EVEREST

Loss Control Alert

Preventing Falls in the Construction Industry

Falls from heights are the leading cause of fatalities among construction workers. The Occupational Safety and Health Administration (OSHA) estimates that, on the average, 150 to 200 workers are killed each year and more than 100,000 are injured as a result of falls at construction sites.

Our own claims reveal an increasing trend of severe fall related injuries, some resulting in permanent disabilities to employees of our construction policyholders. Besides the obvious impact these accidents have on the cost of insurance and possible regulatory (OSHA) investigations, these losses can also present substantial uninsured costs which can significantly impact your business. When you consider the cost of replacing damaged equipment, loss of a productive worker, lost production, possible damage to customer property, and the potentially tarnished image that an accident may have in the eyes of your customer, it makes prefect sense to prevent these losses instead of continually trying to overcome their costly results.

Today, many litigation and cost conscience customers will consider a contractors' accident record along with the quote as a pre-requisite for awarding projects. Contractors that have a good loss history along with a competitive price are usually awarded the job. Contractors that have been successful in preventing accidents, especially more severe losses such as falls from heights, often enjoy business increases due to their favorable accident record.

This Alert does do address fall prevention practices for ladders and scaffolds. For information on this subject, please refer to our Ladders and Scaffolds Loss Control Alert. It can be obtained from our web site.

Fall Prevention Planning

Preventing fall accidents requires careful planning and implementation, close supervision, training, and proper equipment. Due to the numerous types of construction methods and activities, environmental considerations, and work areas, it is often difficult to select one type of fall protection to be effective in all situations. The fall hazards posed by each project and work phase need to be recognized and plans developed and implemented to prevent fall accidents. In

general, all work areas 6 feet or more above a lower level or ground require fall protection. Examples of work areas where fall protection is usually needed include excavations, roofs, ceilings, open sided ramps, stairs, runways, or catwalks. Unprotected wall and floor openings, leading edges (an unprotected edge or side of a floor or other walking/working surface under construction), and hoist areas also need fall protection. Work activities such as steel erection, installing formwork or reinforcing steel, repairing or installing roofs, concrete and brick placement and residential above ground work are examples of activities that may require fall protection.

Once a potential hazard to falls is recognized through your job planning and assessment activities, employers should do the following:

- Determine if walking and working surfaces have the strength and structural integrity to support workers.
- Prohibit workers from walking and working surfaces until they can be installed and secured to safely provide the needed support.
- Select and provide an effective fall protection system to protect remaining fall hazards such as open sides, leading edges, wall and floor holes. Acceptable fall protection systems include a guardrail system, safety net system, or personal fall arrest system. Specific information concerning the design, installation, and performance of these systems is found in the OSHA standard 1926.502. (*Please note that while OSHA allows the use of body belts as part of a positioning system, Everest National Insurance Company has concerns about their use due to the potential for serious disabling injuries. As such, Everest National Insurance Company recommends that employers consider body harnesses for any type of positioning or personal fall restraint system.)*
- Supervise workers to assure safe work procedures are being performed and frequently inspect the work area to eliminate other safety hazards.
- Train workers in the proper selection, use, and maintenance of fall protection systems.

Fall Prevention Plans

In some instances, work must be performed in such a manner or area where it is either not technically feasible to use one of the accepted fall prevention systems or the use of one of these systems may create a hazard to workers. Examples of these instances include overhand bricklaying, precast concrete erection, or residential construction work. In these instances, employers must develop a site specific fall prevention plan using controlled access zones. Controlled access zones are used to keep out workers other than those authorized to enter work areas for which conventional fall protection (guardrails, safety nets, or personal arrest systems) is not provided. A controlled access zone must be designated and clearly marked with the use of ropes, wires, tape, or equivalent materials and supporting stantions, strong enough to withstand at least 200 pounds. OSHA standard, 1926.502(g) provides detailed requirements for the design, construction and use of controlled access zones.

