

Back Injury Prevention in Construction



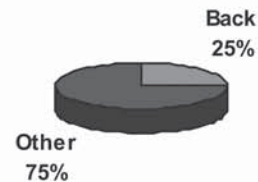
Construction work puts physical stress on the body. Various studies have shown that the construction trades have a higher incidence of back injuries and muscle strains than many other occupations.

Injuries

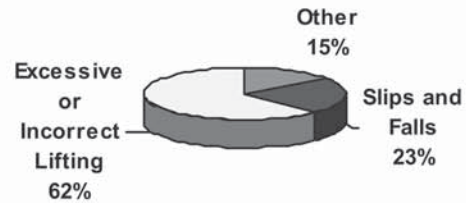
Over the years, back injuries have consistently accounted for about 25% of all the lost workday injuries in the construction trades according to the Bureau of Labor Statistics. Pain in the back and joints is a major factor in forced retirement from the construction trades and in workers seeking less demanding occupations. Such changes are often accompanied by a serious reduction in living standard.

Injury Causes

In construction, over half of the back injuries are attributed to cumulative trauma while roughly 23% are the result of slips, trips and falls. Workers lifting and carrying equipment or materials can be injured when they use improper techniques, twist repeatedly, stand in awkward positions, or try to handle heavy loads without help. Most back injuries are the result of everyday wear and tear rather than a single traumatic event. The cause is generally not a single lift but damage done over time. Back injuries also result from slips, trips, and falls caused by bad weather or poor housekeeping. Repeated twisting, awkward postures, heavy lifting, and prolonged vibration can all contribute to back pain and injury. Unfortunately, once back pain is experienced, the chances of it recurring increase greatly.



Construction Lost Workday Injuries



Causes of Back Injuries

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Injury Prevention Program

To reduce back injuries on the job, an operational process is necessary, covering factors such as housekeeping, workplace postures, proper positioning/ staging of materials and stretching and flexing.



Housekeeping

Back injuries from slips, trips, and falls can sometimes be prevented through good housekeeping. Proper storage of material and regular clean up of debris is critical. Debris and clutter accumulate quickly in construction. In addition to creating trip/fall hazards, poor housekeeping can prohibit the effective operation of mechanical materials handling equipment. As a result, more material is handled manually, creating greater risk of back and other injuries. Failure to keep work and travel areas clear can impede the handling of materials and increase the risk of injury. Plans for housekeeping should cover storage, garbage disposal, and clear work and travel areas.

Well planned storage is an important part of back injury prevention. When storage locations are not designated, material tends to get dumped anywhere. Sooner or later the material has to be moved elsewhere, often by hand and in a rush. This increases the risk of back injury.

Management should designate storage areas, get as much material off the floor and ground as possible, arrange for bins and disposal, put housekeeping provisions in contracts, and ensure that subcontractors meet storage and clean up requirements.

Clean up should take place:

- At the end of each work day or shift
- When trades finish one job and are ready to move on to another area
- When workers or crews change
- When scrap and clutter start to impede work progress and material flow

Workplace Posture

Maintaining proper posture is the most critical part of good back care. Using your muscular system to control posture minimizes the effects of everyday wear and tear on your spine.

Lower back muscles are short, small muscles designed to keep us upright. They are called “anti-gravity” muscles and are usually very strong since they have to work almost continuously.

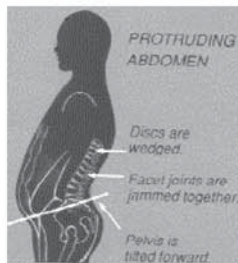
Any position held too long (static loading) is not good for your back. Aches and pains from prolonged working postures are nature’s way of warning you to change positions. If these warnings are continuously ignored, you will be vulnerable to low back injury.

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Unbalanced Pelvis – Weak position vulnerable to injury

When you stand with your stomach protruding, your pelvis is tilted down and your back has an increased curve. In this position, stress is concentrated in your lower back, making it vulnerable to injury. Tightening the lower stomach muscles will straighten the pelvis and correctly align the lower spine.



Balanced Pelvis – Strongest position for the back

When you stand properly with chin tucked in, shoulders back and down, and pelvis level, there is a slight natural inward curve in your lower back. This is the correct posture and the strongest position for your back. Maintaining a level, balanced pelvis is essential to proper back care and helps prevent potential back problems.

Correct Posture

Correct posture is not an erect, military pose but an alignment that maintains the naturally occurring curves in your spine. You have an inward curve (lordosis) at two places in your spine—neck and lower back. You have an outward curve (kyphosis) in your upper back. Keeping your spine aligned in this manner reduces everyday stresses on your back and minimizes the effects of the normal aging process on the spine.

Lifting Techniques

Lifting Capacity

Lifting a weight that is too heavy, lifting in an awkward position, twisting your body when lifting or doing excessively heavy work are all common causes of low back problems. The following lifting models illustrate the need for good work technique.

A Tower crane's lifting capacity is reduced the further the load is away from the mast. Our lifting capacity is also reduced the further a load is away from our spine.

H = The horizontal distance

When H is increased, the crane's capacity to lift the load is decreased.



Lifting Grip

To ensure solid contact when lifting heavy objects, use your entire palm, not just your fingertips.



Unloading

1. Lower the load, maintaining the natural curve of your back.
2. Push the load into place.
3. When lowering a load onto a deep shelf, put it on the edge of the shelf first. Then push it into place.

Carrying

1. Keep your lower back in its normal arched position and use your legs to lift.

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Material on Floor

When possible, before lifting from the floor, every effort should be made to stage the material off the floor at approximately waist height. By placing the material at this height it eliminates the poor postures and high forces on the back when lifting from the floor. In addition, it will improve the efficiency of the job task.

