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Fall protection: *Do you know fall hazards when you see them?*

You know what a fall hazard is, right? Here's a summary of what they are and how to evaluate them.

What is a fall hazard?

A fall hazard is anything in the workplace that could cause an unintended loss of balance or bodily support and result in a fall. Fall hazards cause accidents such as the following:

- A worker walking near an unprotected leading edge trips over a protruding board.
- A worker slips while climbing an icy stairway.
- A makeshift scaffold collapses under the weight of four workers and their equipment.
- A worker carrying a sheet of plywood on a flat roof steps into a skylight opening.

Fall hazards are foreseeable. You can identify them and eliminate or control them before they cause injuries.

How to evaluate fall hazards

The purpose of evaluating fall hazards is to determine how to eliminate or control them before they cause injuries. Below are important factors to consider in conducting an evaluation:

Involve others. You may need others to help you evaluate fall hazards. Involve those who may be exposed to fall hazards and their supervisors; they'll help you identify the hazards and determine how to eliminate or control them. Involving others also strengthens your safety and health program. Your workers' compensation insurance carrier and Oregon OSHA will also help you evaluate fall hazards. Contact your insurance carrier to request a consultation. Contact Oregon OSHA's Consultative Services Section to schedule an on-site evaluation, (503) 378-3272.

Determine how workers will access elevated surfaces to perform their tasks. Will workers be using portable ladders, supported scaffolds, aerial lifts, or suspension platforms to reach their work areas? Which ones will they use? How and where will they use the equipment?

Identify tasks that could expose workers to falls. Using a set of worksite plans, review the entire construction project. Evaluate each phase of the project from the ground up. Ensure that all walking/working surfaces have the strength to support workers and their equipment, then identify all tasks that could expose workers to falls. A walking/working surface is any surface, horizontal or vertical, on which a person walks or works.

Identify hazardous work areas. Determine if workers' tasks could expose them to the following fall hazards:

- Holes in walking/working surfaces that they could step into or fall through.
- Elevated walking/working surfaces 10 feet or more above a lower level.

- Skylights and smoke domes that workers could step into or fall through.
- Wall openings such as those for windows or doors that workers could fall through.
- Trenches and other excavations that workers could fall into.
- Walking/working surfaces from which workers could fall onto dangerous equipment.
- Hoist areas where guardrails have been removed to receive materials.
- Sides and edges of walking/working surfaces such as established floors, mezzanines, balconies, and walkways that are 6 feet or more above a lower level and not protected by guardrails at least 39 inches high.
- Ramps and runways that are not protected by guardrails at least 39 inches high.
- Leading edges — edges of floors, roofs, and decks — that change location as additional sections are added.
- Wells, pits, or shafts not protected with guardrails, fences, barricades, or covers.

Determine how frequently workers will do tasks that expose them to falls. The more frequently a worker is exposed to a fall hazard the more likely it is that the worker could fall.

Determine whether workers need to move horizontally, vertically, or in both directions to do their tasks. How workers move to perform tasks can affect their risk of falling. Knowing how they move to perform tasks can help you determine how to protect them.

Determine the number of workers exposed to fall hazards. Generally, the more workers that are exposed to a fall hazard, the more likely it is one could fall.

Identify walking/working surfaces that could expose workers to fall hazards. Examples: floors, roofs, ramps, bridges, runways, formwork, beams, columns, trusses, and rebar.

Determine fall distances from walking/working surfaces to lower levels. Generally, workers must be protected from fall hazards on walking/working surfaces where they could fall 10 feet or more to a lower level. However, workers must be protected from falls of 6 feet or more from any of the following:

- Holes and skylights in walking/working surfaces.
- Wall openings that have an inside bottom edge less than 39 inches above a walking/working surface.
- Established floors, mezzanines, balconies, and walkways with unprotected sides and edges.
- Excavations with edges that are not readily seen because of plant growth or other visual barriers.
- Wells, pits, shafts and similar excavations.

Workers must also be protected from falling onto or into dangerous equipment.

Ensure that existing guardrails and covers meet Subdivision 3/M requirements. Guardrails must be designed and built to meet the requirements of 1926.502(b). Covers must meet the requirements of 1926.502(i).