A effective fall prevention plan must:

- Be prepared by a “qualified person” (see footnote, page 5)
- Be maintained at the job site. (see footnote, page 5)
- Be supervised by a “competent person”
- Document the reasons why conventional fall protection systems are not used.
- Specify other measures to be used to eliminate or reduce the fall hazard
- Include the names of all workers designated to work in the controlled access zone.

When a site specific fall prevention plan is in place, employers should investigate all employee falls or near misses to determine the need to change their fall prevention plan. Once a need to change this plan is recognized, it must be immediately implemented.

Roof Work

Work on roofs presents special fall protection challenges, especially when the roofs are sloped. For roof work, warning lines can be used to alert workers of approaching fall hazards. Warning line systems consisting of ropes, wires, or chains, and supporting stanchions can be erected 6 to 10 feet around all sides of roof work areas. Details specifying the design and installation of warning lines can be found in the OSHA standard 1926.502(f).

During roofing work, materials and equipment should not be stored within 6 feet of a roof edge unless guardrails are erected at the edge, and materials piled, grouped, or stacked near a roof edge must be stable and self-supporting.

Holes and Openings

Another effective fall prevention control is the use of covers to protect workers from openings in walking surfaces. All covers must be able to support at least twice the weight of all intended loads including employees, equipment, and materials that may be imposed on the cover at any one time. Covers should also be secured in place to prevent their displacement from wind, equipment, or worker activities. As an extra precaution, all covers should be color coded or bear the markings "HOLE" or "COVER."

Material Storage and Debris Containment

When guardrail systems are used to prevent materials from falling from one level to another, any openings must be small enough to prevent passage of potential falling objects. No materials or equipment except masonry and mortar should be stored within 4 feet of working edges. Excess material and debris should be removed at regular intervals.

When All Else Fails

When no other alternative fall protection can be implemented, as part of an employer's fall protection plan, the employer must adopt a safety monitoring system. A safety monitoring system involves a competent person, (the safety monitor) who is responsible for recognizing and warning an authorized worker of fall hazards. The use of a safety monitoring system should be considered the last acceptable means of providing fall protection and should be used when no other more effective fall protection method exists. When using a safety monitoring system, the safety monitor must:

- Warn the employee of approaching fall hazards or when the worker is acting in an unsafe manner.
- Be on the same walking/working surface, within visual sighting, and close enough to verbally communicate with the employee(s) being monitored.
- Should not have any other responsibilities or tasks while performing this function.

Training

A key part of all fall protection plans is worker training. Workers must be adequately trained:

- To recognize fall hazards in their work area
- In proper work procedures for erecting, maintaining, removing and inspecting fall protection systems
- In the proper use of controlled access zones and guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems
- Regarding the role of each employee in the safety monitoring system when the system is in use
- On the correct procedures for equipment and materials handling and storage and the erection of overhead protection
- In the employees' role in all protection plans

Preventing falls requires careful planning and effective controls. Everest National Insurance Company is committed to assist our policyholders in not only preventing falls, but in developing your overall loss control programs to prevent all losses. For more information on fall prevention please refer to Everest National Insurance Company's Loss Control Alert, Ladder and Scaffold Safety.

Remember, Everest National Insurance Company offers loss control services to help you in your loss prevention efforts. If you would like more information about these services, visit our web site at www.everestnational.com.

footnote:
The term *Competent Person* is used by OSHA to mean an individual who, by way of training or experience, is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, is designated by the employer, and has authority to take appropriate actions.

Qualified Person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Loss Control is a daily responsibility of your individual management. This publication is not a substitute for your own loss control program. The information provided in this Alert should not be considered as all-encompassing, or suitable for all situations, conditions, or environments. Each organization is responsible for implementing their safety/injury/illness prevention program and should consult with legal, medical, technical, or other advisors as to the suitability of using the information gained in this Alert.

Outline of a Model Fall Protection Program

I. POLICY:

It is the policy of *XYZ Contracting* to take all practical measures possible to prevent employees from being injured by falls from heights. We will take necessary steps to eliminate, prevent, and control fall hazards. We will comply fully with the OSHA Fall Protection standard (CFR 1926, Subpart M, Fall Protection).

