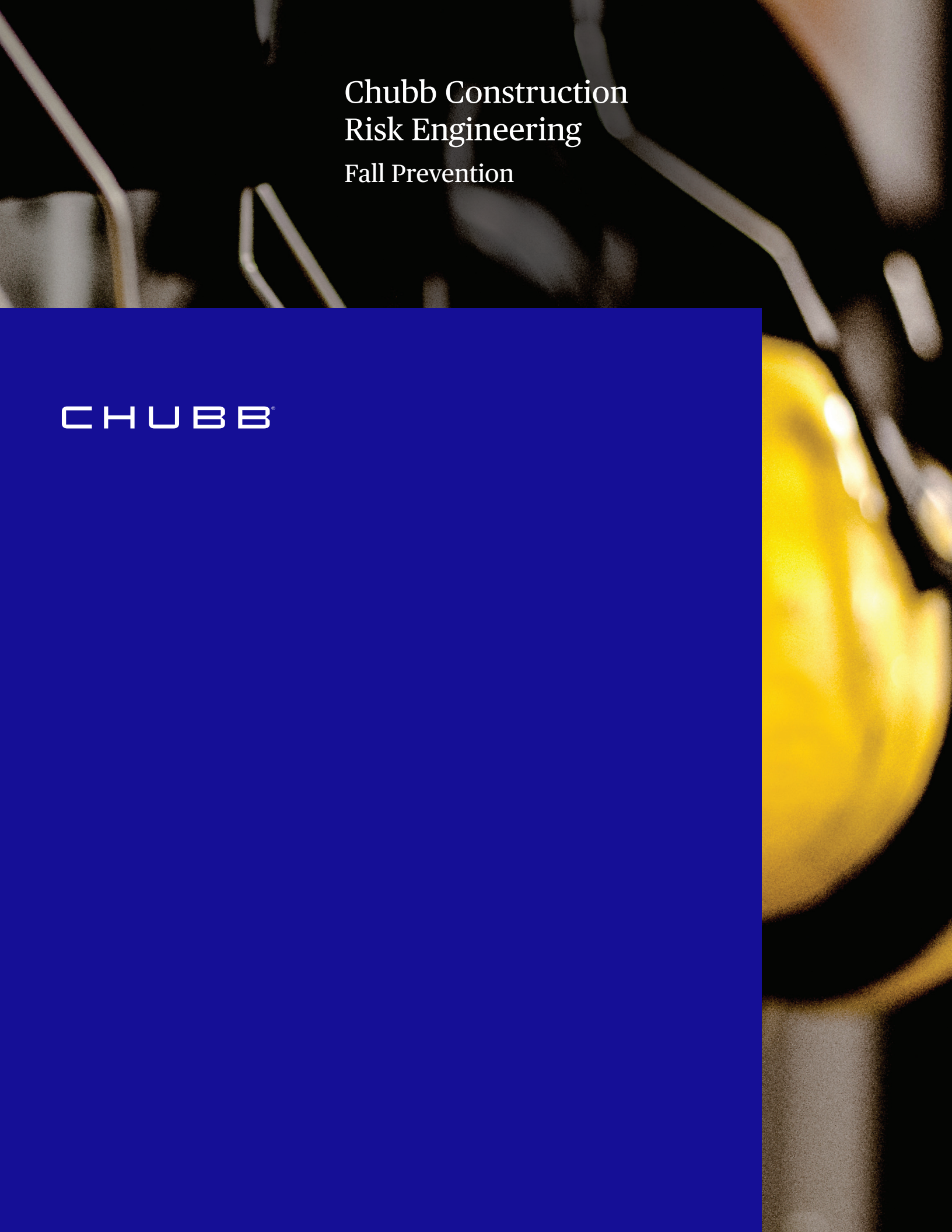

Chubb Construction Risk Engineering

Fall Prevention

CHUBB®

Fall Prevention

Overview

Overview

Introduction

In the construction industry, falls are the leading cause of worker fatalities.

[1]Out of 5,147 worker fatalities in private industry in calendar year 2017, 971 or 19% were in construction. The leading causes of worker deaths on construction sites were falls. Of the 971 construction fatalities in 2017; 386 resulted from falls. The 386 fall-related fatalities account for 40% of all construction worker fatalities in 2017.