Identify fall hazards that you can eliminate. Eliminating a fall hazard is the most effective fall-protection strategy. Ways to eliminate fall hazards:

- Perform construction work on the ground before lifting or tilting it to an elevated position.
- Install permanent stairs early in the project so that workers don't need to use ladders between floors.
- Use tool extensions to perform work from the ground.

Identify fall hazards that you can't eliminate. If you can't eliminate fall hazards, you need to prevent falls or control them so that workers who may fall are not injured.

- Ways to prevent falls include covers, guardrails, handrails, perimeter safety cables, and personal fall-restraint systems.
- Ways to control falls include personal fall-arrest systems, positioning-device systems, and safety-net systems. Use these fall-protection systems only when you can't eliminate fall hazards or prevent falls from occurring.

Consider administrative practices. Administrative practices help prevent falls by influencing the way people work. Examples include substituting a safe work practice for a risky one, training workers how to do their jobs safely, and disciplining those who don't follow safe practices.

Determine whether anchorages are necessary. If workers use personal fall-arrest or restraint systems, they'll need secure anchorages for their lifelines or lanyards. Anchorages for personal fall-arrest systems must be able to support at least 5,000 pounds per attached worker or be designed with a safety factor of at least two — twice the impact force of a worker free-falling 6 feet. Anchorages for personal fall-restraint systems must be able to support at least 3,000 pounds per attached worker or be designed with a safety factor of at least two — twice the peak anticipated dynamic load.

Consider other factors that could increase the risk of falls. Consider the environment. Will workers' tasks expose them to overhead power lines? Will they need to use scaffolds, ladders, or aerial lifts on unstable or uneven ground? Will they be working during hot, cold, or windy weather? Consider ergonomics. Will workers need to frequently lift, bend, or move in ways that put them off balance? Will they be working extended shifts that could contribute to fatigue?

Webinar: *Designing for construction safety*

It's much more effective to design safety into a construction process than it is to try to manage safety after the fact. Want to learn how the hazards construction workers face daily can be addressed in the design of a construction project that significantly reduces those risks?

The National Institute for Occupational Safety and Health (NIOSH) and the National Safety Council (NSC) will host a webinar titled, *Designing for Construction Safety: Preventing Injuries from Concept to Completion* on November 27, 2007. Registration is $75 for NSC members and $125 for non-members. The webinar will be moderated by Dr. Richard Rinehart, Senior Service Fellow in the National Institute for Occupational Safety and Health's Education and Information Division.

Designing for construction safety was identified at the National Occupational Research Agenda (NORA) meeting in September 2007 as one of NIOSH's top ten research priorities.

Injuries and illnesses: *Plumbers and pipefitters*

By Tasha Hodges.

The faucet in your bathroom sink has been dripping incessantly, keeping you up all night. Yesterday, your son decided to see if his sister's Barbie could swim, effectively clogging the toilet. Your showerhead has been oozing green slime for over a week, and your garbage disposal… well, let's just say it's not a pretty sight. It's time to call in the plumbing experts.

Unfortunately, pipes aren't the only things that occasionally need repair. From 2001-2005 the Department of Consumer and Business Services received notification of 695 accepted disabling claims filed by plumbers and pipefitters, an average of 139 claims per year. Sprains and strains to the back (139 claims), lower extremities (73 claims), shoulder (34 claims) and multiple body parts (28 claims) were the most common disabling injuries.

Over the past five years plumbers have also suffered a surprising number of knee injuries. Other than back injuries, the knee was the most commonly injured body part, the subject of 101 accepted disabling claims (14.5 percent of claims from 2001 to 2005). Plumbers' knees were most often strained (39 claims) or dislocated (27 claims).

Overexertion was the most common cause of disabling injury, resulting in 171 claims (24.6 percent), which is typical for most Oregon employees. Falls were the second most common cause of injury (133 claims), the majority of which were either falls to the floor (36 claims) or falls from a ladder (34 claims). Falls were most likely to result in a sprain or strain (50 claims) or a fracture (27 claims).

Tasha Hodges is a Research Analyst in the Department of Consumer and Business Services, Information Management Division.

