				

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 3)
(Used by permission from PCL Construction Services Inc.)

	Possible Information Sources:	YES	NO	N/A
• Previous environmental assessment reports	Engineering and other firms that have conducted environmental studies at the site	☐	☐	☐

Reference Note(s):_____

• Company records, including site plans, building plans (including as-builts) and permits, production and maintenance records, emergency response or contingency plans, and spill reports?	Internal company files and accounts	☐	☐	☐

Reference Note(s):_____

• Geological and geotechnical reports?	Engineering and other firms that have conducted environmental studies at the site	☐	☐	☐

Reference Note(s):_____

• Environmental permits, orders and charges relating to hazardous material storage, hazardous waste treatment, landfills, and contamination of adjacent sites, and other regulatory documents?	Federal or provincial/state government agencies dealing with waste management, water quality, public health, and environmental planning and protection	☐	☐	☐

Reference Note(s):_____

d. Inspection of the site

Has PCL taken any groundwater, soil, microbial or other samples been taken and analyzed which are not part of any consultants report?	☐	☐	☐
Current uses of the property that may involve hazardous materials?	☐	☐	☐

Reference Note(s):_____

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 4)

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	YES	NO	N/A
Details about hazardous materials and unidentified substances observed on the site?	☐	☐	☐
Reference Note(s):_____			
Evidence of present or former underground or aboveground storage tanks. These indicate a high probability of environmental contamination?	☐	☐	☐
Reference Note(s):_____			
The condition of any storage areas and bins. These can suggest the presence of hazardous materials such as solvents and other chemicals?	☐	☐	☐
Reference Note(s):_____			
The presence of "special attention" items, such as items containing asbestos, CFC's and lead". Transformers and old light ballasts suggest the presence of PCB's, which may have leaked or spilled onto surface soils?	☐	☐	☐
Reference Note(s):_____			
Unusual odors at the site?	☐	☐	☐
Reference Note(s):_____			
Housekeeping practices, indicated by the general maintenance and appearance of a site, and by the condition and tidiness of any buildings, storage or waste-disposal areas?	☐	☐	☐
Reference Note(s):_____			
Is there evidence of any bird or mouse feces (body waste) in any of the buildings proposed work areas?	☐	☐	☐
Reference Note(s):_____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 5)
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		YES	NO	N/A
e.	**Interior Observations:**			
	Type of fuel used in heating and cooling systems?	☐	☐	☐
	Reference Note(s):_____			
	Stains on floors, walls, or ceilings?	☐	☐	☐
	Reference Note(s):_____			
	The location and condition of floor drains and sumps?	☐	☐	☐
	Reference Note(s):_____			
	Interior finishes of buildings, which may include hazardous materials such as asbestos &lead paint?	☐	☐	☐
	Reference Note(s):_____			
	Is there evidence of water damage (i.e. Surface stains, sewer backup markings, broken water line or fire suppression)?	☐	☐	☐
	Reference Note(s):_____			
	Is there any black or greenish-black mold growth present on interior surfaces?	☐	☐	☐
	Reference Note(s):_____			
f.	**Exterior Observations:**			
	The exterior condition of buildings on the property?	☐	☐	☐
	Reference Note(s):_____			
	Natural and artificial surface features (i.e. topography and geology). These features sometimes allow judgments to be made about subsurface conditions, such as direction of groundwater flow and migration of contaminants to or from the site?	☐	☐	☐
	Reference Note(s):_____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 6)
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	YES	NO	N/A
The presence of wells on the site. Those that are not used as sources of water may have been used for contamination assessment or impact studies, disposal of liquid wastes; those that are still in use are potential sources of contaminated water?	☐	☐	☐
Reference Note(s):_____			
Waste-disposal practices, such as disposal of process liquids, sewage and solid waste?	☐	☐	☐
Reference Note(s):_____			
Pits and lagoons used for waste disposal or waste treatment, surface water drainage systems, and wastewater discharge systems?	☐	☐	☐
Reference Note(s):_____			
Surface staining, which can suggest the discharge of waste materials or other causes of soil contamination?	☐	☐	☐
Reference Note(s):_____			
Type and condition of vegetation?	☐	☐	☐
Reference Note(s):_____			
Unusual surface formations and areas of fill. These may contain hazardous or otherwise contaminated materials?	☐	☐	☐
Reference Note(s):_____			
Features of adjacent property that may have a direct influence on the presence and type of contamination at site?	☐	☐	☐
Reference Note(s):_____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 7)
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	YES	NO	N/A
Did the Phase II report include:			
• An executive summary?	☐	☐	☐
• The date of assessment?	☐	☐	☐
• A list of clear conclusions and recommendations?	☐	☐	☐
• Data current enough to still be utilized?	☐	☐	☐
Reference Note(s): _____			
Was the Phase II assessment completed in accordance with any standards or protocols (i.e. CSA or ASTM)?	☐	☐	☐
Reference Note(s): _____			
Were these standards and protocols clearly defined within the Phase II report?	☐	☐	☐
Reference Note(s): _____			
Are existing underground tanks or structures identified on any drawings?	☐	☐	☐
Reference Note(s): _____			