The statistics noted above are both alarming and unacceptable in this day and age. With the heightened awareness regarding the importance of safety on construction sites, along with the advances in personal fall protection systems, the statistics noted above are discouraging. The construction industry, again in 2017, had the highest number of fatalities in all industry according to the 2017 Census of Fatal Occupational Injuries from the Bureau of Labor Statistics. Construction workers deserve to work in an industry that is one of the safest, not one of the deadliest industries in this country.

Duty for Fall Protection. Employers are required to determine if the walking/working surfaces on which employees are to work have the strength and structural integrity to safely support workers. Once employers have determined that the surface is safe for employees to work on, the employer must select one of the options listed for the work operation if a fall hazard is present. For example, if an employee is exposed to falling six feet or more from an unprotected side or edge, the employer must select either; guardrail system, safety net system, or personal fall arrest system to protect the worker.

Best Practices for Fall Management

- **100%:** 100 percent fall management program for all trades/operations (including steel erection). Fall management program should include: pre-job planning, roles and responsibilities, accountability, retrieval procedures and training of personnel and review and investigation of all fall related incidents and near misses.
- **Six feet:** Activities involving work at elevations six feet and greater are pre-planned and safety engineered into activity (Job Safety Task Analysis). Contractors may want to consider more aggressive requirements such as 4 feet to further control the potential for falls on their job sites.
- **Discipline:** Progressive discipline program in place (first violation suspension from work for one week, second violation suspension for one month, third violation employee fired)
- **Job Safety Task Analysis (JSTA):** JSTA is reviewed with crew performing work prior to start of operation. Documented and signed. Subcontractors are contractually required to submit a JSTA prior to start of an operation. The JSTA must be submitted and reviewed with the GC/CM prior to starting work.
- **Subs:** Subcontractors engaged in work resulting in fall exposures six feet and greater must adhere to 100 percent fall management program requirements. This is clearly stated in subcontract agreements/contracts.
- **Coordinator:** Contractor has a fall management coordinator to oversee the development and implementation of the program and training. Fall management coordinator conducts audits of work sites to determine the effectiveness of controls and training.
- **Stop:** Full-time safety representative on site has the authority to stop an operation due to lack of compliance.
- **Participate:** All employees including subcontractor employees are required to participate in fall management orientation training on each project.
- **Accountability:** Field management personal are responsible for daily compliance with the fall management program. Field management personnel are held accountable for the safety performance of their respective projects. Safety performance of the project is tied to management's compensation.
- **Job Safety Task Analysis:** This is a way to evaluate the hazards of a job before they occur. Supervisors can use the findings of a JSTA to eliminate and prevent hazards in their workplaces. This analysis can also be a valuable tool for training new employees in the steps required to perform their jobs safely. Every job can be broken down into job tasks or steps. Watch the employee perform the job and list each step as the worker takes it. Be sure to record enough information to describe each job action without getting overly detailed. Avoid making the breakdown of steps so detailed that it becomes unnecessarily long or so broad that it does not include basic steps. When developing a JSTA, you'll need to ask the following questions:
  - What can go wrong? If a fall occurs, the worker could strike an adjacent column, or possibly a lower level due to the swing fall created.
  - What are the consequences? The worker could receive severe injuries as a result of the fall and subsequently hitting the column, lower level or both.
  - How could it happen? The accident could happen as a result of the worker locating the fall arrest anchorage (retractable lanyard) in an improper location that requires movement to a distant work position creating the swing fall.

- What are other contributing factors? Due to the configuration of the steel, work must take place in multiple locations within the columns to complete steel connections. There are two workers using separate retractable lanyards in this work area that may become tangled.
- How likely is it that the hazard will occur? It is highly likely that a swing fall hazard can be created when working in this environment if the placement of overhead anchor points (retractable lanyards) is not preplanned and coordinated.
  To reduce the risk of accidents due to falls, employers and employees can to do the following:
  - Required Competent and/or Qualified persons are assigned and where protection is required, fall protection systems appropriate for given situations are selected
  - Fall protection systems are properly constructed and installed
  - Monitor and supervise employees and operations routinely
  - Always use safe work procedures and engineering controls first
  - Train workers in the proper selection, use, and maintenance of all protection systems and re-train as necessary

