

**SHEET METAL AND AIR CONDITIONING
CONTRACTORS' NATIONAL ASSOCIATION**

SAFETY TOOLBOX TALKS

Volume 2



SMACNA



Safety Toolbox Talks

Volume 2

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Foreword

The Safety Committee of the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) has developed the SMACNA SAFETY TOOLBOX TALKS - Volume 2 for all contractor members of SMACNA

This document is intended to provide general safety and health refresher training material. For compliance with the requirements of OSHA, please refer to the 29 CFR 1910 Standards for General Industry and 29 CFR 1926 Standards for Construction

SMACNA accepts no liability for the consequences of reliance on the contents of these Toolbox Talks.

1996 SMACNA Safety Committee

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Introduction

How to Use Toolbox Meeting Topics

1. Plan the meeting a week in advance so you can become familiar with the topic. Gather any materials you intend to hand out at the meeting. If possible, use actual equipment or visual aids to illustrate your points.
2. Hold the meeting in your work area. A good time for a meeting is first thing in the morning or after lunch when the work will not be interrupted and the work area is relatively quiet. You may want to bring coffee and donuts for a morning meeting.
3. Have the meetings every week, but show your support for safety on the job every single day.

Tips for Successful Meetings

1. Limit each talk to between 10 and 15 minutes. Don't let the meetings turn into a gripe session about unrelated topics. **STAY FOCUSED.**
2. Give recognition. Start each meeting by complimenting the workers for some recent good work by saying something in a positive sense.
3. Give the talk in your own words. Each of the safety topics gives general information and should only be a reference for your discussions. You should always customize your talks to fit your own operations.
4. Get your people to participate. The purpose is to get workers to think about safety problems. Make the talk a discussion and have the workers identify hazards and explain what to do about them. Encourage suggestions for improving jobsite safety.
5. Reinforce the positive points brought out during the discussion at the end of the meeting.
6. When practical, discuss other safety issues at the end of the meeting. This is also a good time to review a Material Safety Data Sheet (MSDS).

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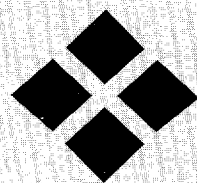
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Chapter One



Driving

Luck is Not Enough



All the luck in the world is not enough to keep a bad driver out of trouble indefinitely.

Driving takes skilled, safety conscious personnel who have knowledge of the road and decision making ability. A driver must be in charge of his own vehicle and look out for others at the same time.

Safe driving is a full time job. There is no time for day dreaming, focusing on the radio, or talking at length on the phone, should you have one available. Your mind is already directing your feet and hands when driving, don't overload your circuits with more demands.

Obey the laws and be a courteous driver. Laws are in place for your driving protection and once broken, you have neutralized your defenses. Also, it is very stressful to be a hostile driver. Hostility definitely leads to trouble on the road. You will be a lot less stressed if you just let the rude driver go on by without incident.

A professional driver has foresight and can size up problems ahead of time by being alert, which involves recognizing accident causing factors right away. He will avoid being a contributing factor in an accident.

Unfortunately, there will always be unskilled drivers on the road. You must develop skills that will help compensate for this. Be alert and be focused, defensive driving is a full time job.

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Correct Driving Positions



To control fatigue and stress while driving, it is important to check your seating position before taking off. Sit with your shoulders comfortably back in the seat and hold the steering wheel at the 3 and 9 o'clock positions or a little lower. By positioning your hands on the outside rim of the wheel, it is less likely your hands will be forced off in a frontal crash. Your arms should be slightly bent, not fully extended and not back against your body.

After adjusting your seating, adjust your mirrors and your headrest. **BEFORE YOU EVEN START YOUR ENGINE, BUCKLE YOUR SEAT BELTS.** In the event of an accident, you cannot control your vehicle while ricocheting around on the inside of it.

Using Your Mirrors—3 Things to Remember:

1. Check the adjustment of your mirrors to be sure you are getting the maximum possible field of view.
2. If you have flat mirrors and convex mirrors, note the field of view of each type and how much overlap of fields there may be.
3. Once the mirrors are adjusted, make sure they are tight so the adjustment does not change while you are driving.

You should be able to move your foot from the accelerator to the brake pedal without lifting your heel from the floor. Since most cars now have disc brakes with an antilock feature, in an emergency drivers should push down hard on the brake and keep it depressed. Do not pump the brakes, this is a method that applied with older drum and shoe braking systems. An antilock brake system uses a computer to prevent the wheels from locking and skidding in a hard stop. This helps you stop quicker on slippery roads and steer while braking. Vehicles with this feature have a 10% lower accident rate and this figure increases to 20% when the roads are slippery.

Like any piece of machinery you may operate, your vehicle will respond better if it is properly adjusted to where you can reach controls and can be in command.

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A Big, Big Mistake



Some people really think that they can hold on or brace themselves during vehicular impact. A quick slam on the brakes can throw you out of your seat, or projectile objects in the vehicle. An impact into or from another vehicle is unlike any quick stop you may have incurred. There is no warning, it is sudden and it can be deadly. You may even be the projected object. You could be slammed into a wall, tree, or into the path of an oncoming vehicle. Also, you cannot possibly keep any degree of control of your vehicle while you are being thrown around and the more movement you are allowed, the greater your injury may be.

So what is the logical reason YOU REFUSE TO WEAR YOUR SEAT BELT?

Certainly there is no logic in exposing yourself to danger, and the reason cannot be reasonable, it can only be a bad excuse.

In a collision you have a choice you can:

- ▲ Hit the Windshield;
- ▲ The Steering Column; Or
- ▲ Your Safety Belt

The Choice Is Yours Only If You BUCKLE UP AHEAD OF TIME

Think of yourself as a professional driver at all times. Employ safe and defensive driving habits. Develop pride in your abilities, and never, never take even a small chance. You should be above sloppy and dangerous driving techniques. Do it right from the first step, buckle up. Use it as a reminder that you are a responsible driver!

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Driving Knowledge



It is impossible to be an accomplished defensive driver, if we don't know the laws that govern driving in our own state.