2. Identification of Potential Environmental Risks

Protected Areas?	☐	☐	☐
Reference Note(s): _____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 8)
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3. Identification of Potential Environmental Risks

	YES	NO	N/A
a. Hazardous Materials			
Will be responsible for dealing with any contaminants? If yes, check the following areas of responsibility:			
• Handling?	☐	☐	☐
• Removal?	☐	☐	☐
• Storage?	☐	☐	☐
• Transportation?	☐	☐	☐
• Disposal?	☐	☐	☐
• Monitoring and Sampling?	☐	☐	☐
• Laboratory Analysis?	☐	☐	☐
• Quality Control/Assurance Procedures?	☐	☐	☐
Reference Note(s):_____			
Water related risks Has a dewatering assessment or plan been completed?	☐	☐	☐
Reference Note(s):_____			
b. Environmental Permits			
Who is responsible for acquiring the hazardous waste generator permit: • the client?	☐	☐	☐
	☐	☐	☐
Is there sufficient time for proper acquisition of permits?	☐	☐	☐
Which environmental permits is responsible for?	☐	☐	☐
Reference Note(s):_____			
Noise/dust/emissions	☐	☐	☐
Reference Note(s):_____			

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	YES	NO	N/A
Species at risk/migratory birds Are there any protected, threatened or endangered species in the area?	☐	☐	☐
Reference Note(s):_____			
Other risks Landslides Are there any historical or archaeological concerns on or near the site?	☐ ☐	☐ ☐	☐ ☐
Reference Note(s):_____			

4. : Contractual or Other Legal Liability for Identified Environmental Risks

Are there any clauses addressing unanticipated environmental occurrences?	☐	☐	☐
If yes, check the following items:			
• Is work to be stopped?	☐	☐	☐
• Has the responsibility for dealing with this problem been clearly defined?	☐	☐	☐
• Is there adequate and equitable adjustment available for suspension of work?	☐	☐	☐
• Will change orders be issued for remedial work?	☐	☐	☐
• Will approval time be adequately allowed to facilitate schedule requirements?	☐	☐	☐
Are there provisions for Environmental Liability Release and Indemnity	☐	☐	☐
Reference Note(s):_____			
Does the bid document contain any deviation clauses or information which places undue environmental liability on ? (i.e. to determine the presence and type of environmental contaminants)	☐	☐	☐
Reference Note(s):_____			

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	YES	NO	N/A
Does the contract document expressly state any environmental scope of work requirements?	☐	☐	☐
Reference Note(s): _____			
• Does the contract clearly identify the regulatory requirements?	☐	☐	☐
• If yes, do they coincide with interpretation of regulatory requirements?	☐	☐	☐
• If no, have we clarified requirements with the client?	☐	☐	☐
Reference Note(s): _____			