Proper Lifting

Proper Lifting



1. Plan your Move.
 - Size up the load and make sure your path is clear.
 - Get help as needed.
 - Use a dolly or other materials handling equipment if possible.
2. Use a wide, balanced stance with one foot slightly ahead of the other.
3. Get as close to the load as possible.
4. When lifting, keep your lower back in its normal arched position and use your legs to lift.
5. Pick up your feet and pivot to turn. Don't twist your back.
6. Lower the load smoothly, maintaining the natural curve in your lower back.

Transferring Weight

1. Pull the object towards you while transferring your weight to the lift side.
2. Lift only to the level required.
3. Shift your weight to the other leg while pushing the object into position. Do not twist.

Stretching & Flexing

To protect your spine, the muscles supporting your back must be both strong and flexible.

Construction work strengthens some muscles while others that are not being used become shorter and weaker, creating a muscle imbalance. A regular stretching program can help to keep muscles balanced and reduce the risk of lower back injury. A pre-work stretching program is highly recommended as part of a good ergonomic process. Warming up prepares your body for the physical work ahead and helps minimize the risk of injury.

A good stretching program should include both stretching and strengthening exercises. The three essentials are:

- Warm up
- Workout
- Cool down

Remember; check with your doctor before starting any stretching program.

Disregard the old maxim "no pain—no gain." Your muscles can be brought to excellent condition by using a sensible and slow approach. If the stretching and flexing causes pain, don't do it. With a new stretching program, however, temporary muscle ache is normal and may be expected.

Spending 5 – 10 minutes a day on stretching the back can help make a significant difference in how good your back feels and how well you function during the day.

Remember – practicing the principles of proper back care will help to prevent or minimize back problems.

Practice these four rules for back injury prevention.

1. WARM UP – before you start work.
2. TONE UP – with a good stretching program.
3. SIZE UP – the load. Don't lift more than you can safely handle.
4. WISE UP – by using good lifting techniques and materials handling equipment

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Backing Techniques



A National Highway Traffic Safety Administration (NHTSA) study determined that over 90% of backing accidents can be attributed to one of the following causes:

- Driver was unaware of the obstacle
- Driver used improper backing techniques

Yet, these accidents can be prevented by using some of the following simple accident prevention techniques:

Preplan trips to avoid or to minimize the need for backing.

- When entering an alley that does not permit drive through or turnaround, back into the alley, if allowed by local ordinance, since it is usually safer to back into the area with less traffic. This will enable you to see the traffic as you exit the alley.
- When backing out of an alley, ask someone to be your guide, and signal when it is safe to back into traffic.
- When a guide is used, instruct the guide to use appropriate hand signals rather than voice commands.
- The majority of backing accidents with bodily injury involve children under the age of 5. Make a walk around inspection of your vehicle before backing, especially in an area where young children can be anticipated.
- Park defensively to prevent your vehicle from rolling into another vehicle. If parking on an incline, turn the front wheels into the curb to prevent the vehicle from rolling.
- Park in the middle of the parking space. This will allow you room to exit the parking space without backing and provide space if backing is required.
- Never take any situation for granted. Even though you may have parked or backed into a location many times, evaluate the location to determine if clearances have changed or if new obstacles are present.
- Experience is required to develop good backing techniques. If you have access to a designated

area to practice backing – use it.

- Learn exactly how the rear of the vehicle responds to every little movement of the steering wheel. Practice - Practice - Practice!
- Know what's going on around you at all times and perform all backing maneuvers SLOWLY.
- Check all your mirrors when backing. Know the mirror blind spots. Conduct a walk around inspection of your vehicle to check these blind spots or get someone to guide you while backing. Know the clearance to all obstacles and the exact distance to your stopping point.

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Construction Quality - A Model Program



The aim of a quality control program is to prevent construction defects and to ensure the performance and durability of the constructed product.

There is not a one-size-fits-all program. The program must be customized to the unique organization taking into account its: size and complexity, organization, operations, culture, exposure to liability, potential for damages resulting from climate, moisture, and soil conditions.

Contractors can not rely exclusively on the local building inspector as a measure of acceptability. An effective quality program, like any other business program, must include a number of key components. Although easier said than done, the keys to quality construction are the use of consistent and qualified labor and materials, and verification of product quality against a known standard. For these components to be implemented effectively, management must be committed and take responsibility for quality. To reduce the risk of liability associated with construction quality, your quality related activities need to be documented. The 5 key components of the quality program can be listed as follows and are described in greater detail below:

- Management Responsibility
- Material Selection
- Workmanship
- Inspection
- Documentation

Management Responsibility for Quality

- **Written Policy** – The quality policy should be a brief statement which clearly describes the company's commitment to quality. It should be signed by the senior executive and any quality manager.
- **Quality Plan** – A quality plan provides needed quality controls of the construction process and

includes all relevant management, training, sub-contractor agreements, material purchase agreements and specifications, inspection procedures, and worker qualifications.

- **Assignment of Responsibilities** to craftsmen, crew supervisors, purchasing agents, quality manager. Some examples of assigned responsibilities are:

All employees have the responsibility to:

- Stop work that affects the condition in question until any unsatisfactory conditions are corrected.
- Stop work that affects the condition in question if the work would cover up any defects.
- Report all quality or safety concerns to the supervisor.

Craftsman are responsible for:

- Performing only work for which they are qualified.
- Using only approved materials, material use specifications, and procedures.
- Using materials and equipment which are not defective.

The Crew Supervisor is responsible to ensure that:

- Each job meets the contract requirements.
- The work complies with any applicable use instructions, codes, and regulations.
- A qualified craftsman is available to the job site when work is performed. Only approved materials and equipment are used.
- Job site inspections are performed and any non-conformances are corrected.