Fall Protection

Basic Requirements

- **Controlled Access Zones:** A Controlled Access Zone is a work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems; guardrail, personal arrest or safety net to protect the employees working in the zone. Controlled Access Zones are used to keep out workers other than those authorized to enter work areas from which guardrails have been removed. Where there are no guardrails, masons are the only workers allowed in controlled access zones.
- **Excavations:** Each employee at the edge of an excavation six feet or more deep shall be protected from falling by guardrail systems, fences, barricades, or covers when the excavation cannot be readily seen. Where walkways are provided to permit employees to cross over excavations, guardrails are required on the walkway if it is six feet or more above lower levels.
- **Formwork and Reinforcing Steel:** For employees, while moving vertically and/or horizontally on the vertical face of rebar assemblies built in place, fall protection is not required when employees are moving. OSHA considers the multiple hand holds and foot holds on rebar assemblies as providing similar protection as that provided by a fixed ladder; consequently, no fall protection is necessary while moving point to point for heights below 24 feet. An employee must be provided with fall protection when climbing or otherwise moving at a height more than 24 feet, the same as for fixed ladders.
- **Hoist Areas:** Each employee in a hoist area shall be protected from falling six feet or more by guardrail systems or personal fall arrest systems. If guardrail systems (or chain gate or guardrail) or portions thereof must be removed to facilitate hoisting operations, as during the landing of materials, and a worker must lean through the access opening or out over the edge of the access opening to receive or guide equipment and materials, that employee must be protected by a personal fall arrest system.
- **Holes:** Personal fall arrest systems, covers, or guardrail systems shall be erected around holes (including skylights) that are more than six feet above lower levels.
- **Leading Edges:** Each employee who is constructing a leading edge six feet or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems. If the employer can demonstrate that it is infeasible or creates a greater hazard to implement these systems, he or she must develop and implement a fall protection plan that meets the requirements of 29 CFR 1926.502(k).
- **Overhand Bricklaying and Related Work:** Each employee performing overhand bricklaying and related work six feet or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems, or shall work in a controlled access zone. All employees reaching more than 10 inches (25 cm) below the level of a walking/working surface on which they are working shall be protected by a guardrail system, safety net system, or personal fall arrest system.
- **Precast Concrete Erection:** Each employee who is six feet or more above lower levels while erecting precast concrete members and related operations such as grouting of precast concrete members shall be protected by guardrail systems, safety net systems, or personal fall arrest systems. Where the employer can demonstrate, however, that it is infeasible or creates a greater hazard to use those systems, the employer must develop and implement a fall protection plan that meets the requirements of 29 CFR 1926.502(k).
- **Ramps, Runways, and Other Walkways:** Each employee using ramps, runways, and other walkways shall be protected from falling six feet or more by guardrail systems.
- **Residential Construction:** In 2013, OSHA issued a directive rescinding the Interim Fall Protection Compliance Guidelines for Residential Construction (STD 03-00-001). Each employee

engaged in Residential Construction activities six feet or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system. If the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of 1926.502(k).

- **Roofing:**
  - Low-slope Roofs: Each employee engaged in roofing activities on low-slope roofs with unprotected sides and edges six feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of a warning line system and guardrail system, warning line system and safety net system, warning line system and personal fall arrest system, or warning line system and safety monitoring system. On roofs 50 feet or less in width, the use of a safety monitoring system without a warning line system is permitted.
  - Steep Roofs: Each employee on a steep roof with unprotected sides and edges six feet or more above lower levels shall be protected by guardrail systems with toe boards, safety net systems, or personal fall arrest systems.
  - Wall Openings: Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is six feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface must be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

ABCDs of Fall Arrest[2]

A – Anchorage
Anchorage means a secure point of attachment (structure) for the fall arrest system. The type of anchorage varies with the industry, the job being performed, the type of installation and most importantly the structure available. Anchorage connectors provide a means of attaching the system to the anchorage.

B – Body Support
Full body harnesses provide a connection point on the worker for the personal fall arrest system. Depending upon the application, they can be used as part of a system to protect the worker from falling and to limit the extent of potential injury in case of a fall.

C – Connectors
Connectors are devices used to connect the worker's full body harness to the Anchor system. Connectors include lanyards, snap-hooks, carabiners, deceleration devices and specialty systems such as self-retracting lifelines, ladder climbing systems, vertical lifelines and rope grabs as well as horizontal lifeline.

D – Descent and Rescue
Rescue, the retrieval of a fallen worker or the self-rescue of workers, is a necessary part of a fall protection program. OSHA requires that where a worker is exposed to the risk of a fall, a rescue plan must be in place for the self-rescue or retrieval of that fallen worker.