5. PLOT PLAN AND CONSTRUCTION DRAWINGS:

Are existing underground tanks or structures identified on any drawings?	☐	☐	☐
Reference Note(s): _____			

6. ON-SITE CONSIDERATIONS

Will on-site spill kits be required?	☐	☐	☐
Reference Note(s): _____			
Will containment booms be required?	☐	☐	☐
Reference Note(s): _____			
Will absorbent booms be required?	☐	☐	☐
Reference Note(s): _____			
Will transfer pumps be required?	☐	☐	☐
Reference Note(s): _____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 11)
(Used by permission from PCL Construction Services Inc.)

	YES	NO	N/A
Will containment membranes be required?	☐	☐	☐
Reference Note(s):_____			
Will storage bins be required?	☐	☐	☐
Reference Note(s):_____			
Will spill containment trays be required?	☐	☐	☐
Reference Note(s):_____			
Will spill overpack drums be required?	☐	☐	☐
Reference Note(s):_____			
Will special personal protective and activity isolation equipment be required?	☐	☐	☐
Reference Note(s):_____			

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 12)
(Used by permission from PCL Construction Services Inc.)

7. MISCELLANEOUS CONSIDERATIONS/NOTES (Please specify)

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Exhibit 23-1 Example Project Environmental Planning Checklist (page 13)

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ENVIRONMENTAL RISK EVALUATION AND CONTROL CONSIDERATIONS

Topic or Item

GENERAL CONTRACT CONSIDERATIONS

An extremely important contract consideration is determining the environmental risks associated with the proposed scope of work which in most cases, have accompanying liabilities and costs. The following items have been complied to assist with this evaluation:

Environmental Risk Assessment and Control

HAZARD (definition)
Any object, chemical, material, activity, operation, situation, etc. with the inherent ability to cause harm or adverse impact.

Harms/Adverse Impacts Include:

- Environmental damage
- Occupational or community health and safety
- Adverse financial or operational cost impact
- Increased regulatory agency scrutiny
- Public, client or labor relations image
- Management perception
- Operational or manpower resource impacts
- Regulatory compliance program resource impact
- Civil and criminal liability (and cost of defense)

VULNERABILITY, SUSCEPTIBILITY, OR SEVERITY (Definition)
The vulnerability or susceptibility of the potential "hazard receptor" to harm or adverse impacts, or the severity of these impacts resulting from the particular hazard(s).

Receptors include:

- Public
- Workers (direct hire)
- Trade contractors
- Third Party/Consultants
- Property
- Environment
- Business Operations
- Operating Resources
- Public Image
- Utilities such as storm drains

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Exhibit 23-2 Example Environmental Spill Report
(Used by Permission from PCL Construction Services Inc.)

Collect Environmental/Environmental Spill Facts

COLLECT ENVIRONMENTAL SPILL FACTS

Project Environmental Designate*:	
Name of product/Substance that was spilled/released*:	
Total Quantity Involved:	**Estimated Quantity Spilled/Released:**
Time Spill/Release Started: HH:MM **(AM/PM)**	**Time Spill/Release Stopped:** HH:MM **(AM/PM)**
What caused the spill/release?	
What was affected by the spill/release? (Identify surface area, wetlands, rivers/lakes):	
Describe the measures taken to control the spill/release:	
Weather During Cleanup*: ☐Indoor ☐Overcast ☐Raining ☐Freezing Rain ☐Clear ☐Snowing ☐Foggy ☐Sunny ☐Windy ☐Underground Work ☐Hot/ Humid	
Who was contacted?: District Manager, ☐ District HSE Manager, ☐ ☐ ☐ Government Environmental Protection Agency ☐	
Other Government Agency (Who/When):	

* indicates a mandatory field in the SMC.