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The Purchasing Manager is responsible to ensure that:

- All purchasing contracts for materials, equipment and services comply with the requirements of the quality program.

- Material storage requirements
- Job readiness requirements
- Equipment and tools
- Inspection procedures
- Marking of any non-conformances
- Trade contract requirements
- Any product specific training

Material Selection

In most cases, since the selection of materials affects quality of the completed product, its fitness for the intended purpose must be verified. The assessment of materials' fitness must consider:

- Building code requirements
- Design specifications
- Demonstrated product performance capabilities and limitations
- UL approved or FM listed materials
- Compatibility of product systems

Materials must be inspected and stored properly, and any defects observed must be reported to the supplier promptly. A record of approved materials should be maintained and updated as needed.

Workmanship

To ensure proper installation and construction of approved materials, skilled, trained, and informed workers must be employed. In addition, every job should have a designated crew supervisor to perform inspections and oversee operations. Selection of workers should be based in part on their demonstration of key skill requirements. Following are some of the key components to ensure quality workmanship:

- Communication of quality program and their responsibilities for quality.

Training of craftsmen should include:

- Quality program responsibilities
- Use of approved materials
- Design requirements
- Installation requirements
- Work instructions

- Review and approval of workers by crew supervisor.

Trade contractor assessments should evaluate the capability of the trade contractor to:

Perform the specific types of work

- Complete job inspections
- Use qualified craftsmen
- Yield quality results
- Listed as an approved contractor by the product manufacturer

Job Site Inspection

Jobsite Inspection is a critical component to ensure quality construction materials and installation methods are being used at each stage of the construction process. Inspections detect any defects so that corrective action can be taken. Inspection forms are part of the inspection process and must be customized to the specific type of job and operation. Inspections are done by a qualified crew supervisor who must be available at critical job stages. Inspections are performed prior to start to determine readiness conditions during the construction process, and following the completion of the job. Below are more details of the purpose of each of these inspections.

- Readiness Inspection
 - Adequacy of work performed by previous trades that may affect installation quality
 - Building details are compatible with installation requirements
 - No adverse conditions that may impact quality
 - Available installation instructions
 - Only approved materials are available for use

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- Job site is suitable for work to begin
- Process Inspection
 - Crew supervisor inspections at each phase of construction as needed by quality plan
 - Inspection forms available
 - Verify use of specific tools and equipment where quality is affected
 - Any non-conformances, including materials, manufacturers' specifications, work instructions, and trade contracts are reported to management for correction
- Completion Inspection
 - Verify that construction requirements of trade contracts have been met
 - Provide record of any non-conformance
 - Actual measurements are made where dimensional specifications are available
 - Records are maintained
 - Verify that installation instruction needed for next phase is available

Documentation

To help protect against liability and to verify that key activities of the quality program have been completed, documentation is needed. Below are some of the items which should be documented and recorded.

- Materials approved and used
- Readiness, process, and completion inspections
- Resolution of non-conformances
- Training
- Approved trade contractors
- Trade contracts
- List of qualified craftsmen

Sample Quality Policy

Our company shall operate with an effective quality program that ensures the performance and durability of products we construct, and prevents construction defects. Our quality program applies throughout our company to all employees and work activities that affect quality. To this end, we are committed to:

- Use materials and equipment that are capable of performing
- Ensure that work is performed by qualified craftsmen
- Assign clear quality responsibilities in our contracts
- Ensure that job site inspections are done properly and documented
- Comply with any manufacturer specifications
- Comply with any building codes and regulations
- Follow any procedures contained in our quality manual

Senior Executive Signature

_____ Date _____

Quality Manager Signature

_____ Date _____

Quality Plan Design Considerations

A quality plan should define the necessary quality controls and take into account possible defects, frequency and severity, performance and durability, and the effect on final product quality.

Update the quality plan when a product or process is changed, or when the process is unstable or not capable of producing reliable results.

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The plan should include the following elements:

- Work instructions
- Approved materials
- Equipment and tools
- Inspector qualification
- Craftsman qualification
- Trade contractor qualification
- Material storage
- Inspection procedures
- Marking of non-conformances
- Posting of instructions for others

Trade Contracts

To provide a basis for an agreement between the general contractor and the subcontractor, the trade contract should clearly describe the work to be performed and the respective responsibilities of the trade contractor.

The following should normally be included in a trade contract:

- Job site location
- Dates of contract
- Product or system installed
- Responsibility for pre and post quality related activities
- Method of releasing work to start
- Specifications and conditions to be ready to start

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Construction Work Zones



Drivers who have no problems in routine driving may encounter them where road construction or repair is under way.

Drivers should first look out for construction warnings on highways. Some are difficult to notice and others may be overlooked due to anxiety over anticipated delays.

However, drivers who suddenly round a bend at high speed and come upon barricades and a survey party, a road maintenance vehicle, or perhaps a piece of heavy equipment in their lane or entering it, may lose control when they brake quickly and forcefully. In one case, sudden braking for a barricade caused a semi-trailer truck to overturn. The orange signs should be heeded.

The worst thing a driver can do when slowing down or stopping for changing road conditions is to lose his or her temper at the perceived annoyance and take chances in order to make up time or to merely put the situation behind him. A better approach is to take things in stride, to safely do what must be done to protect all parties.

The driver who stays alert for advance warning signs and prepares to follow them protects others. Drivers who do not see or who ignore warning signs and who crash into work areas are a leading cause of death for on the job highway construction workers. Drivers should not resent the necessary slowdown caused by road work but should cooperate with traffic controls. Above all, drivers should slow down for the small work party which may not have properly protected itself with adequate signs and barricades.

Furthermore, drivers who speed past construction sites where people work close to the road and where signs call for slow speeds sometimes hit workers or vehicles that have strayed from the work site onto the road. Since all parties present at road construction sites have a duty to act in a reasonable manner, it does not matter that "the other guy should not have been there."