Knowledge of laws is NOT enough though. Keep an open mind and **KNOW THE LAW**. Remember that none of us can ever know everything there is to know about driving.

Speeding—Is It Legal?

Is it legal to exceed the speed limit when passing? **NO!**

If traffic is already moving at the posted speed there is no reason to pass.

To pass a vehicle you must increase your speed 5 to 10 miles per hour.

Thus, to pass a vehicle that is moving the posted speed you must break the law by speeding

Alertness

As alert drivers we must keep ourselves free of distraction and focused on what's going on all around our vehicles

Foresight

Is the ability to anticipate and prepare for most eventualities.

It means being able to size up traffic situations as far ahead as possible, anticipate how they are likely to develop and decide whether these developments will endanger us.

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The Road Ahead



Curves

When driving, it is important to adjust your speed for curves in the road. If you take a curve too fast, the wheels can lose their traction and continue straight forward, causing you to skid off the road. Or, the wheels may keep their traction and the vehicle will flip over. Tests have proven that trucks with a high center of gravity can roll over even when doing the posted speed limit for a curve.

Slow down to a safe speed **BEFORE** entering into a curve. Braking while already into a curve is dangerous because it is easier to lock the wheels up, causing a skid. Slow down as needed. Never exceed the posted speed limit for a curve. Be in a gear that will let you accelerate slightly in the curve. This will help you keep control.

Expand your look-ahead capacity

Looking ahead only a short distance while driving is a dangerous trap. It is dangerous because you may not see what is happening down the road.

You may not see someone:

- ▲ Running a Red Light
- ▲ Running a Stop Sign
- ▲ Pulling into Moving Traffic
- ▲ Stopping Ahead

If you do not look ahead to spot trouble, you may **RUN INTO IT** when you get there!!

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Back Off



Vehicle accidents impact your company's cash flow, timely commitments, and the most valuable resource - the employees. Although getting to your destination on a timely basis is important, nothing can be more disruptive than having a vehicular accident.

Vehicular accidents are costly and in many cases can be prevented.

One of the most common of vehicular accidents is the rear-end collision caused by following other drivers too closely. Tailgating is not only a safety problem but a public relations problem also. Remember that your company's name is posted on the side of your vehicles and you may be presenting a negative image. By tailgating on a regular basis you are literally playing Russian Roulette on the highway.

It is impossible for a driver to "stop on a dime." The stopping distance, which is the total distance needed to come to a complete stop:

- ▲ Of an automobile moving 60 mph on a hard, dry pavement is 366 feet. That is longer than a football field;
- ▲ In a pickup, the stopping distance is 426 feet;
- ▲ In a heavy two-axle truck, 436 feet; and
- ▲ In a three-axle truck, 531 feet.

If you add in other factors like wet pavement, a downhill grade, or poorly adjusted brakes, you will need the length of about several football fields to come to a complete stop.

One way of reducing tailgating accidents is to master the "four-second rule." This is the most basic of defensive driving techniques. As the vehicle ahead passes a fixed point, such as a tree or a bridge, check your distance by counting "one thousand, one thousand two..." until you have counted to four. If you reach the fixed point before you have finished counting then you are following too closely. Remember, this rule applies only under ideal road and weather conditions. Rain, ice, snow, or reduced visibility will require a greater following distance.

It may not always be easy to maintain that safety cushion, with other drivers trying to pull into it, but it can be done. The key to reducing rear-end collisions is to keep the proper distance from the vehicle ahead or behind. The best allowance you can make as a driver is to just SLOW DOWN. A few more seconds on the road is well worth a reduction in rear end collisions.

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Drinking and Driving



The Effects of Alcohol

Have you ever had one or two drinks while out with friends and just felt so tired while driving home you could hardly keep your eyes open? Did you just assume it was because it was so late at night, because you did not get much sleep the night before, or that you had a real long day?

Alcohol acts as a depressant to the central nervous system. It makes you tired and slows down the brain's ability to make quick and accurate decisions. Not all drinking and driving accidents that occur involve drivers that are drunk. In many alcohol related accidents the drivers did not have more than a couple of beers.

Have you ever heard that a cold shower or hot coffee sobers up a drunk person?

Nothing can sober up someone who is drunk except time. Sticking someone in a cold shower or giving them hot coffee only wakes them up and makes them an angry drunk. Let them sleep it off. It is the nicest thing you can do for a drunk person and it could save a life.

Designate a driver before the drinking begins so you are guaranteed a safe ride home. If you must drive, wait at least one hour for each drink consumed before driving. It takes the body that long to process and remove the alcohol from your system.

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Driving in the Rain or Fog



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- ▲ Use your windshield wipers. Inspect your blades regularly and replace them when necessary.
 - ▲ Defrosters and/or fans will help cut condensation on the inside of the car windows. If you have a choice, select outside air instead of recycling interior air. This will help control condensation.
 - ▲ In fog, roll down the side window part way and turn off the radio so you can hear better with less distractions.
 - ▲ Use low beams on headlights. Turning them on high only reflects light off the fog and impairs your vision more.
 - ▲ Slow down and keep moving. If you must stop make sure you are completely off the road.
 - ▲ On wet pavement, apply the brakes smoothly and evenly in front-wheel drive vehicles. Use a quick even pumping action for a rear-wheel drive vehicle. Never pump anti-lock brakes.

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Night Driving



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- ▲ For best visibility, keep all mirrors, lights, and windshields clean.
 - ▲ Remember to remove sunglasses at nightfall.
 - ▲ Make sure you are visible at dusk, turn your headlights on early.
 - ▲ Make sure the headlights are properly adjusted and aimed.
 - ▲ Your eyes take seven seconds to recover from the glare of oncoming vehicles. If oncoming headlights make it difficult to see the road, focus on the right edge of the pavement.
 - ▲ Before pulling out onto the road let your eyes adjust to the darkness.
 - ▲ Reduce your speed. Your stopping distance should be no greater than the visible distance of your headlights.
 - ▲ If you have trouble seeing at night let someone else do the driving.