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24
PROJECT COMMISSIONING AND TURNOVER

24.1 PURPOSE

Commissioning, closeout, and turnover is the last phase of the construction project life cycle. Commissioning is done to ensure the building systems, equipment, and the overall facility functions correctly. Many construction workers may be assisting with the system startups while some engaged in final clean-up for turnover, and the rest fixing final punch list items. This overlap between the construction and commissioning phase can introduce unique safety challenges to the contractors. The safety of all personnel and the protection of newly installed equipment and systems from damage should be an important consideration during this final phase.

Contractors should ensure that the exposures during this stage are addressed in the Site Specific Safety Plan (SSSP). Below, is a non-exhaustive list of items that the project team should consider during commissioning, closeout, and the final turnover process.

24.2 PROTECTION OF FINISHED PRODUCTS

Most owners expect their final product to be high quality with zero defects and are pushing for zero punch list items. Why should a contractor focus quality in an SSSP? Anecdotal evidence suggests contractors who produce the highest construction quality are also some of the safest contractors. Defective construction work can result in:

- Rework that results in workers performing work in tight or confined places, working on or near live systems, increasing their risks of injuries.
- Products and equipment that could later fail and cause severe injuries and/or property damage.
- Increased construction cost and delays.

Hence, contractors should develop a plan to emphasize quality and a way to protect finished product such as:

- Preventing roof damage with proper roof access and work protocol.
- Protect floors and walls by limiting equipment such as scissor lifts that can cause damage or by putting down plywood or plastic.
- Clean all surfaces so construction dust cannot impede sensitive functions of the vital equipment.
- Emphasize quality during site orientation.

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24.3 PROTECTION OF OWNER'S LIVE SYSTEMS

On many projects, especially industrial facilities, the owner will require the contractor to turn over individual equipment or part of the facility to its control before substantial completion. At this time, construction workers are performing work on or near potentially live systems. This is common in renovation or retrofit work inside existing facilities. How do contractors prevent or minimize impacts to owner's operating facility, services, operations, and personnel? One method is to implement a process called SimOps {Review of Simultaneous Operations}. Simply put, this is a process of hazard analysis identifying a risk when one or more and separate operations are operating or exist in one geographical area within a facility or site. The hazard analysis will identify hazardous scenarios, consequences, hazard controls and responsibilities to ensure operations are conducted and achieved in accordance with the risk factors as low as reasonably practicable.

Each facility presents its unique risks; the contractor should work closely with the client to ensure proper coordination and communication between them to minimize exposure to live energy. A Lock-Out-Tag-Out (LOTO) plan shall be in place and followed to ensure no one is exposed to any live energy including steam, sewer, mechanical, high pressure, electrical, etc. Contractors should develop and implement industry best practices such as "Construction Incident Prevention Plan (CIPP)" or "Facility Incident Prevention Plan (FIPP)" for any work that might pose a potential risk to the owner's personnel and systems.

The CIPP/FIPPs is a communications tool that ensures that all appropriate information has been presented to the owner, and necessary approval has been obtained from the facility's system owners. It helps prevent or minimize incidents and business interruptions. See Exhibit 24-1 for a sample FIPP form. Some examples include:

- Interim Life Safety Measures & Infection Control during Construction in hospitals
- Any work (e.g., excavation) near or around utilities that feed a live operating facility
- Crane work over occupied owner areas
- LOTO plan establishing the competent person
- Any work involving utilities (e.g., electrical) which feeds a live operating facility
- Concrete coring or saw cutting
- Odor producing activities

24.4 OVERLAPPING SAFETY PROGRAMS

Typically the owner will implement a separate facility safety program in place after either full or part of the facility is turned over. Some of the following questions should be considered at this point:

- How will the contractor and the owner manage overlapping safety programs?
- Will owner's staff and commissioning contractors (contracted with the owner) working in contractor controlled areas go through contractor orientation?
- What about owner's staff or building occupants working on or near a system that is still under the contractor's control?
- How will the programs such as hot work permits, energized hot work permits, confined space permits, lockout / tag out permits be managed?