Rocks and debris that may get on the road from the work site can be picked up by speeding vehicles and flung at the construction crew. The road being worked on is often left open to accommodate motorists, who should reciprocate by driving safely past the work site.

Flag people who direct traffic around a road construction project are highly visible in their bright orange vests, as they hold up their "Stop" and "Go" signs and inform drivers how to proceed through a single lane bypass. There are consequences for ignoring such "flaggers". In many states, disobeying flaggers and speeding in construction work zones is serious business, punishable by fines and imprisonment if it results in a bodily injury accident. Drivers near construction sites should consider that, in most cases, the slowdown is not serious and any delay will not last long.

Bypass lane pavement may not be as smooth as that of the expressway. In fact, it is likely to be rough, uneven, and possibly full of potholes. It could even be muddy and slippery. Drivers should enter bypass lanes slowly and carefully. Speeding through bypass lanes is much more likely to cause lurching, swaying, and loss of control.

Many construction projects are located such that a bypass alongside the work site is not possible. This is true in particular when a bridge is being replaced. In such cases a long detour is required, usually starting back at a crossroads that connects to an alternate route.

Such detours may involve more hazardous driving than a short bypass. They often make use of secondary roadways, or even unimproved country lanes. Use extreme caution to negotiate unexpected sharp turns in the detour without mishap.

While driving on any kind of an extended detour, be sure to watch for all detour turn signs to avoid getting far off course on uncharted roads. Remember that detour signs are considered temporary, and they may not be displayed

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as prominently as permanent road signs.

Although detour routes may include some stretches of good pavement, slower speeds are normally called for. Resist the temptation to pass other vehicles.

One type of detour that may catch some drivers used to relatively flat roadways unaware is that which involves poorly maintained mountain roads. Any driver who is likely to encounter such driving should consider a few pointers:

- Long pulls on uphill grades and steep inclines where excessive speeds can trap the unwary driver are to be expected in mountain driving.
- If the engine overheats in a long pull in high altitude, find a wide shoulder and stop. Raise the hood and let the engine cool.
- Slow down before entering a downgrade to avoid being fooled by the increase in speed.
- Steady, gentle pressure on the brake pedal is better than intermittent heavy braking, which does not allow enough time between jabs to cool overheated brakes.
- Shift to a lower gear on a steep downgrade and let the engine help with the braking.
- Do not downshift suddenly if the pavement is slippery. Sudden engine braking might cause a skid.
- If a vehicle continues to gain speed after downshifting, slow with the brakes and shift to an even lower gear.
- Never coast downhill in neutral or with a depressed clutch.
- Never turn off the ignition when going downhill.
- Stay on your side of the road and avoid the temptation to pass other vehicles, or to cut corners or swing wide on curves.
- Maintain a greater space cushion (following distance) behind other vehicles than usual, when going downhill, since it takes longer to slow down or stop.

Road construction projects may be frustrating, but they're necessary. So make the best of warnings and road conditions and always drive like a pro – with caution and good sense.

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Driver Distractions



This document is intended to assist CNA customers in developing a program that helps in the control of driver behaviors.

This bulletin provides:

- Information about severity of distracted drivers.
- Steps customers should take to help control their exposure.
- Support materials.
- Sample recommendations.

The University of North Carolina Highway Safety Research Center study titled, *The Role of Driver Distraction in Traffic Crashes*, found that an estimated 284,000 distracted drivers are involved in serious vehicle accidents every year.

Contributing factors were:

- Distractions outside the vehicle.
- Talking or listening on cell phone.
- Adjusting radio or CD player.
- Other occupants.
- Adjusting climate controls.
- Moving object in vehicle.
- Eating or drinking.
- Smoking.

More than 80% of the nation's 94 million cell phone owners use them while driving — at least sometimes. Many states have legislation to regulate cell phone use while driving. At least 13 nations, including England, Germany and Japan, have banned the use of cell phones when driving a vehicle.

In the past few years, cell phone usage has been an issue in several lawsuits, and employers are being held responsible if a worker causes an accident while talking on the phone. So why are employers concerned about

cell phones? Cell phone records can be subpoenaed to prove the employee was on the phone when the accident occurred.

Other distractions cannot be identified to a specific time, and many drivers don't want to say they were distracted and not driving safely.

Interestingly, the distraction problem does not seem to exist with two-way radios, which are as much a staple of contractors as cell phones. This is because those calls are usually much shorter. However, some states that ban handheld phones may consider two-way radios the same. You will need to check with your state's regulations on the use of two-way radios.

While there is no guaranteed defense to liability, developing appropriate policies, training and enforcement mechanisms can help limit potential liability and increase public safety. Some companies prohibit employees from using cell phones while driving on company time. In contrast, other companies adopt cell phone safety guidelines and focus on training and enforcement. Each company should determine whether the benefits of employee cell phone use outweighs the risk. Some examples of cell phone use policies include:

- Completely banning cell phone use while driving.
- Directing employees to comply with all state and local laws governing cell phone use.
- Requiring employees to pull over to take phone calls.
- Instructing employees to avoid or terminate phone calls involving stressful or emotional conversations.
- Prohibiting cell phone use in adverse weather or difficult traffic conditions.
- Prohibiting reading or writing while operating the vehicle.
- Planning calls prior to traveling or while on rest breaks whenever possible.

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- Restricting driver cell phone use to brief conversations.