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Winter Driving



-
- ▲ **Slow down on ice or snow.** Braking distances on ice can increase by up to 10 times the normal distance.
 - ▲ **Do not slam on your brakes when on an icy spot.** When approaching icy spots, slow down gradually to retain vehicle control.
 - ▲ **Never pump anti-lock brakes.** Use an even quick pumping action for rear-wheel drive OR slow steady pressure for front wheel drive.
 - ▲ **Turn the front wheels in the direction of the skid when skidding.**
 - ▲ **Window peepholes are not sufficient.** After a snowfall clean both front and back windows completely. Try to push excess off the roof of the vehicle to prevent snow from sliding down onto clear windows.
 - ▲ **Snow tires are an advantage.** Make sure you have proper snow tires or all-weather radial tires that are in good condition.
 - ▲ **Always allow extra time to get where you are going.**
 - ▲ **Use sunglasses or the sun-visor on sunny days.** The winter sun can be glaring and the reflection off of the snow can be blinding.
 - ▲ **Be aware of the narrowing roadways.** As the snow banks at the edge of the roads get bigger the roads get more narrow, making slipping and sliding even more dangerous with other vehicles around.

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Skidding



If your car starts skidding you should:

- A. Turn the wheel in the opposite direction of the skid.
- B. Step on the brake firmly.
- C. Turn the wheel in the direction you want the vehicle to go.
- D. None of the above.

The correct answer is C: Turn the wheel in the direction you want the vehicle to go.

You may be confused because you were expecting to hear "Turn in the direction of the skid." These two responses are really the same thing. Turning the car in the direction of the skid and turning the car in the direction you want to go is the same thing.

If the back of your vehicle is skidding right, then turn the wheel right to counteract the skid. This will be turning in the direction of the skid, and turning the way you want the car to go.

The terminology has changed because old instructions were not clear, and in the midst of panic, drivers had a hard time figuring out what their back wheels were doing. Turning the wheel in the direction you want the car to go is what you do even when not skidding.

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Tire Failure



In the event you experience tire failure while operating an automobile, there are four important aspects to reacting safely.

1. Be aware that a tire has failed. Quickly knowing you have tire failure will provide more reaction time. Even a few seconds of reaction time, to remember what to do, can be helpful. Below are warning signs of a possible tire failure.

- a. Sound: A blowout is always associated with a "LOUD BANG". It can take a few seconds for your vehicle to react to a blowout, so NEVER assume it was some one else's vehicle when the noise is heard.
- b. Vibration: If you notice your vehicle vibrating or thumping heavily, it may be a sign of a flat tire. If a rear tire is flat this may be the only sign.
- c. Feel: If the steering feels heavy, it is possible that a front tire has failed. Sometimes, failure of a rear tire can cause your vehicle to "fishtail", but dual rear tires will usually prevent this.

2. Hold the steering wheel firmly. A front tire failure can twist the steering wheel from your grip. Keeping a firm grip on the steering wheel with both hands at all times is the only way to prevent this.

3. Stay off the brake. In an emergency, the natural reaction is to brake. Braking when a tire has failed could cause you to lose control of your vehicle. Unless you are about to hit something, stay off the brake until the vehicle has slowed down.

4. Check the tires. After coming to a stop, get out and check all the tires. This should be done even if the vehicle appears to be handling well. If one of your dual tires has gone, the only way you may know is by looking at it.

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Railroad Crossings



Every 90 minutes a collision between a train and a motor vehicle occurs in our country. A train may be coming at any time!

Specified vehicles are required to completely stop before crossing a railroad track or tracks at grade. The vehicle should be stopped within 50 feet of, and not closer than 15 feet to tracks. After coming to a complete stop, listen and look in each direction along the tracks for an approaching train. When it is safe, cross the tracks in a gear that permits the vehicle to complete the crossing without a change of gears. Gears should not be shifted while crossing the tracks. The following specified vehicles must come to a complete stop:

1. Buses transporting passengers.
2. Any motor vehicle transporting any quantity of chlorine.
3. Vehicles carrying any hazardous material or placarded, as defined in the Hazardous

Materials Regulations of the Department of Transportation.

Every other vehicle other than those listed above should slow down and yield upon approaching a railroad grade crossing. The tracks should not be crossed until due caution has been taken and the course is clear.

All vehicles must stop at rural crossings with no flashing lights or crossing gate.

Be Cautious!

1. Always expect a train.
2. Watch out for a second train on any track.
3. Get out of a vehicle that is stalled on a crossing.
4. Stop as soon as the lights begin to flash.
5. Never drive around gates and NEVER race a train to the crossing.

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Secure Your Load



Recently, a truck was traveling on an interstate highway and lost a ladder in traffic. Three vehicles following the truck were damaged. Fortunately, no one lost control of their vehicle nor were there any serious injuries.

Can you imagine driving 55 mph and seeing a 30 foot ladder coming towards you?

More recently, a plumber forgot to secure a box of plumbing parts. While traveling, the box fell from the truck and struck another vehicle.

Don't assume your load will only fall from the back of your vehicle. Secure it from all sides.

A truck carrying several pipes stopped short at a light and one pipe came over the cab of the truck, flew through the rear windshield of the car in front, and out of the front windshield of that same car. Fortunately, the pipe went right between the two front seats of the car, otherwise it could have taken someone's head with it through the windshield.

As driver of a vehicle, you are responsible to make sure all loads are secure before moving. Not just for the safety of others, but also for yourself. Anything that can fall off the rear of your vehicle also has the potential to fly through your cab when you stop short. A pre-trip walk-around your vehicle is necessary, each time, to inspect for unsecured loads.

How many times have you driven behind a truck and/or trailer hauling an unstable pile of junk? If the junk falls off, who do you think will suffer the consequences? Not the driver of the truck, he is in front of the action. There is a good chance you will be the one who suffers, either from personal injury or physical damage.

If at all possible, do not follow directly behind vehicles or trailers that are transporting loads. Either change lanes, pass the vehicle, or increase your following distance to allow for an escape route.