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- Will the construction personnel be required to go through owner's facility orientation?
- What about the PPE requirements in the owner and contractor controlled areas?

24.5 CONCURRENT WORKFORCE

Commissioning and other owner personnel must make themselves familiar with contractor safety procedures when working within contractor controlled areas, and the contractors should be familiar with the owner managed areas. The project team's primary goal should be to assess and control the potential risks to the facility's employees from contractors' activities, and to the contractors' employees from the facility activities.

24.6 WARRANTY WORK

A typical warranty period lasts approximately 12-months from project turnover, and the same safety procedures must be followed when construction workers show up to conduct warranty work. The hazards of the warranty work can be similar to those during construction, commissioning, and turnover.

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Exhibit 24-1: Example Facility Incident Prevention Plan Template

Date submitted:	**Company:**
Requester:	**Phone:**
Supervisor:	**Phone:**
Safety contact:	**Phone:**
Owner contact:	**Phone:**
Location of work (include drawings with grid lines and levels):	
Start date:	**Finish date:**
Start time:	**Finish time:**
Scope of work:	
List all facility systems potentially impacted by the scope of work (Electrical, fire alarms, natural gas, etc.):	
Detailed Job Hazard Analysis performed and attached?	☐ Yes ☐ No
All special permits required have been obtained?	☐ Yes ☐ No
All impacted system owners notified and received approval to proceed?	☐ Yes ☐ No
All issues regarding overlapping safety programs resolved?	☐ Yes ☐ No

OWNER APPROVAL

System Name:	**Owner Name**	**Sign**	**Date**
System Name:	**Owner Name**	**Sign**	**Date**
Approved Date	**From:**	**To:**	

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25
PROJECT SAFETY RECORDS MANAGEMENT

25.1 PURPOSE

Every construction company should establish a written record retention policy that should be applied consistently to the records of their projects. Safety records should be an integral component of this policy. Failure to maintain records required by law could subject a firm to penalties and fines, or other legal consequences. Some companies might be concerned that site records might be used against them when responding to lawsuits. However, proper record retention practices can also protect them from lawsuits brought against them, by helping prove that they did their due diligence to protect their workers and the members of the public.

Note: Construction companies should consult their attorneys, and review all local, state, and federal government record retention requirements before finalizing their safety record retention procedures.

This chapter offers site safety records retention guidance for construction firms. The guidance provided in this section is not a legal advice.

25.2 RECORDS RETENTION POLICY

When developing a record retention policy, the following questions should be considered.

1. What records should be retained?
2. How long the records should be retained?
3. Should the record retention requirements be included in the construction contracts?
4. In what form should the records be stored?
5. How will the records generated by each project archived? Who will be in charge to oversee the archiving process? Where will it be stored?
6. Is the company storage facility secure?
7. How will the records be disposed of at the end of required retention time?

25.3 TYPES OF RECORDS

At a minimum, the project safety records should include the following materials (depending upon the terms of the contract other project safety records may be necessary). Remember any of these records could be read in courts in a lawsuit situation, so contractors have to make sure the records are accurate and credible with only "facts."

25.3.1 Employee Records

These records will help when responding to lawsuits relating to workplace injuries and discrimination/harassment lawsuits.

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- o New employee orientation checklist
- o Drug and alcohol testing-related forms
- o Employee training records
- o Employee injury records
- o Employee disciplinary records
- o Employment records (timesheet / payroll records)
- o Exposure records – Division of Occupational Safety and Health (DOSH) required workplace health exposure records and medical records, retained for the duration required by DOSH.
- o Medical records – if employees underwent any medical treatment at the onsite medical facility (e.g., nurse station).

25.3.2 Government-Records

Many government regulatory agencies require employers to maintain certain records for a specified period. For example, OSHA's Recordkeeping regulation requires employers to prepare and maintain records of serious occupational injuries and illnesses, using the OSHA 300 Log. Similarly, DOSH requires employers to maintain medical evaluation records for the duration of employment plus thirty years. Hence, construction employers should review all regulatory requirements they are subject and comply with their recordkeeping and retention requirements.