To protect themselves, companies should consider establishing a written policy restricting any use of a cell phone and ensure employees read and sign the written policy. The restriction should include the use of hands-free headsets, since studies indicate it's the conversation, not the physical act of holding the phone that contributes to accidents. An insurance company's sample policy states:

- Cellular phones should not be used while operating a vehicle.
- Allow voice mail to handle your calls. Return the calls and messages when you are not driving.
- If you need to place a call or send a text, pull off the road to park in a legal and safe location.
- Ask a passenger to make or take the call.
- Inform regular callers of your driving schedule and when you will be available to talk.
- While driving, keep your hands on the wheel and your eyes and mind on the road

Sample Recommendations for Reducing the Risk

Driver Distractions

The number one cause of workplace fatalities is vehicle accidents. Studies have shown that inattentive driving is a leading contributor to vehicle accidents. The purpose of a fleet safety policy addressing driver distractions is to aid management in their efforts to increase vehicle operator safety and control exposures to loss. This policy should be reviewed with all new hires as part of their orientation and with existing employees on a periodic basis. Documentation (employee signatures) should be obtained to ensure all drivers have received, reviewed and understand the policy. A fleet safety policy regarding distractions should include at least the following items:

1. Driver acknowledgement form that explains what the employee is responsible for while driving for the company.
2. Cell phone use policy that limits or restricts usage and provides safe use instructions.
3. Process to inspect vehicles not only for mechanical items but for items that may cause unsafe

behaviors, such as radar detectors, objects hanging from mirrors, loose materials laying about, writing pads designed for use while driving, etc.

If a motor vehicle law of a state is more stringent than this policy, that law will supersede this policy.

Sample Fleet Safety Program Policy

As an authorized driver, you are required to do the following:

- Do not take chances. To arrive safely is more important than to arrive on time.
- Be mentally and physically rested and alert prior to each trip.
- No drinking alcoholic beverages while driving, or driving while under the influence of alcohol or restricted drugs.
- Have a valid driver's license for the type of vehicle to be operated, and keep the license(s) with you at all times while driving.
- Obey traffic laws.
- Never go faster than a rate consistent with existing speed laws, or road, traffic and weather conditions. Posted speed limits must be obeyed.
- Never attempt to exercise the right-of-way. Always let the other driver go first.
- Keep to the right except when overtaking slow-moving vehicles or when getting into a position to make a left turn.
- Never follow another vehicle so closely that you will not be able to make a safe stop under any conditions.
- While going into traffic and before every turn or lane change, use turn signals to show where you are heading,
- Slow down and watch for children in school zones.
- Only allow authorized people to drive vehicles.
- Do not give rides to hitchhikers or strangers.

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- Seat belts should be worn by drivers and passengers.
- Check your vehicle daily before each trip. In particular, check lights, tires, brakes, and steering. An unsafe vehicle should not be operated until repairs are made.
- As required by the law and the company rules, report all accidents immediately.
- Report all arrests and traffic convictions to the company. Repeated traffic convictions or failure to report traffic accidents or convictions may result in disciplinary action.
- Adhere to other safe driving rules adopted by your company, prescribed by the state or local laws, or by the applicable DOT Motor Carrier Safety Regulations.

Sample Driver Acknowledgement Form

When in possession/driving a vehicle provided by the company or any vehicle on company business, I acknowledge and agree that:

- 1) I will abide by the following operating rules/procedures including those specified by the company's Car & Van Drivers' Policies and Procedure manual.
 - a. I will notify the company (my supervisor/manager) if I am charged with a DUI/DWI and/or my driving privileges have been revoked, suspended or withdrawn, within one business day following receipt of the notice.
 - b. I will not operate a company vehicle:
 - i. i) if my ability or alertness is impaired through illness or fatigue; or
 - ii. ii) when impaired or intoxicated by alcohol and/or drugs; or
 - iii. iii) if my driving privileges have been revoked, suspended or withdrawn.
- 2) I understand that my Motor Vehicle Record (MVR) will be reviewed:
 - a. Once a year; or
 - b. At any time at the discretion of the company.
- 3) I understand the following safety rules/policies:
 - a. I will follow all motor vehicle laws for each state in which I operate a company vehicle.
 - b. Wireless telephones - I realize communication is important; however, conflict exists between safety and the utilization of a wireless phone in a vehicle. Therefore, wireless phones are not to be used when driving the vehicle.
 - c. Seat belts - As the driver, I must wear my seat belt at all times. The driver must also assure all passengers are wearing their seat belts. I will inspect belts periodically for possible cuts in the fabric or fabric loosening at the buckle or anchor brackets. I will keep the seat belts and shoulder harnesses clean and dry.
 - d. I will turn on my low beam lights in rain, fog, darkness or any other time visibility is hampered.
 - e. Tires - I will inspect tires at least weekly for pressure and wear.
 - f. I will lock the vehicle, and not leave keys inside the vehicle.
- 4) I understand the following maintenance rules/policies:
 - a. I will contact the Fleet Maintenance Department to schedule an appointment for periodic maintenance every 5,000 miles the company vehicle has traveled.
- 5) Accidents - I will take the following steps if I am involved in an accident in addition to completing the Drivers' Accident Report Kit located in each vehicle:
 - a. Take care of any injured persons. Don't try more than basic first aid (unless qualified), and move the injured as little as possible.
 - b. Call for medical aid (if required).
 - c. Call the police.

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- d. Report accident to Fleet Maintenance as soon as possible, no later than 24 hours.
- e. Get names and address of all parties and witnesses.

6) I understand the company has the right to implement appropriate disciplinary/corrective actions and/or revoke the use of my company vehicle at any time. Examples of reasons for the above actions include, but are not limited to the following:

- a. I have had my driver's license revoked, suspended or withdrawn for any reason.
- b. I have been charged for operating any vehicle while impaired or under the influence of alcohol, drugs or controlled substances.
- c. I have been charged for leaving the scene of an accident.
- d. I have had two or more at fault accidents, or three or more moving violations, or one at fault accident and two moving violations in a three-year period.
- e. There is evidence of gross negligence, recklessness or incompetence in operating a vehicle.
- f. Making a false accident report.
- g. Allowing use of the company vehicle by an unauthorized driver.