Eight-Step Fall Protection Plan

A well-designed, written plan is highly recommended and may show that an employer is making an effort to comply with mandated regulations. It can help prevent against the economic consequences of an incident including fines, liability and increased insurance costs. Most important, it may reduce worker risk and possibly saves lives. OSHA 1926.502(k) states that the Fall Protection Plan must be developed by a qualified person, must be specific for each site and kept up to date. A copy of the plan must be kept on site, and only a qualified person may make changes to the plan.

- STEP 1: Perform a hazard analysis to determine areas of risk.
- STEP 2: Wherever possible, engineer out the hazard.
- STEP 3: Wherever possible, implement fall prevention systems such as guardrails, handrails, and warning lines.
- STEP 4: Select appropriate fall arrest equipment for your site and personnel.
- STEP 5: Use expert analysis to determine and install appropriate anchorages, along with any necessary horizontal and vertical equipment.
- STEP 6: Determine equipment required to cover reasonably likely rescue contingencies.
- STEP 7: Establish a comprehensive training program on all aspects of Fall Protection and Rescue.
- STEP 8: Document the Plan. A Fall Prevention Plan should include a statement of policy, a description of fall prevention measures implemented, delegation of ongoing responsibilities in the areas of inspection, record keeping, maintenance, equipment replacement, incident reporting, enforcement, accident investigation, training and changes to the plan.

Anchorage Systems[2]

Basics

Anchorage points for fall arrest need to support 5,000 pounds per person attached (see below for horizontal lifeline considerations)

- Different anchorage requirements for fall restraint and positioning systems
- Anchorages for work positioning must meet a minimum strength requirement of 3,000 pounds or at least twice the potential impact load of an employee's fall whichever is greater.

- Anchorages should be located directly above your work area.
- If an anchorage is used regularly, get it certified.
- Clearly identify anchorages used for fall protection only.
- Don't use water pipes, electrical conduits, light fixtures or guardrails.
- Ensure there is LESS than 45 degrees between sling ends.
- Protect yourself from a fall even while you are installing the anchorage system.
- Horizontal Lifeline anchorages are different than individual points used for fall arrest. It is important that you consult an engineer as they must be designed, installed and used under supervision of a Qualified Person and maintains a safety factor of at least two.
- Inspect your anchorages and anchorage connectors.

Anchorages can be defined as secure points or structure to attach an anchorage connector (anchor), lifeline, lanyard, deceleration, and or any other fall arrest or rescue system. Some examples of typical anchorages include:

- Structural steel members
- Pre-cast concrete beams, and
- Wooden trusses

In most situations, when setting up an anchorage system, an anchorage connector will be required. This piece of equipment is used as a safe means of attachment for the lanyard or lifeline to the anchorage. Some types include, cable and synthetic slings, roof anchors, and beam clamps.

Impact Force[2]

The impact force, or maximum arrest force (MAF), can be defined as the maximum dynamic load that results from immediately stopping a worker's fall. The impact force is reliant upon the workers weight, freefall distance, and the amount of energy that is dissipated by the system (i.e. the amount of give or stretch in the system). It is this expected or calculated impact force that affects the strength requirements of the fall protection system components, including the anchorage.

Note: Typically, the impact force resulting from the free fall of a 220 pound steel test weight will be as follows:

- Rope Lanyard 2,500 lbs.
- Web Lanyard 4,000 to 5,000 lbs.
- Cable Lanyard (6" free fall) 3,600 to 4,000 lbs.

Strength Requirements for Anchorage[2]

Fall Arrest Systems:

Anchorages used for fall arrest must be capable of supporting a static load of 5,000 pounds for every worker connected to the anchorage, unless engineering certification exists. Anchorages that have been certified by a qualified person must still maintain a safety factor of at least 2:1, when the entire fall arrest system is designed, installed and used under the supervision of a qualified person.

Fall Restraint and Work Positioning Systems:

Fall Restraint Systems

In a properly designed fall restraint system, the worker is not permitted to fall from the work platform, so the impact force is a result of the worker leaning or stumbling into the system. It is recommended that a nonengineered fall restraint anchorage be capable of supporting at least 800 pounds.

Note: The greatest concern with the use of any fall restraint system is that if it is not used correctly, a fall may occur. If there is ever any question of a potential fall while using a fall restraint system, it is recommended that the requirements of the fall arrest anchorage be used (i.e. 5,000 lbs.).