People have died from debris flying off of vehicles.

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Back It Up Safely



This writer was once a passenger in a vehicle when the driver started the engine, put the car in reverse and backed into a tree. The driver never looked first and misjudged his distance. Checking his position first was free. Repairing the damage was not! What foolish things we can do when we get in too big a hurry to be cautious. Not a second was saved by this careless act.

Backing is not normal. We must generally twist and turn to be sure our way is clear. Do what you can to avoid the problem by trying to plan your routes and parking so backing will not be necessary. Think ahead!

When you must back up, use all caution. Check ALL of your mirrors. Turn around and keep an eye on your path; Conditions can change quickly. Do not hang out of the driver's door to see what is behind you. This leaves three sides of your vehicle unwatched.

Never back around a corner at an intersection to turn around, drive around the block instead. Always try to use an alternate plan, try to eliminate your exposure.

In residential areas, small children can appear quickly and can be unpredictable. Go slowly and allow them space. You understand the dangers. They do not always understand them because they are busy playing.

There is a lot to watch for, it takes a lot of defensive driving to remain safe. You are a professional driver; Employ safe driving practices. Remember, your exposure is increased but your skills should be even greater.

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Vehicle Fires



Vehicle fires can cause both injury and damage. It is important we learn what causes fires, how to prevent them, and how to extinguish them.

Some causes of vehicle fires are:

1. Spilled fuel or improper use of flares after a vehicular accident.
2. Underinflated tires or duals that touch.
3. Loose connections in the electrical system or short circuits due to damaged insulation.
4. Loose fuel connections, improper fueling, or driver smoking.
5. Flammable cargo that is improperly sealed or loaded, or poor ventilation.

Tips for prevention are:

1. Keep a check on the electrical, fuel, and exhaust systems.
2. Whenever stopping, observe wheels, tires, and vehicle body for signs of heat.
3. Always follow safe procedures when refueling the vehicle or handling flares.
4. Check gauges and instruments for signs of overheating.
5. Be cautious with flammables.

Properly extinguishing fires is very important. Fires have been made worse by drivers not knowing what to do. Below are some fire fighting tips.

1. Immediately get the vehicle off the road. Park in an open area, away from buildings, trees, brush, other vehicles, or anything else that may catch fire. Do not pull into a service station!!! If you can, notify police.
2. Keep the fire from spreading. With an engine fire, turn off the engine as soon as you can. If avoidable, do not open the hood. Shoot extinguisher through louvers, radiator, or from underside.
3. Use the correct fire extinguisher. The B/C type will work on electrical fires and burning liquids. The A/B/C type will work on burning wood, paper, and cloth. Never use water on an electrical fire, you may get shocked, or a gasoline fire, because the flames will spread. Water can be used to extinguish burning wood, paper, or cloth. A burning tire requires cooling, and a lot of water may be necessary. If you are unsure what to do, wait for qualified fire fighters.
4. Learn proper procedures for using a fire extinguisher before you need it.
5. Stay as far away from fire as possible when using the extinguisher.
6. Aim at the base of the fire.
7. Position yourself upwind from the fire. Let the wind carry the extinguisher to the fire instead of carrying the flames towards you.
8. Continue extinguishing until whatever was burning has been cooled. Just because the flames or smoke have ceased does not mean the fire is completely out or cannot restart.
9. Only extinguish a fire if you know what to do and it is safe to do so.

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Lock It or Lose It



Recently, a company had a vehicle stolen while an employee was on company business. The employee left the keys in the ignition and left the vehicle unlocked. Upon returning, approximately 13 minutes later, the employee found the vehicle had been stolen. We are all victimized by a crime such as this through rising insurance costs and it is your responsibility to make this crime tougher to commit.

During the past decade, automobile theft has emerged as one of the fastest growing crimes in the United States. It is estimated that one in every hundred registered vehicles is stolen and two out of every hundred have parts or property stolen from them. 48% of these crimes occur in parking lots and 30% occur on streets, roads, or highways. At the time of theft 25% of vehicles are unlocked, 20% have keys left in the ignition, and 2% are actually left running.

Tips for preventing auto theft are:

1. NEVER leave a vehicle unlocked, even if you will only be gone for a minute.
2. NEVER leave the keys in the ignition of an unattended vehicle for ANY period of time.
3. NEVER leave a running vehicle unattended.
4. NEVER leave the windows of a vehicle cracked enough that a thief can have easy access.
5. Avoid parking a vehicle in an isolated area. If it is dark, park in a well lit area.
6. If you notice anyone suspicious in the area, report them to the proper authorities.

In the event a theft does occur:

1. Call the police immediately.
2. Remain calm and be prepared to give them all the information they will need.
3. Always know the make, model, and license plate number of the vehicle you are in or call the office for the information.
4. Check around in the area for any witnesses to the crime.

❖ SMACNA Safety Toolbox Talks ❖

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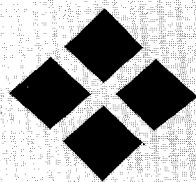
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Chapter Two



Electrical

Electricity for Non-electricians



We use a lot of electricity for light and power. Bad light and belt-driven machines were man-killers in the days before industry went electric. But like any good thing—electricity can be deadly if it is misused.

Your job assignment does not require you to be a qualified electrician and we don't expect you to know how to handle electrical repairs. But there are a few facts about electricity you ought to know to guard yourselves against electrical shock.

The first thing is this - it isn't the amount of voltage in a circuit that makes the difference between life and death. What make the difference is the amount of current that runs through the vital parts of your body.

Even the 110 volt power in your home can kill if you come in contact while standing on a concrete floor, touching a water pipe or providing some other grounding path.

Here are some suggestions that will keep you safe from electrical hazards:

- ▲ Use Ground Fault Interrupters (GFIs) on construction sites, around your home, in wet locations, and locations where a ground path exists such as a water faucet or pipe.

- ▲ If any electrical device near your work area sparks, overheats or smokes, don't try to repair it yourself. Shut it off and report it.