7) I understand that if I allow an unauthorized individual to use the company vehicle and it is involved in an accident, I am responsible for all damages to the company vehicle and to any other vehicles, property, and/or individuals involved.

I have read and understand my obligations listed above concerning the possession and use of a company vehicle. Further, I understand that failure to abide by this agreement shall result in suspension/revocation of my company vehicle privileges and/or disciplinary action.

Name (print)

Signature

Date

Resource

<http://www.nhtsa.gov/people/injury/airbags/Countermeasures/pages/Chapt4/1p1CellPhLaws.htm>
retrieved July 6, 2010.

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Excavation



Introduction

The Occupational Safety and Health Administration (OSHA) issued its first Excavation and Trenching Standard in 1971 to protect workers from excavation hazards. Since then, OSHA has amended the standard several times to increase worker protection and to reduce the frequency and severity of excavation accidents and injuries. Despite these efforts, excavation-related accidents resulting in injuries and fatalities continue to occur.

To better assist excavation firms and contractors, OSHA has completely updated the existing standard to simplify many of the existing provisions, add and clarify definitions, eliminate duplicate provisions and ambiguous language, and give employers added flexibility in providing protection for employees. The standard is effective as of March 5, 1990.

In addition, the standard provides several new appendices. One appendix provides a consistent method of soil classification. Others provide sloping and benching requirements, pictorial examples of shoring and shielding devices, timber tables, hydraulic shoring tables, and selection charts that provide a graphic summary of the requirements contained in the standard.

This booklet highlights the requirements in the updated standard for excavation and trenching operations, provides methods for protecting employees against cave-ins, and describes safe work practices for employees.

Scope and Application

OSHA's revised rule applies to all open excavations made in the earth's surface, which includes trenches.

According to the OSHA construction safety and health standards, a trench is referred to as a narrow excavation made below the surface of the ground in which the depth is greater than the width—the width not exceeding 15 feet. An excavation is any man-made cut, cavity, trench, or

depression in the earth's surface formed by earth removal. This can include excavations for anything from cellars to highways.

General Requirements

Planning for Safety

Many on-the-job accidents are a direct result of inadequate initial planning. Correcting mistakes in shoring and/or sloping after work has begun slows down the operation, adds to the cost, and increases the possibility of an excavation failure. The contractor should build safety into the pre-bid planning in the same way all other pre-bid factors are considered.

It is a good idea for contractors to develop safety checklists before preparing a bid, to make certain there is adequate information about the job site and all needed items are on hand.

These checklists should incorporate elements of the relevant OSHA standards, as well as other information necessary for safe operations.

Before preparing a bid, these specific site conditions should be taken into account:

- Traffic
- Nearness of structures and their conditions
- Soil
- Surface and ground water
- The water table
- Overhead and underground utilities
- Weather

These and other conditions can be determined by job site studies, observations, test borings for soil type or conditions, and consultations with local officials and utility companies.

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Before any excavation actually begins, the standard requires the employer to determine the estimated location of utility installations – sewer, telephone, fuel, electric, water lines, or any other underground installations – that may be encountered during digging. Also, before starting the excavation, the contractor must contact the utility companies or owners involved and inform them, within established or customary local response times, of the proposed work. The contractor must also ask the utility companies or owners to find the exact location of the underground installations. To find the exact location of underground installations, workers must use safe and acceptable means. If underground installations are exposed, OSHA regulations also require that they be removed, protected or properly supported.

NOTE: Federal Law titled the "Comprehensive One-Call Notification Act of 1997" requires all states to establish local One-Call centers, and excavators must call the center prior to excavation per state regulations.

When all the necessary specific information about the job site is assembled, the contractor is ready to determine the amount, kind, and cost of the safety equipment needed. A careful inventory of the safety items on hand should be made before deciding what additional safety material must be acquired. No matter how many trenching, shoring and backfilling jobs have been done in the past, each job should be approached with the utmost care and preparation.

Before Beginning the Job

It is important, before beginning the job, for the contractor to establish and maintain a safety and health program for the work site that provides adequate systematic policies, procedures, and practices to protect employees from, and allow them to recognize, job-related safety and health hazards.

An effective program includes provisions for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards and potential hazards that may arise from foreseeable conditions. The program may be written or verbal, but it should reflect the unique characteristics of the job site.

To help contractors develop an effective safety and health program, in 1989, OSHA issued recommended guidelines for the effective management and protection of worker safety and health. The complete original text of the recommended guidelines is found in the Federal Register (54 FR (18):3904-3916, January 26, 1989).

A copy of the guidelines can be obtained from the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., Room N-3101, Washington, D.C. 20210, or from the nearest OSHA Regional Office.

To be sure safety policies are implemented effectively, there must be cooperation among supervisors, employee groups, including unions, and individual employees. Each supervisor must understand the degree of responsibility and authority he or she holds in a particular area. For effective labor support, affected unions should be notified of construction plans and asked to cooperate.

It is also important, before beginning work, for employers to provide employees who are exposed to public vehicular traffic with warning vests or other suitable garments marked with or made of reflectorized or high-visibility material and to ensure that they wear them.

Workers must also be instructed to remove or neutralize surface encumbrances that may create a hazard.

In addition, no employee should operate a piece of equipment without first being properly trained to handle it and fully alerted to its potential hazards.

In the training and in the site safety and health program, it also is important to incorporate procedures for fast notification and investigation of accidents.