- o DOSH/WAC codes (version during the project duration)
- o OSHA 300 Log and OSHA 300A summary page
- o DOSH consultation reports if any
- o DOSH inspection records
- o DOSH citations and notices
- o Other government agency inspection records and any resultant citations

25.3.3 Accident Investigation Package

Accident-related records for all injuries, incidents, and illnesses, involving employees, visitors, and the public. The package should include incident reports, witness statements, pictures, handwritten notes used by the investigators, recommendations, and any follow-up on the recommendations. All evidence (paper, photos, pictures, and physical) collected as part of the investigation process should be properly archived.

25.3.4 Safety Meetings

All safety meeting related records such as agenda, meeting minutes, and sign-up sheets. A few examples of safety meetings include:

- o Project overall mass-safety meetings
- o Safety personnel meetings
- o Toolbox meetings

25.3.5 Safety Inspections

Records related to site safety inspections performed by insurance consultants, project owners, subcontractors; equipment related inspections, tool inspections (ladders, slings, fall protection, etc.), en-

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vironmental inspections and reports, etc. Ensure all safety hazards and issues identified during these inspections were fixed and documented accordingly.

25.3.6 Meeting Minutes

Most site meetings discuss safety issues/updates as the first agenda item. Hence, it is critical to store all meeting minutes including:

- Subcontractor weekly coordination meetings
- Daily foremen meetings
- Pre-bid meetings
- Pre-award meetings
- Pre-construction meetings
- Any other meetings where safety was discussed

25.3.7 Safety Planning Related Documents

General Contractor's Site Specific Safety Plan (SSSP) & all documents generated as a result of the SSSP requirements. For example, the SSSP might require hot work permits, confined space permits, crane critical lift plans, etc. All these documents should be retained.

- SSSPs of all Subcontractors and its tiers
- All project Job Hazard Analysis (JHA)
- All project Pre-task Plan (PTP)
- Air / noise monitoring results
- Hazardous waste manifests
- Hazard communication program / SDS for each job

25.3.8 Project Safety Correspondence

All safety related correspondence (E-mails, memos, letters, notes of telephone conversations, etc.) between the general contractor and owner, general contractor and architect/engineer (A/E), general contractor and subcontractors, etc.

25.3.9 Contract Documents

- Safety pre-qualification documents
- Contract drawings
- Contract Specifications
- Contracts between owner and general contractor
- Contracts between the general contractor and subcontractors
- Documentation of any changes to your contract

25.3.10 Daily Work Record (DWR) / Job Diaries

A DWR documents the contractor name, work description, work location, equipment involved, crafts names and hours worked, visitor information, any construction related issues, safety meetings attended or inspections participated, accidents on the project and any other information pertinent to the work. All contractors performing work on the job site should complete a DWR. The DWRs has provided valuable evidence during contractual disputes and legal actions.

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25.4 RECORD RETENTION DURATION

The minimum retention period for project-related safety records will be governed by:

- Regulatory requirements specified by government agencies such as DOSH, Mine Safety and Health Administration (MSHA), Environmental Protection Agency (EPA), Department of Transportation (DOT) recordkeeping requirements, and also by other applicable legal (law) requirements.
- Terms of the contractual requirements.
- The Statute of Repose/Statute of Limitations in the state where the project was completed. For example in Washington State, the statute of limitations for filing a personal injury lawsuit is three years, and it is two years in Oregon. The firm should consider these factors when deciding how long to store their records.

25.5 RECORD RETENTION IN CONTRACTS

All contracts generated as part of the project (contracts between the owner and general contractor, and contracts between general contractor and subcontractors) should clearly state the documents to be archived/retained as part of the project.