- ▲ Stay away from all electrical switches, fuse boxes, or other devices unless you have been authorized to handle them and instructed in their use. Even if you think you understand them completely, it's better to remember the old saying, "A little knowledge is a dangerous thing."

- ▲ If you are authorized to replace fuses, follow the operating instructions you've been given faithfully. An apparently harmless variation may be deadly. And never bridge a fuse with a nail or other metal. The fuse is your best safety device on any electrical circuit.

- ▲ When you must use any electrical equipment (including portable electrical tools or extension lights) in a situation where there is a lot of moisture around or where you have to contact grounded metal (particularly water or heating pipes). **GET CLEARANCE FROM YOUR SUPERVISOR FIRST.**

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Lockout and Tagging of Circuits



Controls that are to be deactivated during the course of work on energized or de-energized equipment or circuits shall be tagged. Equipment or circuits that are de-energized shall be rendered inoperative and shall have tags attached at all points where such equipment or circuits can be energized. Tags shall be placed to identify plainly the equipment or circuits on which work is being done.

“Lockout and tagging”: While any employee is exposed to contact with parts of fixed electrical equipment or circuits which have been de-energized, the circuits energizing the parts shall be locked out or tagged.

“De-energizing equipment”: Safe procedures for de-energizing circuits and equipment shall be determined before circuits or equipment are de-energized. The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Circuit control devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

“Application of locks and tags”: A lock and a tag shall be placed on each disconnecting means used to deenergize circuits and equipment, on which work is to be performed. The lock shall be attached so as to prevent persons from operating the disconnecting means, unless they resort to undue force or the use of tools. Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag. If a lock cannot be applied, or if the employer can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock. A tag used without a lock shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by use of a lock.

Each lock and tag shall be removed by the employee who applied it, or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task, provided that:

- A. The employer ensures that the employee who applied the lock or tag is not available at the workplace, and
- B. The employer ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.
- C. There shall be a visual determination that all employees are clear of the circuits and equipment.

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Lucky Friday the 13th



A 3-phase, 4160 volt to 480/277 volt transformer was fed directly from an adjacent power pole. There were 3 fuse disconnects at the top of the pole for the 4160 primary voltage feed. The middle phase had previously grounded and the fuse had blown.

An electrician was contacted to check the other 2 phases to make sure they were clear. The electrician was previously told that all of the voltage to the transformer had been de-energized. He proceeded to unbolt and open the transformer doors. He had a wrench to remove the lug bolt on the 4160 volt connection, but before he touched it, discovered the wrench was too small.

The electrician returned to his truck to get a larger wrench and when he got there, he decided to take his voltage meter back with him to ensure the voltage had been de-energized. The only voltage meter he had was one with a maximum 600 volt limit.

When he returned to the transformer, he proceeded to test the voltage. When the 2 probes made contact, a loud explosion occurred and a large ball of fire erupted in his face. The circuit was not de-energized and the 4160 volts completely destroyed the voltmeter.

The electrician came within 6 inches of what could have been a fatal accident. Fortunately, his only injury was a scratch on the cornea of his right eye because he was wearing contact lenses.

Recommendations:

1. NEVER, NEVER, NEVER accept someone else's word or assume that a circuit is de-energized.
2. Before testing know the potential voltages and make sure the meter is rated high enough.
3. Always assume circuits are energized and wear safety glasses.

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Extension Cords



Nothing about an extension cord suggests danger. There are no moving parts, no flames, no noise. It is harmless looking, yet it can be dangerous if misused.

Good cords should be used all the time, preferably ones that are approved and tested by Underwriter's Laboratories. Cords that show wear should be repaired or discarded.

There are some hazards in using extension cords that only you can control. First of all, no extension cord can stand rough usage. If you kink it, knot it, cut it, or crush it, and even bend it, you can break the insulation which may cause a short circuit and a fire or even an electric shock.

Most cords used carry regular 110-volt electricity. Now, no doubt at some time you have received a shock from a 110-volt line without serious harm—just a great tingling sensation. But, even a 110-volt current can kill, it is not harmless. The conditions, however, must be right.

The right conditions may consist of you making a good connection with the live wire carrying a 110-voltage with wet or sweaty hands, and standing on a wet floor, a stream or water pipe, or another electrical connection.

So, protect that extension cord you use. Coil it in large loops, not in close kinked coils. Don't bend it unnecessarily. Don't subject it to strain. A cord should never be left hanging down in a passageway or laid on the floor where people can step on it. The reasons are simple— to prevent a tripping accident and to prevent damage to the cord.

If an extension cord does show signs of wear; or if you know it has been damaged, turn it in for a new one. Don't repair it yourself.

In special situations, special types of cords are needed. Some cords are water-resistant, others are not. Some are insulated for heat resistance, others are designed to withstand the action of solvents and other chemicals that may be present.

These rules should be applied for safe use of extension cords:

- ▲ Handle the cord gently, avoiding strain, kinking, crushing or cutting.
- ▲ String it where it will not be hit or tramped on.
- ▲ If it shows any signs of wear, turn it in and get a new one.
- ▲ If moisture, heat or chemicals are present, be sure your cord is the proper type to resist the conditions there.

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Electric Power Cords



Perhaps the most abused tool on the construction job site is the electrical cord. They are kinked, twisted, cut, pulled and crushed almost constantly. On some jobs, it's surprising just how much punishment they do take.

Unfortunately, these damaged cords also take their toll in injuries and even fatalities. In one incident, a worker was installing ventilation ducts and received a slight jolt from the exposed conductors on a damaged electrical cord. The shock didn't kill him, but he fell backward four feet off a scaffold and struck his head. The fall paralyzed him permanently from the waist down.

Don't take electrical cords for granted. They can be a big help to us, but they can also hurt. Keep these pointers in mind:

- ▲ Visually inspect the cord for damage and exposed conductors. If the cord is in damaged condition, don't use it.
- ▲ Inspect to make sure that the ground prong is in good condition and that the cord provides a satisfactory ground for the electrical tools being used.
- ▲ Do not drag cords over rough surfaces and don't use them to lift or pull materials. Electrical cords were not designed to function as ropes.
- ▲ Do not disconnect cords by jerking them out. They should be disconnected by grasping the plug at the receptacle.
- ▲ Do not string electrical cords through water or oil and grease. Also, don't hammer nails or staples into cords.
- ▲ When not in use, the electrical cord should be neatly coiled and stored.