This policy will follow the OSHA standard for potential falls from heights of at least 6 feet. First consideration will be given to the elimination of fall hazards. If a fall hazard cannot be eliminated, effective fall protection will be planned, implemented, and monitored to control the risks of injury due to falling.

All personnel exposed to potential falls from heights will be trained to minimize the exposures. Fall protection equipment will be provided and its use required by all employees. Foreman will be responsible for implementation of a fall protection plan for their jobsite.

II. FALL HAZARD IDENTIFICATION AND EVALUATION:

The foreman on each jobsite will be responsible for identifying fall hazards on their jobsite. The foreman will evaluate each situation or work procedure where employees may be exposed to a fall of 6 feet or more. The foreman will be responsible for developing a plan to eliminate the exposures, if possible, or to select the appropriate fall protection systems and/or equipment.

The following are examples of situations were fall protection would be needed. This listing is by no means complete, and there are many other situations where a fall of 6 feet or more is possible. <u>It should be noted that ladders and scaffolding are not included in this list because they are covered by other OSHA standards and other requirements of our safety program.</u>

A. 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 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 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.

B. Holes

Personal fall arrest systems, covers, or guardrail systems shall be erected around holes (including skylights) that are more than 6 feet above lower levels.

C. Leading Edges

Each employee who is constructing a leading edge 6 feet or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems.

D. Excavations

Each employee at the edge of an excavation 6 feet or more deep shall be protected from falling by guardrail systems, fences, barricades, or covers. Where walkways are provided to permit employees to cross over excavations, guardrails are required on the walkway if it is 6 feet or more above the excavation.

E. Formwork and Reinforcing Steel

Fall protection is not required while workers are moving vertically or horizontally along the vertical face of rebar assemblies, built in place. 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.

F. Hoist Areas

Each employee in a hoist area shall be protected from falling 6 feet or more by guardrail systems or personal fall arrest systems. If guardrail systems (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.

G. Overhand Bricklaying and Related Work

Each employee performing overhand bricklaying and related work 6 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 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.

H. Precast Concrete Erection and Residential Construction

Each employee who is 6 feet or more above lower levels while erecting precast concrete members and related operations such as grouting of precast concrete members and each employee engaged in residential construction, shall be protected by guardrail systems, safety net systems, or personal fall arrest systems.

I. Ramps, Runways, and Other Walkways

Each employee using ramps, runways, and other walkways shall be protected from falling 6 feet or more by guardrail systems.

J. Low-slope Roofs

Each employee engaged in roofing activities on low-slope roofs with unprotected sides and edges 6 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.

K. Steep Roofs

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

L. 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.

Controlled access zones, when created to limit entrance to areas where leading edge work and other operations are taking place, must be defined by a control line or by any other means that restrict access. Control lines shall consist of ropes, wires, tapes or equivalent materials, and supporting stanchions, and each must be:

- Flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material;
- Rigged and supported in such a way that the lowest point (including sag) is not less than 39 inches from the walking/working surface and the highest point is not more than 45--nor more than 50 inches when overhand bricklaying operations are being performed—from the walking/working surface;

- Strong enough to sustain stress of not less than 200 pounds. Control lines shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.
- Control lines also must be connected on each side to a guardrail system or wall.

When control lines are used, they shall be erected not less than 6 feet nor more than 25 feet from the unprotected or leading edge, except when precast concrete members are being erected. In the latter case, the control line is to be erected not less than 6 nor more than the lesser of : 60 feet or half the length of the member being erected, from the leading edge.

Controlled access zones when used to determine access to areas where overhand bricklaying and related work are taking place are to be defined by a control line erected not less than 10 feet nor more than 15 feet from the working edge. Additional control lines must be erected at each end to enclose the controlled access zone. Only employees engaged in overhand bricklaying or related work are permitted in the controlled access zones.

On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones will be enlarged as necessary to enclose all points of access, material handling areas, and storage areas.