25.6 STORAGE

Construction projects generate both electronic and paper records. Some companies are incorporating modern technologies such as smartphone apps to perform safety inspections, site exposure assessments and conduct pre-task planning meetings. They also use learning management systems to manage training and store related records. However, construction projects still generate lots of paper records, and contractors should plan on storing both paper and electronic records. Separate policies should be developed to addresses both these formats.

25.7 ARCHIVE

Every project typically has an office manager who is designated as the keeper of the records. At the end of the project, the office manager should work with all major disciplines within the project such as payroll, cost, schedule, contract, safety, etc., to archive records generated in each area. Usually, each discipline should be coded, and records are stored in boxes and transported to a remote storage facility. For example, safety might be coded as "1" and safety-related documents might be archived in boxes 1-1, 1-2, 1-3, etc. See example project safety filing system provided in Exhibit 25-1.

It is critical to protect the paper records from risks such as water damage, fire damage, vandalism or theft. Some firms have built or rented a storage warehouse with a rack system, and use large archive boxes to store paper documents. These buildings are secured and are protected against fire and water damages.

All project-related electronic records should be stored online in a secure manner in multiple locations. The company's Information Technology (IT) professionals should able to assist with the safe and secure (password protection) storage of electronic records. All electronic mails (E-mail) should be saved either in hard copy or downloaded as a computer file. In addition, some companies convert paper records into electronic format using scanning, so they are stored forever.

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Individual employee records are governed by privacy laws such as HIPPA. These include OSHA 300 logs, drug and alcohol testing records, and medical records. These records should not be accessible to unauthorized personnel.

25.8 DISPOSAL

A large high-rise building project, depending on specific requirements, might generate thousands of documents. These documents take up a lot of storage space. Hence, it is critical to determine the life of each document and come up with ways to dispose of them at the end-of-life. Before destroying any project-related documents, it is advisable to seek legal counsel.

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Exhibit 25-1: Example Safety and Health Filing System

(Used by permission from BNBuilders)

Administration

A. Warning / Dismissal Notices

- Project Health & Safety Committee Meeting Minutes
- Health & Safety Correspondence
- Incident Reports Log
- Corporate Health & Safety Committee Memos
- Operating Group Safety Committee Memos
- Visitor Sign-In Sheets

BNBuilders Manuals

B. Zero Injury Training Manual

- Mobile Crane Training Manual
- Crisis Management Manual
- Site Specific Safety Manual
- Hazard Communications Manual
- SDS's
- Safety Supplies Catalog
- Substance Abuse Policy Booklets
- Project Incentive Program
- Safety Orientation Booklet
- Disruption Avoidance Plans (If Applicable)

Subcontractor Manuals

C. Subcontractor Site Specific Safety Manual

D. Subcontractor SDS's

- Workers Comp. / Insurance
- DWC Form 1 (Blank)
- W/C Reporting Forms (Blank)
- First Incident Reports (Blank)
- Incident Investigation Forms (Blank)
- Completed Incident Reports (Shall include completed copies of all forms noted above and subsequent documents relating to the incident.)

E. DOSH

- OSHA 300 Logs
- Consultation Visits
- Inspections / Citations
- Construction / Excavation / Scaffold Permits
- Tower Crane Submittal and Permit to Operate
- Man/Material Hoist Permit and Inspections Records

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F. Training

- Orientation Records
- Safety Meetings
- Subcontractor Safety Meetings
- Employee Training Records
- Re-Training Records

G. Loss Control

- Jobsite Audits
- Insurance Co. Audits
- PAHA's
- Pre-Task Planning Cards
- Pre-Construction Meeting Minutes
- Scaffold Inspections (If Applicable)
- Confined Space Permits (If Applicable)
- Excavation Inspections (If Applicable)
- Equipment and Scaffold Waivers

H. Medical

- Medical Provider / Clinic Information
- Chain of Custody Forms
- Prescription Eyewear Program
- Respirator Physical
- Respirator Fit Test Records

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