On-the-Job Evaluation

The standard requires that a competent person inspect, on a daily basis, excavations and the adjacent areas for possible cave-ins, failures of protective systems and equipment, hazardous atmospheres, or other hazardous conditions. If these conditions are encountered, exposed employees must be removed from the hazardous area until the necessary safety precautions have been taken. Inspections are also required after natural (e.g., heavy

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rains) or man-made events, such as blasting, that may increase the potential for hazards.

Larger and more complex operations should have a full-time safety official who makes recommendations to improve the implementation of the safety plan. In a smaller operation, the safety official may be part-time and usually will be a supervisor.

Supervisors are the contractor's representatives on the job. Supervisors should conduct inspections, investigate accidents, and anticipate hazards. They should ensure that employees receive on-the-job safety and health training. They should also review and strengthen overall safety and health precautions to guard against potential hazards, get the necessary worker cooperation in safety matters, and make frequent reports to the contractor.

It is important that managers and supervisors set the example for safety at the job site. It is essential that when visiting the job site, all managers, regardless of status, wear the prescribed personal protective equipment such as safety shoes, safety glasses, hard hats, and other necessary gear (see CFR 1926.100 and 102).

Employees must also take an active role in job safety. The contractor and supervisor should make certain that workers have been properly trained in the use and fit of the prescribed protective gear and equipment, that they are wearing and using the equipment correctly, and that they are using safe work practices.

Cave-ins and Protective Support Systems

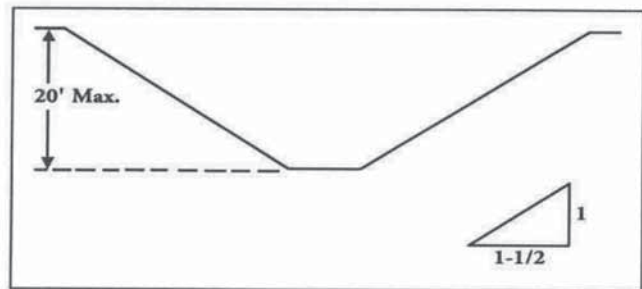
Support Systems

Excavation workers are exposed to many hazards, but the chief hazard is danger of cave-ins. OSHA requires that in all excavations employees exposed to potential cave-ins must be protected by sloping, or benching the sides of the excavation; supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area.

Designing a protective system can be complex because of the number of factors involved – soil classification, depth of cut, water content of soil, changes due to

weather and climate, or other operations in the vicinity. The standard, however, provides several different methods and approaches (four for sloping and four for shoring, including the use of shields) * for designing protective systems that can be used to provide the required level of protection against cave-ins.

*See Appendix F to the standard for a complete overview of all options.



One method of ensuring the safety and health of workers in an excavation is to slope the sides to an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal). These slopes must be excavated to form configurations that are in accordance with those for Type C soil found in Appendix B of the standard. A slope of this gradation or less is considered safe for any type of soil (see Figure 1).

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 ½:1.

A second design method, which can be applied for both sloping and shoring, involves using tabulated data, such as tables and charts, approved by a registered professional engineer. These data must be in writing and must include sufficient explanatory information to enable the user to make a selection, including the criteria for determining the selection and the limits on the use of the data.

At least one copy of the information, including the identity of the registered professional engineer who approved the data, must be kept at the worksite during construction of the protective system. Upon completion of the system, the data may be stored away from the job site, but a copy must be made available, upon request, to the Assistant

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Secretary of Labor for OSHA.

Contractors also may use a trench box or shield that is either designed or approved by a registered professional engineer or is based on tabulated data prepared or approved by a registered professional engineer. Timber, aluminum, or other suitable materials may also be used. OSHA standards permit the use of a trench shield (also known as a welder's hut) as long as the protection it provides is equal to or greater than the protection that would be provided by the appropriate shoring system (see Figure 2).

The employer is free to choose the most practical design approach for any particular circumstance. Once an approach has been selected, however, the required performance criteria must be met by that system.

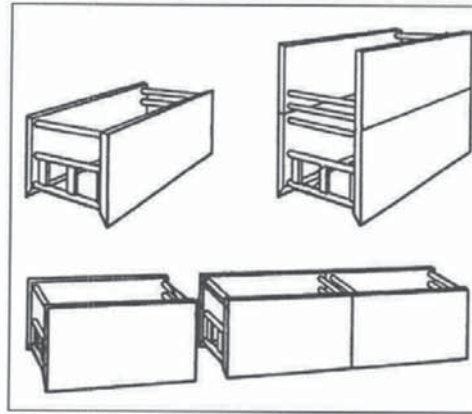
The standard does not require the installation and use of a protective system when an excavation (1) is made entirely in stable rock, or (2) is less than 5 feet deep and a competent person has examined the ground and found no indication of a potential cave-in.

Safety Precautions

The standard requires the employer to provide support systems such as shoring, bracing, or underpinning to ensure the stability of adjacent structures, such as buildings, walls, sidewalks or pavements.

The standard prohibits excavation below the level of the base or footing of any foundation or retaining wall unless: (1) a support system such as underpinning is provided, (2) the excavation is in stable rock, or (3) a registered professional engineer determines that the structure is sufficiently removed from the excavation and that excavation will not pose a hazard to employees.

Excavations under sidewalks and pavements are also prohibited unless an appropriately designed support system is provided or another effective method is used.



Installation and Removal of Protective Systems

The standard requires the following procedures for the protection of employees when installing support systems:

- Securely connect members of support systems
- Safely install support systems
- Never overload members of support systems
- Install other structural members to carry loads imposed on the support system when temporary removal of individual members is necessary

In addition, the standard permits excavation of 2 feet or less below the bottom of the members of a support or shield system of a trench if (1) the system is designed to resist the forces calculated for the full depth of the trench, and (2) there are no indications, while the trench is open, of a possible cave-in below the bottom of the support system. Also, the installation of support systems must be closely coordinated with the excavation of trenches.