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Portable Electric Tools



The most serious hazard in the use of portable electric tools is electrical shock. Most tools are tested for leakage of electricity before they leave the manufacturer, but at any time something can go wrong and cause a short circuit.

When you use a portable electric tool on metal, you can protect yourself in several ways: Wear rubber boots or rubber soled shoes, and use the ground wire or a three-way plug. Don't use portable electric tools where there are explosive gases or dust unless the motors are explosion-proof.

Rules for Portable Electric Tools

1. Use only equipment that is in good condition. Take good care of it.
2. Be sure the tool is properly grounded.
3. Report the following unsafe conditions:
 - ▲ Defective or broken insulation on cords;
 - ▲ Improper or poorly made connections to terminals;
 - ▲ Broken or otherwise defective plug;
 - ▲ A loose or broken switch;
 - ▲ Brushes sparking or copper dust around the vents.
4. Don't overstrain the tool, and overload the motor.
5. Never use a portable electric tool in the presence of flammable vapors or gases unless it is designed for such use.

Report all Defective Electrical Equipment

Unless you're using a tool in a stand or jig, leave the control in the trigger so that the tool can be stopped automatically. In other words, don't use the switch lock on the tool.

A few special precautions should be mentioned, too. As you know, a heavy-duty drill or an impact wrench rotates with terrific force. If the tool gets jammed, the operator can be upset in a fraction of a second. That's why you should be especially careful when you use these tools on scaffoldings, skeleton framework or other high places.

Portable saws, if not used properly can cause serious problems. Operators must follow these safety rules:

- ▲ Be sure the guard is in place before you start the machine. Keep it there as long as the power is on.
- ▲ Keep other employees away from the plane of rotation to avoid injury if the machine is operating. A broken saw blade or abrasion disc can put a man in a hospital for a long time.
- ▲ Remember: Portable electric tools can be used safely if they're used with care and common sense.

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Grounding Portable Electric Tools



There's a widespread but mistaken idea that 110 volts can't injure a person. Each of you should think about the dangers of low voltage electricity, especially if you use portable electric tools.

The possibility of death from electrical shock doesn't depend entirely on the voltage of the power supply. It depends on the resistance of the human body which varies greatly among individuals and on the conditions under which a person is working. It takes only 1/10 of an Amp to kill you.

One cause of electrical shock when using portable electric tools is failure of the insulation between the current-carrying part and the frame of the tool. When the insulation fails, fatal electric shock, severe burns, and falls from one level to another may result.

Electricity always tries to reach a ground potential and will always take the path of least resistance. If the outer metal shell of a defective tool becomes energized, the operator sets up a direct path through his own body between the energized tool and the ground itself. This ground can be the earth or it can be some structure like pipes or steel building structures that are in contact with the earth. Body resistance is lowered when you work in wet areas or sweat heavily. Then electricity can flow easily through vital regions of your body.

Keep portable electric tools in good condition through use of a regular inspection program. But you have to do your share by turning in a tool as soon as you see that it needs repair.

When you work in wet areas, near a water pipe, grounded tank, and other reinforcing rods that may be grounded, be extra careful to keep yourself as dry as possible. Stand on a wood platform or wear rubber boots. In places where tools may become very wet, use only tools designed especially for that type of service.

When you notice defects in trigger switches, connecting rods, plugs, or receptacles, report them immediately so that repairs can be made. Don't use the tools.

Regardless of the grounding circuit, unsafe conditions should be respected and corrected at once. Remember, there's no excuse for unsafe equipment.

"It only takes 1/10 of an Amp to kill a person"

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Lightning



Lightning. A random and unpredictable force of nature that's been around as long as time itself. It is mentioned in the Bible and the Koran, the Muslim Holy Book. Early Greeks believed lightning to be a weapon of Zeus. Hindus, African Bantu Tribesmen, and Navajo Indians all hold it in very high regard. Lightning!

According to figures published in 1992 by the National Weather Service, lightning claims the lives of 75 to 300 people annually in the United States. Twice that number sustain serious injuries. Of all strike victims, 70 percent are survivors that suffer serious long term after effects.

In slow motion, as lightning approaches the earth it's looking for a place to go. It's trying to follow a basic law of physics called the "Path of Least Resistance." And as it is a hundred meters, 300 feet or so off the ground, it selects the most electrically active target on the ground. It could be a golfer with a nine iron, or a blade of grass, or a tree in the forest, or a power line. We don't know. What we do know is objects on the ground in the shadow or the electrical path of lightning are excited and electrified and they go through stages of excitement starting with rapid ionization of molecules leading up to St. Elmo's fire and then launching actually an upward streamer to meet the downward streamer of the lightning stroke from the clouds.

Whether you work or play, indoors or out of doors, you are at risk. So, here's what you can do to better protect yourself against a lightning strike whether it be direct or indirect.

1. Practice the "Flash-to-Bang" theory. As soon as you see a flash, start counting. For every slow count of five, lightning is a mile away. Take immediate defensive action at a count of ten at least.
2. Take shelter in a building and stay away from doors and windows, or an enclosed metal vehicle like a car. Motorized golf carts are completely unsafe.
3. Stay away from metal objects. Don't touch, work or be near fences, metal pipes, steel structures, conduits, or plug-in electrical devices.
4. Do not use the telephone. Turn off and/or unplug computers and all appliances.
5. If outdoors, seek the low ground. Avoid hillsides, tall trees, machinery and water and assume the airline crouch position. Feet together, hands on knees, and stay away from other people.
6. Administer CPR and other first aid immediately to anyone injured by lightning, and call for help.

Since lightning is a completely random event, you must do all you can to lower your odds of being struck.