Work Positioning Systems

Work positioning systems should alwaysbe backed up by a secondary fall arrest system. When they are used alone (e.g. under 24 feet on a form or rebar wall, or utility pole climbing) the system shall be rigged such that the worker cannot free fall more than two feet (0.9 m). In these cases the work positioning anchorage must be capable of supporting a minimum of 3,000 lbs. (13.3 kN), or twice the potential impact load, whichever is greater.

Certified vs. Uncertified Anchorages[2]

There are two classes of anchorages:

- Certified (Engineered)
- Non-Certified (Improvised)

Certified Anchorages

Engineered anchorages have both been designed and certified specifically for fall protection, or may be existing structures that have been tested, evaluated, and or approved for use. All engineered anchorages must be certified by a qualified person (preferably a professional engineer familiar with fall protection requirements). Certified anchorages may be permanent or portable. All certified anchorages should be identified with paint or special markings to ensure that they are only used for their intended purpose. Furthermore, once a certified anchorage is installed or identified, it should be added to a location list. This list should be maintained and the information kept by a competent person. The record describes the anchorage whereabouts and any additional relevant information. When possible, a regularly used anchorage should be certified to remove any doubt as to its intended use and suitability for fall protection.

Non-Certified Anchorages

It is not always feasible or practical to engineer or certify all anchorages used on a site. As a result, non-certified or improvised anchorages will be used.

Improvised anchorages (or temporary anchorages), include existing beams, trusses or other suitably strong structures located throughout a job site that are not formally certified. Workers using improvised anchorages must be thoroughly trained in their use and proper identification. Inappropriate anchorages may include, water and other fluid carrying pipes, electrical conduits, guardrails, and catwalk grating or mesh. If there is any uncertainty as to the strength or state of an improvised anchorage, it should not be used until inspected and approved by a competent or qualified person.

Anchorage Connectors[2]

There are various types of anchorage connectors that can be used with either certified or improvised anchorages. The purpose of an anchorage connector is to provide a connection point onto the anchorage (structure or secure point) in order to attach the rest of the fall arrest system. While there is a wide variety of anchorage connectors one very common type is the web or cable sling. Slings come in a number of different configurations and sizes depending uponthe requirements of the worker using the system.

All slings must meet a minimum breaking strength of 5,000 pounds. When using slings it must be noted that depending upon the method of attachment, the sling has different rated capacities. For example, the use of a sling in “choker” or “girth” hitch, where one end of the sling passes through the other end can reduce the strength of the sling by up to 66 percent as compared to the same sling being used in a basket configuration.

Furthermore, it important to ensure that the sling is long enough to entirely encircle the anchorage with room to spare. A sling that is too short can multiply the load due to the large angle that is created between the two sling ends; there should not be more than 45 degrees between the two legs of the sling.

While slings are a very common and often practical form of anchorage connector it is important to ensure that compatible hardware is used with the sling. If a carabiner is used to connect the two sling ends then that carabiner must be connected directly to your connecting means (i.e.: directly to a self-retracting lifeline). It is not recommended that a snap hook be connected to a carabiner due to the possibility of cross gate loading or forced rollout.

There are many other anchorage connectors that are available for use in fall protection. Some include permanent and temporary roof anchors, beam clamps, eye bolts, rail sliders, trolleys, and shepherd’s hooks. It is most important that all manufacturers’ directions be followed when using anchorage connectors.

Important Considerations

- The anchorage should be located directly above the work area to minimize swing falls. A swing fall is a pendulum type motion created by the worker falling back toward an anchorage that is not directly over his/her head.
- The free fall distance should be minimized by locating the anchor system as high as possible. A common practice is to ensure that the anchorage is located at or above your shoulder.
- Anchorages must also be chosen for ease of use and safe access, ensuring that the worker is not exposed to a fall hazard while attempting to set up the anchor system. This can be accomplished by choosing a location for the anchorage beside a protected catwalk or by using a “first man up” system to install the anchorage connector easily and safely. Locating the anchorage for ease of rescue is also an important factor to consider.
- When slings are used, the anchorages should be free from sharp edges; this would also include any edges that the sling may come in contact with during a fall. If this is not possible a wear pad must be used.
- All components of the anchorage system should be inspected prior to each use, as well as on a regular basis by a competent or qualified person.
- A temporary anchorage must be able to withstand 5,000 lbs. If certified by a qualified person will be 5,000 lbs. or two times the expected load applied to the system in the direction that the force of the fall will be applied, and should be separate from the anchorage used for work positioning or supporting the workers weight.