As soon as work is completed, the excavation should be backfilled as the protective system is dismantled. After the excavation has been cleared, workers should slowly remove the protective system from the bottom up, taking care to release members slowly.

Materials and Equipment

The employer is responsible for the safe condition of materials and equipment used for protective systems. Defective and damaged materials and equipment can result in the failure of a protective system and cause excavation

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hazards.

To avoid possible failure of a protective system, the employer must ensure that (1) materials and equipment are free from damage or defects, (2) manufactured materials and equipment are used and maintained in a manner consistent with the recommendations of the manufacturer and in a way that will prevent employee exposure to hazards, and (3) while in operation, damaged materials and equipment are examined by a competent person to determine if they are suitable for continued use. If materials and equipment are not safe for use, they must be removed from service. These materials cannot be returned to service without the evaluation and approval of a registered professional engineer.

Other Hazards

Falls and Equipment

In addition to cave-in hazards and secondary hazards related to cave-ins, there are other hazards from which workers must be protected during excavation-related work. These hazards include exposure to falls, falling loads, and mobile equipment. To protect employees from these hazards, OSHA requires the employer to take the following precautions:

- Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge of excavations, or have retaining devices, or both.
- Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alert operators of the edge of an excavation. If possible, keep the grade away from the excavation.
- Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees against falling rock, soil, or materials.
- Prohibit employees from working on faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.
- Prohibit employees under loads that are handled by lining or digging equipment. To avoid being

struck by any spillage or falling materials, require employees to stand away from vehicles being loaded or unloaded. If cabs of vehicles provide adequate protection from falling loads during loading and unloading operations, the operators may remain in them.

Water Accumulation

The OSHA standard prohibits employees from working in excavations where water has accumulated or is accumulating unless adequate protection has been taken. If water removal equipment is used to control or prevent water from accumulating, the equipment and operations of the equipment must be monitored by a competent person to ensure proper use.

OSHA standards also require that diversion ditches, dikes, or other suitable means be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Also, a competent person must inspect excavations subject to run-offs from heavy rains.

Hazardous Atmospheres

Under this provision, a competent person must test excavations greater than 4 feet in depth as well as ones where oxygen deficiency or a hazardous atmosphere exists or could reasonably be expected to exist, before an employee enters the excavation. If hazardous conditions exist, controls such as proper respiratory protection or ventilation must be provided. Also, controls used to reduce atmospheric contaminants to acceptable levels must be tested regularly.

Where adverse atmospheric conditions may exist or develop in an excavation, the employer also must provide and ensure that emergency rescue equipment, (e.g., breathing apparatus, a safety harness and line, basket stretcher, etc.) is readily available. This equipment must be attended when used.

When an employee enters bell-bottom pier holes and similar deep and confined footing excavations, the employee must wear a harness with a lifeline. The lifeline must be securely attached to the harness and must be

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separate from any line used to handle materials. Also, while the employee wearing the lifeline is in the excavation, an observer must be present to ensure that the lifeline is working properly and to maintain communication with the employee.

Access and Egress

Under the standard, the employer must provide safe access and egress to all excavations. According to OSHA regulations, when employees are required to be in trench excavations 4 feet deep or more, adequate means of exit, such as ladders, steps, ramps or other safe means of egress, must be provided and be within 25 feet of lateral travel. If structural ramps are used as means of access or egress, they must be designed by a competent person if used for employee access or egress, or a competent person qualified in structural design if used by vehicles. Also, structural members used for ramps or runways must be uniform in thickness and joined in a manner to prevent tripping or displacement.

Related Issues

Hazard Communication

The Hazard Communication Standard (29 CFR 1910.1200) requires employers to inform employees of the identities, properties, characteristics, and hazards of chemicals they use and the protective measures they can take to prevent adverse effects. The standard covers both physical hazards (e.g., flammability) and health hazards (e.g., lung damage, cancer). Knowledge acquired under the Hazard Communication Standard will help employers provide safer workplaces for their employees, establish proper work practices, and help prevent chemical-related illnesses and injuries.

Access to Medical and Exposure Records Under the provision of the Access to Medical and Exposure Records standard (29 CFR 1910.20), employees, their designated representatives, and OSHA are permitted direct access to employer-maintained exposure and medical records. This access is designed to yield both direct and indirect improvements in the detection, treatment, and prevention of occupational disease. Also, access to these records will assist employees in the management of their own safety and health.

Recordkeeping

Each employer must preserve and maintain accurate medical and exposure records for each employee. The standard requires that exposure records be kept for 30 years and medical records be kept for at least the duration of employment plus 30 years. Background data for exposure records, such as laboratory reports and work sheets, need be kept only for 1 year.

Records of employees who have worked for less than 1 year need not be retained after employment, but the employer must provide these records to the employee upon termination of employment. First-aid records of one-time treatment need not be retained for any specified period.

The employer must inform each employee of the existence, location, and availability of these records. When an employer plans to stop doing business and there is no successor employer to receive and maintain these records, the employer must notify employees of their right to access of their records at least 3 months before the employer ceases to do business. At the same time, the employer also must inform the National Institute for Occupational Safety and Health.

State Plan States

States administering their own occupational safety and health program through plans approved under section 18 (b) of the Occupational Safety and Health Act of 1970 must adopt standards and enforce requirements at least as effective as federal requirements. There are currently 25 state plan states; 23 covering private and public (state and local government) sectors and two covering public sector only.

Summary

Trenching and excavation work presents serious risks to all workers involved. The greatest risk, and one of primary concern, is that of a cave-in. Furthermore, when cave-in accidents occur, they are much more likely to result in worker fatalities than other excavation-related accidents. Strict compliance, however, with all sections of the standard will prevent or greatly reduce the risk of cave-ins, as well as other excavation-related accidents.

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