On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

III. FALL PROTECTION SYSTEMS

When there is a potential fall of 6 feet or more, we will utilize one or more of the following means of providing protection:

A. Guardrail Systems

Guardrail systems must meet the following criteria. Toprails and midrails of guardrail systems must be at least one-quarter inch nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for toprails, it must be flagged at not more 6 feet intervals with high-visibility material. Steel and plastic banding cannot be used as toprails or midrails. Manila, plastic, or synthetic rope used for toprails or midrails must be inspected as frequently as necessary to ensure strength and stability.

The top edge height of toprails, or (equivalent) guardrails must be 42 inches plus or minus 3 inches, above the walking/working level. When workers are using stilts, the top edge height of the top rail, or equivalent member, must be increased an amount equal to the height of the stilts.

Screens, midrails, mesh, intermediate vertical members, or equivalent intermediate structural members must be installed between the top edge of the guardrail system and the walking/working surface when there are no walls or parapet walls at least 21 high. When midrails are used, they must be installed at a height midway between the top edge of the guardrail system and the walking/working level. When screens and mesh are used, they must extend from the top rail to the walking/working level and along the entire opening between top rail supports. Intermediate members, such as balusters, when used between posts, shall not be more than 19 inches apart.

Other structural members, such as additional midrails and architectural panels, shall be installed so that there are no openings in the guardrail system more than 19 inches.

The guardrail system must be capable of withstanding a force of at least 200 pounds applied within 2 inches of the top edge in any outward or downward direction. When the 200 pound test is applied in a downward direction, the top edge of the guardrail must not deflect to a height less than 39 inches above the walking/working level.

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding a force of at least 150 pounds applied in any downward or outward direction at any point along the midrail or other member.

Guardrail systems shall be surfaced to protect workers from punctures or lacerations and to prevent clothing from snagging.

The ends of top rails and midrails must not overhang terminal posts, except where such overhang does not constitute a projection hazard.

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section must be placed across the access opening between guardrail sections when hoisting operations are not taking place.

At holes, guardrail systems must be set up on all unprotected sides or edges. When holes are used for the passage of materials, the hole shall have not more than two sides with removable guardrail sections. When the hole is not in use, it must be covered or provided with guardrails along all unprotected sides or edges.

If guardrail systems are used around holes that are used as access points (such as ladderways), gates must be used or the point of access must be offset to prevent accidental walking into the hole.

If guardrails are used at unprotected sides or edges of ramps and runways, they must be erected on each unprotected side or edge.

B. Personal Fall Arrest Systems

These consist of an anchorage, connectors, and a body harness and may include a deceleration device, lifeline, or suitable combinations. If a personal fall arrest system is used for fall protection, it must do the following:

- Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;
- Be rigged so that an employee can neither free fall more than 6 feet nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet; and
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less.

Personal fall arrest systems must be inspected prior to each use for wear damage, and other deterioration. Defective components must be removed from service.

C. Positioning Device Systems

These body harness systems are to be set up so that a worker can free fall no farther than 2 feet. They shall be secured to an anchorage capable of supporting a least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

D. Safety Monitoring Systems

When no other alternative fall protection has been implemented, the employer shall implement a safety monitoring system. Employers must appoint a competent person to monitor the safety of workers and the employer shall ensure that the safety monitor:

- Is competent in the recognition of fall hazards;
- Is capable of warning workers of fall hazard dangers and in detecting unsafe work practices;
- Is operating on the same walking/working surfaces of the workers and can see them;
- Is close enough to work operations to communicate orally with workers and has no other duties to distract from the monitoring function.

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-sloped roofs.

No worker, other than one engaged in roofing work (on low-sloped roofs) or one covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

All workers in a controlled access zone shall be instructed to promptly comply with fall hazard warnings issued by safety monitors.

E. Safety Net Systems

Safety nets must be installed as close as practicable under the walking/working surface on which employees are working and never more than 30 feet below such levels. Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Safety nets shall be installed with sufficient clearance underneath to prevent contact with the surface or structure below.

Items that have fallen into safety nets including—but not restricted to, materials, scrap, equipment, and tools—must be removed as soon as possible and at least before the next work shift.