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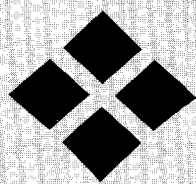
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Chapter Three



Material Handling

Manual Handling



It's a pretty good bet that everyone on this job has injured a hand, fingers, toes or back at one time or another, while handling materials.

In our type of work we probably do more manual handling than is done in any other industry. What with tools, sheet metal, steel, and all the other items that have to be moved on any construction job, we are exposed more times, in more ways and to more different sizes, shapes and weights than employees in any other occupation.

Each year, manual handling of objects and material produces many disabling injuries in the construction industry.

Let's review some proper manual handling methods to help to reduce these injuries:

- ▲ Don't try to carry too bulky or too heavy a load. Get help. Always be sure you can see where you're going.
- ▲ Before you set material down, be sure that your fingers and toes are in the clear.
- ▲ Watch out for sharp rough edges. When handling such, protect your hands with gloves.
- ▲ Lift gradually-do not jerk.
- ▲ Avoid twisting when carrying a heavy load-if you have to turn, do so by shifting your feet.
- ▲ Also, when carrying loads, keep them as close to your body as possible.
- ▲ When carrying long pieces, look out for others. As a general rule, the leading end of long pieces should be high and the trailing end should be low.

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Lifting



Almost everyone has experienced a sore back: If you haven't, don't brag about it because it could easily happen the next time you lift an object. The following statements are particularly true when referring to back injury claims:

- ▲ They do not know they are lifting wrong.
- ▲ They misunderstand the lifting instructions.
- ▲ They do not consider the instructions important.
- ▲ They are not given specific instructions.
- ▲ They deliberately disregard instructions.
- ▲ They haven't been properly trained.

To avoid back strains - Learn to lift properly.

Don't lean forward to pick up an object without bending the knees. Squat and lift with your leg muscles. If you lift with the knees straight, the work must be done with the lower back muscles and they are not built for this task. Also, as the back approaches an upright position, the lower back sways in.

Be very careful if you must lift anything higher than your chest, especially if you must hold it away from your body. If you hold a weight in this way, it will pull you forward causing a back strain.

- ▲ Keep the load near your body.
- ▲ Lifting and twisting with a load is dangerous.
- ▲ Be careful not to slip or trip with or without a load.
- ▲ Ordinary standing will strain your back. When you must stand, bend the hip and knee by placing your foot on a box or stool. This will correct swayback and help relieve the strain.

Other injuries can be sustained by lifting or moving objects the wrong way.

▲ **Sprains** - A weakening of a joint and related muscles by a sudden or excessive exertion. These might be wrists, knees, etc.

▲ **Hernia** - Protrusion of an organ (often the intestines) because of a pulling apart of the body's muscle lining.

▲ **Wounds** - Cuts and bruises, usually on the hands, fingers or toes.

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Proper Lifting Procedures



Most of us know how to lift properly to prevent back injuries and hernias. But let's review what we should watch out for when lifting, handling and carrying loads.

- ▲ Size up the load and decide how to grasp it securely.
- ▲ Make sure the load is not too heavy for you to lift alone.
- ▲ Carefully examine the load for sharp edges, nails, metals strips or bands, splinters or anything that could pierce or cut you.
- ▲ Face the load squarely—don't attempt to raise the load if your body is twisted.
- ▲ Determine the center of gravity of the load and grasp it accordingly.
- ▲ Place your feet in a stable and comfortable position.
- ▲ Bend at the knees in a squatting position.
- ▲ Keep your back straight, but in a comfortable position-not fully vertical.
- ▲ Lift with your strong leg muscles, not your weaker back muscles.
- ▲ Position the load as close to your body as possible.
- ▲ Ease the load up; don't jerk it because inertia makes it heavier.
- ▲ If the load seems to be too heavy to lift alone, don't hesitate to get help.
- ▲ Determine the path you will take to move the load and make sure it is free of all obstructions.
- ▲ While carrying the load, always look where you are going, watching for anyone or anything that is approaching you, even from the sides.
- ▲ To lower the load, use the same basic lifting steps in reverse.
- ▲ When the load is lowered, a pinch point is created. Watch your fingers, hands and feet.

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Material Storage



A poorly arranged stack of materials can be quite dangerous. If it has been stacked incorrectly, a sudden bump can cause it to collapse.

Materials such as pipe should be stacked neatly and chocked so that it cannot roll. All materials should be stacked in rows for easy access and pick-up rather than indiscriminately dumped in piles. Materials such as pipe and fittings should be stacked according to size so that "burrowing" for a particular piece is not necessary.

Bagged materials should not be stacked the same width all the way to the top of the pile.

Materials stored in cartons should be kept away from moisture to keep cartons from collapsing. They should never be stacked higher than the height listed on the carton.

Stack materials so that they don't interfere with other activities and are readily accessible for use. If the material you are stacking is too heavy, too high to reach, or improperly piled, get help. Some materials take only common sense to stack. If you don't know the safest way ask for assistance. Each material has its own way of being stacked correctly. Beware of the "jackstraw system".

The purpose of stacking the materials is to create a safe storage without danger to others and also to allow more room in the warehouse or job site. A good safe pile is very important; an unsafe pile could kill, paralyze or otherwise injure someone. Surplus job site materials and tools should be returned to the warehouse.

Another caution-be sure to keep aisles and passageways clear in the storage area.

Taking the time to do the job of storing the material correctly can save space, time, injuries and even lives.

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Handling Materials



For the next five minutes let's talk about keeping our fingers and toes safe when we handle materials. There are a great many hazards on the job because materials come in various sizes, weights and shapes. Since they do, we have to find the best way to handle them with maximum safety and minimum cost. You are probably aware of many of the hazards, but it might be a good idea to refresh our memories.

We won't spend much time talking about the materials which we handle by rigs or cranes. You realize that when a heavy load is being handled by crane, everyone knows they should stand clear so they won't be caught under the boom or the load.

Instead, let's talk about handling materials by hand. The fact is, more backs, hands, fingers and toes are injured in construction than by any other type of material handling operation.

The proper methods of handling are to...