Horizontal Lifeline Anchors[2]

The requirements for a single fall arrest anchorage should not be confused with the strength requirements of the two anchorages needed for a Horizontal Lifeline which can be well over 10,000 pounds in some situations.

There are a great number of factors involved in resolving the necessary strengths of anchorages for horizontal lifelines. Some include, pretension in the lifeline, number of workers using the system, diameter and material used for the lifeline, and its overall length. Some horizontal lifeline systems have in-line energy absorbers installed to reduce the overall forces in the system. Due to the increased load requirements for calculating of horizontal lifeline anchorages, design and installation must be by and under the supervision of a qualified person.

Note: All horizontal lifeline systems should be designed by a professional engineer who has experience with their design, and maintains a factor of safety of at least two.

Rescue[2]

- Rescue is a necessary component of any fall protection program.
- Rescue personnel sustain more than 75 percent of the injuries resulting from rescue.
- The simplest form of rescue should always be the first (i.e. man lifts, ladders etc.)

- In-house rescue teams must be properly trained and practice regularly.
- Wherever feasible start the rescue from the ground up, it's always better to find out the anchor will not hold at ground level. Self-rescue should always be available when a lone worker can be stranded.
- A raising and lowering system used for rescue or non-emergency work must be backed up with a fall arrest system.

Rescue, although often overlooked, is a critical component of any fall protection program. Even though rescue budgets are being severely reduced, there is now a greater need than ever for a site to maintain the capability to perform a safe and efficient rescue. A common misconception is that because fall protection programs are being implemented the site will no longer have a need for rescue. In the past, workers were left to their skills to prevent a fall and rescue was not a big issue.

Today, rescue plans are an important part of the training and safety precautions and should be in place well before a fall can even occur.

Keep it Simple[2]

High angle rescue operations may be conducted in several ways. The typical "Hollywood style" rescue, while exciting and adrenaline inducing, can be dangerous and is often not necessary. Rescue personnel sustain most injuries because they often panic and overlook important aspects of their training. Pressure can be a great motivator for some, but can cause others to fall apart. As a result, the rescue should be as simple and as safe as possible, putting the fewest workers at risk.

If a fallen worker can be accessed using a scissors lift, bucket truck, or extension ladder, then one of these methods should be used. When simple and practical procedures are used, there is a much larger margin of safety. Industrial sites may also rely on the local fire department to perform high angle and confined space emergency rescues. If the 911 system is incorporated into the rescue plan, then the abilities, limitations, and response time of the Rescue Professionals should be confirmed. Their capabilities should never be taken for granted.

The National Fire Academy teaches the following statement: "Risk nothing to save nothing; Risk a little to save a little; Risk a lot to save a lot." Risk should not have to be a part of rescue. Protect yourself even when involved in a rescue!

Suspension Trauma/ Orthostatic Intolerance[3]

Orthostatic intolerance may be defined as "the development of symptoms such as light-headedness, palpitations, tremulousness, poor concentration, fatigue, nausea, dizziness, headache, sweating, weakness and occasionally fainting during upright standing." While in a sedentary position, blood can accumulate in the veins. This is commonly called "venous pooling," and can cause orthostatic intolerance, which can occur when one moves suddenly after being sedentary for a long time. For example, a person may experience orthostatic intolerance when they stand up quickly after sitting still for a long time.

A well-known example of orthostatic intolerance is that of a soldier who faints while standing at attention for a long period of time. The moment the soldier loses consciousness, he or she collapses into a horizontal position. With the legs, heart, and brain on the same level, blood is returned to the heart. Assuming no injuries are caused during the collapse, the individual will quickly regain consciousness and recovery is likely to be rapid.

Venous pooling typically occurs in the legs due to the force of gravity and a lack of movement. Some venous pooling occurs naturally when a person is standing. In the veins, blood normally is moved back to the heart through one-way valves using the normal muscular action associated with limb movement. If the legs are immobile, then these "muscle pumps" do not operate effectively, and blood can accumulate. Since veins can expand, a large volume of blood may accumulate in the veins.