Powered platforms: *Top 10 things an aerial operator needs to know*

This article reprinted with permission from Jeff Stachowiak, National Safety Director, Sunbelt Rentals.

In conducting training on aerial work platforms (AWP's) since 1992 I've had many people in training sessions with varied experience. From "never been on one of these things" to "I've been operating these things since before you were born". Which in my case, would make you pretty old.

With the varied experience and many classes and the thousands of people who have attended these sessions I've come up with some "must know" items that even experienced operators may not know or may not have thought about. By no means is this a complete list, so get training.

Aerial work platform operators need to know a lot of things about the lift they are using and the site conditions where the lift is going to be used. So the first "must know" item is:

Training – Most jobsites now require some sort of AWP training before contractors on site will be allowed to operate the lifts to do their work. Some governmental agencies may require this training as well. But realistically do we need the government to tell us to train our people. Training is morally the "right thing to do."

There are many training programs out there and most companies who rent AWP's offer this training. As well, the International Platform Access Federation (IPAF) and its affiliate in the states the AWPT can help direct you to one of their members for formal AWP training. Contact IPAF for more information.

Read the operator's manual – This seems like a no brainer, but in reality hardly ever happens. Even when an operator encounters a problem with the lift, pulling out the manual and reading it just doesn't happen. I believe this is a Macho thing, "Real men don't read instructions." Yet, in this day and age it is virtually impossible to know how each lift operates or is supposed to operate without reading the manual for that lift. I train people on these lifts and have been on hundreds of them and I cannot keep up with the controls and functions of them all without pulling out the manual and looking them up. I have often times actually pulled out the manual with students standing there while I verify or look something up. You're not less of a man for doing this. It might just save your life or at the very least safe you some time and money. As well, there should always be an operator's manual (and an ANSI Manual of Responsibilities) on the lift, usually inside a waterproof box.

Pre-start inspection – If you have read the instructions or had training you would already know this one. A pre-start inspection is just like a pilot's pre-flight check. Going up 20 feet in a scissor lift or 30,000 feet in a jet, if you crash the results are usually the same. Pre-start inspections cover many items on the AWP and also check to make sure you have all your personal protective equipment like hardhat, work boots, safety glasses, etc. This requires a visual walk around as well as function checks of all the controls on the machine. Usually there is a detailed list of things to checks in, you guessed it, the Operator's Manual.

Workplace inspection – This involves knowing what the lift weighs and the ground pressure of the tires/wheels on the ground or surface. Then literally walking the worksite area to make sure the surface on which the lift will be operated will support the AWP. Pick up debris, note any obstacles, drop-off, holes, overhead obstacles, power lines, moving machinery or overhead cranes, etc.

Stay away from power-lines – AWP's are NOT insulated from electrical shock from power-lines, transformers, power poles, overhead crane bus bars, and anything else that can conduct electricity. Most regulatory agencies and governing bodies require you to stay at least 10 feet (3 meters) away from all power-lines and power parts. This will always include materials handled on the AWP as well. For instance if you are handling pipe or steel stud that will go outside the perimeter of the basket you need to add 10 feet to the distance the material will protrude outside the basket. Put an imaginary bubble measured 10 feet out from the line all the way around it. You cannot pierce the bubble.

Direction of travel arrows – Many operators have seen the arrow decals on the boom lift chassis and may have even noticed the arrow indicators near the drive control joystick, but do not know what they are there for or how to use them. Since you can rotate a boom lift 180 degrees around to the opposite side, the drive control joystick is now reversed, so when you push the drive control joystick away from you, you will go backwards to how you are facing and when you pull it towards you it will go in the opposite direction or forwards. This can be a problem if you do not remember which way you drove the lift the last time you drove it. If you should drive in the wrong direction you could run into a wall, over someone or off the surface you are driving, all catastrophic events. Before you ever drive a lift, get into the habit of looking first at the chassis arrows and say to yourself, "which way do I want the chassis to move, white arrow or black arrow direction." If you want to move in the white arrow direction then move the drive control joystick in the white arrow direction according to the arrows on the control panel.