F. Warning Line Systems

Warning line systems consist of ropes, wires, or chains, and supporting stanchions and are set up as follows:

- Flagged at not more than 6-foot intervals with high-visibility material;
- Rigged and supported so that the lowest point including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches from the walking/working surface.
- Stanchions, after being rigged with warning lines, shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line and in the direction of the floor, roof, or platform edge;
- The rope, wire, or chain shall have a minimum tensile strength of 500 pounds and after being attached to the stanchions, must support without breaking the load applied to the stanchions as prescribed above.
- Shall be attached to each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in the adjacent section before the stanchion tips over.

Warning lines shall be erected around all sides of roof work areas. When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of mechanical equipment operation.

When mechanical equipment is not being used, the warning line must be erected not less than 6 feet from the roof edge.

G. Covers

Covers located in roadways and vehicular aisles must be able to support at least twice the maximum axle load of the largest vehicle to which the cover might be subjected. All other covers must be able to support at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time. To prevent accidental displacement resulting from wind, equipment, or workers' activities, all covers must be secured. All covers shall be color-coded or bear the markings "HOLE" or "COVER."

H. Protection From Falling Objects

When guardrail systems are used to prevent materials from falling from one level to another, any openings must be small enough to prevent passage of potential falling objects. No materials or equipment except masonry and mortar shall be stored within 4 feet of working edges. Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear of the working area by removal at regular intervals.

During roofing work, materials and equipment shall not be stored within 6 feet of a roof edge unless guardrails are erected at the edge, and materials piled, grouped, or stacked near a roof edge must be stable and self-supporting.

IV. TRAINING:

Employees will be trained in the following areas:

a) the nature of fall hazards in the work area;
b) the correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
c) the use and operation of controlled access zones and guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems;
d) the role of each employee in the safety monitoring system when the system is in use;
e) the limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs;
f) the correct procedures for equipment and materials handling and storage and the erection of overhead protection; and,
g) employees' role in fall protection plans.

Fall Protection Program Checklist

The following checklist has been developed to help our policyholders evaluate their fall protection program. Any "No" response indicates a program deficiency. Action should be taken to correct all "No" responses. Use this checklist as part of your fall prevention planning efforts.

Yes	No	Topic
❑	❑	Do your job planning activities include fall prevention?
❑	❑	Are job plans reviewed by management to identify potential fall hazards?
❑	❑	Does your fall prevention program include ladders and scaffolds? (Refer to Everest National Insurance Company's Loss Control Alert Ladder and Scaffold Safety.)
❑	❑	Is a policy in place and enforced, prohibiting workers from above ground walking and working surfaces until they have been secured in place, can safely support all intended loads, and have been inspected by a competent person?
❑	❑	Does your fall protection program specify the use of the following fall prevention systems? • Guardrail Systems meeting OSHA 12926.502 requirements including barriers to prevent falling debris and covers, where practical, protecting holes in walking surfaces? • Personal Fall Arrest Systems meeting OSHA 1926.502 requirements? Does your program prohibit the use of body belts? • Safety Net System meeting OSHA 1926.502 requirements?
❑	❑	When the above fall protection systems can not be used, do you develop a written fall prevention plan?
❑	❑	Is this plan developed by a "qualified person"?
❑	❑	Is the plan job specific and maintained at the site?
❑	❑	Is the plan supervised by a "competent person" to assure effective implementation?
❑	❑	Does the plan document your reasons for not using any of the above fall protection systems?
❑	❑	Does it specify the fall prevention methods to be used and the identity of affected workers?
❑	❑	Does the plan include the use of controlled access zones and warning line systems, meeting OSHA 1926.502 requirements?
❑	❑	Is safety monitoring considered as a last resort to provide fall protection?
❑	❑	Is the safety monitor a competent person?
❑	❑	Does your safety monitor system meet the requirements of OSHA 1926.502?
❑	❑	Do workers receive specific training on your fall protection program and plans before the job commences?
❑	❑	Are work activities monitored and workers re-trained when unsafe behaviors are observed?