An accumulation of blood in the legs reduces the amount of blood in circulation. The body reacts to this reduction by speeding up the heart rate in an attempt to maintain sufficient blood flow to the brain. If the blood supply is significantly reduced, this reaction will not be effective. The body will abruptly slow the heart rate and blood pressure will diminish in the arteries. During severe venous pooling, the reduction in quantity and/or quality (oxygen content) of blood flowing to the brain causes fainting. This reduction also can have an effect on other vital organs, such as the kidneys. The kidneys are very sensitive to blood oxygen, and renal failure can occur with excessive venous pooling. If these conditions continue, they potentially may be fatal.

Conclusions and Recommendations for Rescue[3]

Prolonged suspension from fall arrest systems can cause orthostatic intolerance, which can result in serious physical injury or death. Research indicates that suspension in a fall arrest device can result in unconsciousness followed by death, in under 30 minutes. To reduce the risk associated with prolonged suspension in fall arrest systems, plans to prevent prolonged suspension should be implemented. The plan should include procedures for: preventing prolonged suspension, identifying orthostatic intolerance signs and symptoms, and performing rescue and treatment as quickly as possible.

OSHA recommends the following general practices/considerations:

- Rescue suspended workers as quickly as possible.

- Be aware that suspended workers are at risk of orthostatic intolerance and suspension trauma.
- Be aware of signs and symptoms of orthostatic intolerance.
- Be aware that orthostatic intolerance is potentially life threatening. Suspended workers with head injuries or who are unconscious are particularly at risk.
- Be aware of factors that can increase the risk of suspension trauma.
- Be aware that some authorities advise against moving the rescued workers to a horizontal position too quickly. Employers must provide a training program that teaches employees who might be exposed to fall hazards how to recognize such hazards and how to minimize them.

Contractors whose operations require workers to work at height should become familiar with and stay current on evolving technology and available products that can be used to make their work safer and that may provide options when determining types of protection and rescue.

For example, Miller, a leading Fall Protection equipment manufacturer sells a product called The Miller Relief Step Safety Device. This device is attached to the worker's full-body harness and designed to allow the worker to release and step into a stirrup type strap to alleviate the effects of orthostatic intolerance, also known as suspension trauma. Miller states:[4]

When used, the Relief Step Safety Device provides support and enhances blood circulation until rescue – permitting the ability to move and flex leg muscles.

- Small and lightweight; the Relief Step Safety Device attaches to any brand full-body harness
- Utilizing two (2) Relief Steps (one for each leg/foot) assures greater comfort until rescue is completed

Training

Employees should be trained in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
- The use and operation of controlled access zones and guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems; The role of each employee in the safety monitoring system when the system is in use;
- The limitations on the use of mechanical equipment during the performance of roofing work on lowsloped roofs;
- The correct procedures for equipment and materials handling and storage and the erection of overhead protection; and,
- Employees' role in fall protection plans. Employers prepare a written certification that identifies the employee trained and the date of the training. The employer or trainer should sign the certification record. Retraining also must be provided when necessary.

Fall Protections and Multi-Employer Sites

Contractors can be performing multiple roles on a worksite. A controlling, creating, or correcting contractor/employer (see next section) is often an exposing contractor/employer and exposing, controlling, and a creating contractor/employer can be a correcting employer if they are authorized to remedy the hazard.

The two-step process for evaluating whether more than one employer is to be cited includes:

- What type of employer the contractor is and their role in the project. Remember, one contractor may be performing several roles.
- Determining if the employer's actions meet the responsibilities of the employer type.

Multi-employer liabilities arise not only in the regulatory area but also civilly. Any contractor meeting the definition of a creating, exposing, correcting or controlling employer may also be subject to a lawsuit for damages by an injured worker.

Types of Employers

The four types of an employer are:

- Controlling
- Creating
- Exposing
- Correcting

These categories are without regard to their contractual relationships one to the other. Lines of liability will not necessarily follow sub-contract relationships. Any contractor may be citable as one of the four types of employers. OSHA and ANSI established a safety duty to exercise reasonable care to detect and prevent safety hazards throughout the worksite.

This criterion is based upon:

- Project scale
- Construction type and speed that will impact the frequency of the number and type of hazards that change
- Inspection frequency
- Trade knowledge and/or expertise

Controlling Employer

A Controlling Employer is in charge of completing the project on time and on budget and identifying the project site safety criteria. The controlling employer is NOT responsible for each specialty contractor's safety program; only the policies and procedures that the specialty contractors must follow while planning or performing project work activities. A controlling employer can be established by either a signed contract that so designates a contractor or if a contractor controls the safety of a project site beyond its own employees.