Battery charging and fuel problems – Probably the most common reason for a service call is, "It was plugged in all night and it is not charged." Other reasons that an electric AWP does not charge include: not plugged in to the battery charger, usually plugged into the power-to-the-platform cord which will not charge the batteries, no power to the cord, blown GFCI or circuit breaker, or a bad extension cord. Or my favorite: the power on the jobsite is shut off for the night sometime after the jobsite is vacated. And last, CHECK the batteries for WATER. Other fueling problems and a close second to battery charging service calls is the user putting the wrong fuel into the lift. Putting gas into a diesel engine machine, putting diesel into a gas engine machine and also putting fuel into the hydraulic tank, another favorite of mine. All very expensive service calls too.

Emergency descent controls – All AWP's are equipped with a way to get you down if something should go wrong. READ the manual. These controlled descent or emergency descent controls are different for many AWP's. Not only do you need to know how these operate but someone on the ground needs to know too so they can get you down incase something would happen to you while you're elevated.

Annual and frequent inspections – Both the AWP manufacturers and ANSI require that these be done by a factory trained technician. Consult the operator's and maintenance manual on the AWP for this procedure. Annual inspection dates should be noted on the AWP somewhere.

Don't operate a lift that is not operating properly – If during your pre-start inspection or any time you are operating the AWP something does not seem right, shut the AWP down, take the key out and tag the machine as DOWN, DO NOT USE. Until a trained service technician can inspect it.

These 10 things are by no means everything you need to know to operate an AWP safely. We hope though that these 10 things will help you make the right decisions the next time you are going to buy, rent, use or operate an aerial work platform.

Electrical: *Coated hand tools may not protect you from electrical hazards*

By Ron Haverkost.

Recently, while removing lighting on a demolition project, a worker inadvertently cut an energized power cord with a pair of pliers that caused a spark and a hole in the cutting portion of the pliers. The worker used pliers with plastic-coated handles made for ergonomic comfort; however, this type of coating doesn't insulate against electrical current and doesn't provide a complete safety barrier.

Some hand tools such as electrically rated lineman's pliers have insulated handles that are designed to withstand specific voltage levels - for example, 1000 volts a.c. The coated pliers that most workers use are not electrically rated. Insulated hand tools must be covered with material that protects the user from electric shock and minimizes the risk of a short circuit. The American Society for Testing and Materials (ASTM F1505) and the International Electrotechnical Commission (IEC 60900) specifies the requirements for selecting and using insulated hand tools.

Oregon OSHA's Division 2/S and Division 3/K electrical safety rules require employers to have safe work practices that protect employees who work near or on energized equipment or circuits. Live parts that an employee may be exposed to must be de-energized before the employee works on or near them. If de-energizing live parts makes work more hazardous or is not feasible, employers must use other effective safe practices.

Never assume that a hand tool is acceptable for work on energized equipment because it has a plastic coating on its handles. Although insulated hand tools must meet specific industry standards, they provide only a partial barrier from electrical hazards. The safest way to work on electrical equipment is to make sure that it's de-energized before you begin.

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Excavating: *Working with hydraulic excavators and backhoe loaders*

You can dig an excavation with a hand shovel or a machine. Use a hand shovel improperly and you risk blisters. Use a machine improperly and you risk a life. Too many workers are injured or killed because they are not properly trained or supervised and don't follow safe practices when they use mechanical equipment for excavation work. Most accidents happen for three reasons.

1: Entering the excavator's swing area

Workers need to be aware of the excavator's swing area and blind spots. Always maintain at least 3 feet of unimpaired clearance between the excavator's rotating superstructure and adjacent objects. Keep workers outside the area by marking it with rope, tape, or a similar barrier if necessary.

- Require the operator to lower the boom to a safe position with the bucket on the ground and turn off the excavator before getting off.
- Require the operator to keep the bucket as close to the ground as possible when workers are attaching loads.
- Do not allow workers to stand under a suspended load, the boom, arm, or bucket.

2: Using quick-coupling devices improperly

After-market "quick-coupling" devices make it easy for workers to quickly change buckets or replace other attachments. However, a number of workers have been killed when the coupling devices have not been locked properly and the buckets have detached. Manufacturers of quick couplers recognized the hazard and newer devices have locks that prevent buckets from detaching unintentionally, but not all users may be aware of the problem. Retrofit locking pins are available for older equipment.

- Follow the manufacturer's instructions for using positive locks on quick-disconnect equipment.
- Securely latch attachments such as quick-disconnect buckets before beginning work.
- Make frequent visual inspections of quick-disconnect systems — especially after changing attachments.

3: Using unsafe rigging methods to drag a trench shield

Using an excavator to drag a shield through a trench can put tremendous forces on rigging components. For example, the force required to drag a 10,000-pound trench shield through a narrow trench will increase dramatically with resistance from the trench walls or from plowing of the front of the shield. Know the sling's rated capacities and never exceed them. The whiplash effect of a broken or improperly rigged sling can kill anyone in its path.

- Follow the instructions in the operator's manual when using an excavator to lift or move an object.
- "Lift and drag" to move a trench shield horizontally in a trench; avoid "plowing" with

the front of the shield. Plowing significantly increases the tension on the slings.

- Some manufacturers of trench shields warn workers to stay out of the “box” while it is being moved. Always check the manufacturers’ requirements.
- Never use damaged chains, frayed cables, slings, straps, or ropes.
- Use an appropriate lifting shackle for attaching cables or slings.
- Never stand in line with or next to a sling that is under tension.

Driving: *Getting traction in winter*

If you do much winter driving in Oregon, you've probably seen the Oregon Department of Transportation (ODOT) SNOW ZONE signs that tell you the current requirements for chains or traction tires. But do you know what they mean? Here's a primer.

1. You must have chains or traction tires in or on your vehicle, they must be the right size for your vehicle, and of sufficient number to comply with ODOT's chain requirements.

2. You must use chains if your vehicle is towing or rated more than 10,000 pounds gross vehicle weight (GVW). Chains must also be used on a trailer or vehicle being towed if it has a brake that operates while in tow.

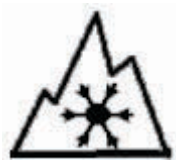
3. You must use chains if your vehicle is towing or weighs over 10,000 pounds GVW. If your vehicle weighs 10,000 pounds GVW or less and is not towing you must use chains or traction tires. Chains must also be used on a trailer or vehicle being towed if it has a brake that operates while in tow.

Drivers who disobey SNOW ZONE signs are subject to a class C traffic infraction.

During severe weather, ODOT may require all vehicles to use chains. This is known as a conditional road closure.

Chains include any device that attaches to the wheel, vehicle, or outside of the tire, that is designed to increase traction on ice and snow.

Traction tires are studded tires or other tires that are suitable for use in severe snow conditions. These tires are marked with a mountain/snowflake emblem on the sidewall like this:



Studs must be made of a rigid material that wears at the same rate as the tire tread and must extend at least 0.04 inch but not more than 0.06 inch beyond the tread surface. Studded tires are legal for use in Oregon from Nov. 1 to April 1. For information on tires that are suitable for use in severe snow conditions, contact your tire dealer.

A four-wheel or all-wheel drive passenger vehicle is exempt from ODOT's chain requirements if all of the following are true:

a. It has an unloaded weight of 6,500 pounds or less.
b. It is operated to provide power to both the front and rear wheels.
c. It is carrying chains.
d. It has mud-and-snow, all-weather radial, or traction tires on all of its wheels.
e. It is not towing another vehicle.
f. It is not being operated in a manner or under conditions that cause the vehicle to lose traction.

For more information, click on "Trip Check" on the ODOT Web site: www.oregon.gov/ODOT/

Ask an expert: *Warning line safety for workers other than roofers*

Q: Can workers other than roofers use colored ribbon or flagged rope as a warning line?

A: Workers should use rope, wire, or a chain rather than colored ribbon - they should be able to feel the line if they back up against it, even if they're wearing heavy clothing. The warning line should also be flagged at least every 6 feet with high-visibility material and have warning signs that are visible to workers.

Need more information on how to set up and use a warning line? Check out Oregon OSHA's new fact sheet: **Construction industry best practices for using warning lines**.