OSHA and ANSI require the controlling employer to exercise reasonable care to detect and prevent safety hazards throughout the worksite. The scope of this duty varies depending on project scale; construction type and speed that will impact the frequency of the number and type of hazards that change; inspection frequency, and trade knowledge and/or expertise. General safety duties of a controlling employer include:

- Creates specific worksite safety program
- Enforces the policy for the worksite safety program
- Provides general supervision of worksite activity & safety
- Fulfills budget and schedule requirements
- Authority to correct safety hazards
- Authority to require other specialty employers to correct safety hazards
- Conducts frequent and regular inspections of the specialty contractors
- Conducts frequent and regular safety meetings with specialty contractors

Creating Contractor/Employer

The Creating Contractor is the employer who created hazards on a worksite that violates an OSHA standard. An example would be a specialty contractor/employer who created a hole that its employees and employees of other contractors could fall into and be injured or killed. The creating contractor/employer is citable if it fails to implement a feasible elimination or control of the hazard whether or not the employees exposed to the hazard are its own or other employees at the site.

The reasonable care measures it must take include frequent and regular inspections and safety meetings, along with providing an effective system to enforce the prompt correction of hazards both recognized and foreseeable. Even if the employer does not have the authority to fix a problem, it must inform the controlling contractor/employer of the hazard and take the appropriate steps to keep all employees away from the hazardous condition until it is fixed.

Exposing Contractor/Employer

The Exposing Contractor is the employer who failed to take the necessary steps to protect its own employees from the hazard. This employer can be citable on two accounts: one, if it created the violation it is citable as the creating contractor/employer or two, if the hazard was created by another employer it becomes citable if it knew of the hazard or did not exercise reasonable diligence to discover the hazard. If the exposing contractor/employer has the authority to correct the hazard it must do so; if it does not have the authority, it is that employer's responsibility to:

- Request the creating and/or controlling contractor/employer to correct the hazard;
- Inform its employees of the hazard; and
- Take reasonable alternative measures to protect its employees. If the situation affords imminent danger it should remove its employees from the worksite.

The reasonable care measures they must take include frequent and regular inspections and safety meetings, along with providing an effective system to enforce the prompt correction of hazards both recognized and foreseeable. Even if they do not have the authority to fix a problem, they must inform the controlling contractor/employer of the hazard and take the appropriate steps to keep their employees away from the hazardous condition.

Correcting Contractor/Employer

The Correcting Contractor is the employer who is responsible for correcting a hazard on the worksite. It must take reasonable care to prevent and discover violations and to meet industry standards to correct the hazard(s).

An example of a correcting contractor/employer is a carpenter hired to erect and maintain guardrails on a large multi-story project. It is his responsibility to provide frequent and regular inspections in the areas with guardrails and to forward notice of damaged or missing guardrails to the controlling contractor/employer. He is also responsible to immediately repair or replace damaged or missing guardrails once it has been discovered or reported to the controlling contractor/employer.

Fall Protection Requirements on a Multi-Employer Site

- Pre-plan worksite fall protection with safety, supervisors and skilled trades;
- Incorporate fall protection requirements into contract documents;
- Verify that adequate fall protection training has occurred – certificates with the type of training, date and number of hours;
- Develop a site fall protection safety plan & procedures;
- Require a fall protection work activity safety plan & procedures;
- Verify that fall protection safety meetings occur regularly and frequently;
- Verify that fall protection equipment is inspected regularly and frequently.

References/Acknowledgements

For additional information regarding these and other exposures, please visit the Chubb Construction Risk Engineering Portal at www.chubb.com/us-en/ss-construction-risk-engineering

1. www.bls.gov/iif/oshwc/cfoi/cftb0313.htm
2. DBI/SALA Fall Protection Competent Person Course and Materials – 2003 (excerpts used throughout this document)
3. U. S. Department of Labor Occupational Safety and Health Administration Directorate of Science, Technology and Medicine Office of Science and Technology Assessment - Suspension Trauma/ Orthostatic Intolerance, Safety and Health Information Bulletins; SHIB 03-24-2004
4. Miller By Honeywell; Relief Step Safety Device: www.millerfallprotection.com/fall-protection products/accessories/relief-step-safety-device Occupational Safety and Health Administration, 29CFR 1926 Subpart M – Fall Protection.

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