- ▲ First, bend at the knees and keep your back straight.
- ▲ Get a good grip on the object and be sure your footing is firm. Lift with the leg muscles instead of the back muscles because your leg muscles are the most powerful.
- ▲ Again, bend at the knees when you get ready to lower the material or set it down.
- ▲ Never try to move a load that's too heavy or too clumsy to be handled by one man. When this type of load must be moved, ask one of your fellow workers to help you.
- ▲ Don't try to carry too bulky a load. Always be sure you can see where you are going.
- ▲ Watch for sharp or jagged edges. When you handle sharp materials, wear gloves.
- ▲ Before you set materials down, be sure your fingers and toes are in the clear.
- ▲ When you pile block stone, bricks, etc., see that you have clearance for your fingers so they won't be wedged between pieces of material.
- ▲ Wear safety shoes.

Remember that common sense and know-how will save a lot of pain.

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Overhead Loads



A young construction worker was killed the same day his wife was coming home from the hospital with their first child. How did this occur? A heavy, bulky section was being transported by a crane, which had to carry it six or seven feet in the air to clear other objects. The load was equipped with taglines, which were being used to guide it by all of the workers except this young man. Although warned by his foreman to use the line, he didn't. A lifting pad gave way and he was killed instantly.

If it's in the air, it's dangerous

This incident reminds of a slogan: "If it's in the air, it's dangerous." This is something to remember even if the mechanical equipment seems to be in good condition.

Safety Rules

A load that can be carried close to the ground can be stabilized by a person at each end. These individuals must stay in the clear at all times, and the ground surface must be unobstructed and reasonably level. Taglines should always be used where needed. And definitely where the load is to be carried more than five feet above the ground. In some cases, ten-foot taglines should be used to guide loads being raised and lowered, rather than using extremely long lines that drag around the job and can snag on something.

On all jobs, only one person, generally the lead person, should give signals to the crane operator. If you are assigned the job of directing the crane, follow these basic rules:

- ▲ Stand in the clear and place yourself where the operator can plainly see you and you can see the operator.
- ▲ If you can't see the load and another person is signaling to you, be sure everyone is in the clear before you give the signal to the operator. Remember, it takes time to relay signals.
- ▲ Never permit a load to be lowered, raised, or swung over a worker's head. If the operator can see the load, it's the operator's responsibility-without exception-to see that this rule is followed.

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Falling Objects



Falling objects can be materials, tools, equipment or other employees, and if they land on you, you can be seriously injured or even killed.

Let's look at the problem of materials. Materials are piled in the yard, in the truck, or at various places on the job site. The phrase "Piling up Trouble" surely fits the situation when you pile material improperly. All materials should be piled on a sound base, straight and steady, and at a reasonable height. It may be well to crosstie and cover the material for protection and safety.

Piling materials on scaffolds requires special care. You have to be sure not to overload, to allow ample space for work operations, and to make the piles stable. Be sure toe boards are placed on all scaffolding and open elevations to safeguard employees below from falling materials, loose brick, tools, equipment.

When you want to send material, tools or equipment to higher elevations, use containers or buckets and hand lines. Never throw materials or tools. When you pull on a hand line, be sure to stand clear of the loaded materials and tools. Keep an eye on the load as it goes up. When you have to pull up materials that can't be placed in a container, fasten the load securely to the hand line. If materials like pipe, conduit, and rods aren't properly fastened in bundles, a piece can be jarred loose and hit the man pulling the hand line.

Tools, equipment and materials often fall when men attempt to carry them up ladders. Use hand lines so your hands will be free to hold onto the ladder when you go up. When you load hoists and platform skips, be sure the materials and packages are stacked safely. A sloppy load is a load of trouble. Never leave a load suspended.

Where scaffolds are not provided and you work at an open elevation, wear a safety belt or harness and secure the life-line. Working from swing staging is also a dangerous operation and requires the utmost care to prevent falls of equipment, materials and employees. A safety belt or harness is a must!

We know what precautions the company takes to protect us. Now let's all do our share to keep objects from falling. We will prevent injury to employees below us as well as to ourselves.

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Forklifts



Driving a forklift is like driving a car or other vehicle. Rules of the road must be followed, and all drivers must be trained and licensed to operate these vehicles.

The following do's and don'ts should be observed by all forklift truck operators:

- ▲ Before operating the truck each day, check the tires, fluid levels, radiator, battery, fire extinguisher, brake, deadman control, warning lights, horn and reverse indicators.
- ▲ Travel in reverse when carrying a bulky load which blocks vision in front.
- ▲ Face a load uphill when driving on an incline and downhill when the truck is empty.
- ▲ Travel at a safe speed and use extra caution on hills, corners and ramps.
- ▲ Check the stability of a load before moving it.
- ▲ Never lift loads which exceed the rated load capacity on the nameplate.
- ▲ Follow all jobsite traffic rules and take extra care in areas where pedestrians are present.
- ▲ Lower the fork and remove the key before leaving the truck.
- ▲ Forklift trucks should be inspected on a daily basis for any defects or problems, and the forks should be checked for cracks and dents each day.
- ▲ Defects must be reported to your supervisor.

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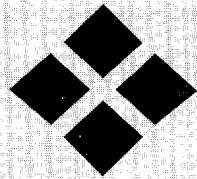
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Chapter Four



Scaffolds & Ladders

Scaffolding



Perhaps no job site conjures up a more dangerous image than one involving scaffolding. And with good reason. According to the U.S. Bureau of Labor Statistics, falls from scaffolding are the leading type of fatal falls for the past three years. It's a long way up, and an even longer way down. Just ask anyone who's ever been in a scaffolding accident.

Accident Victim

"I broke my right leg in two places, the left leg in four places, the left ankle was crushed, it's not a moveable part of my body, I've learned to adjust to it." But he wouldn't have to have adjusted to not being able to bend his ankle, if all those years ago someone just took the time to set up the scaffolding properly.

In today's safety meeting we're going to examine the safest way to erect and work around scaffolding. The proper safety practices will give you the confidence of knowing that you'll be back on the job tomorrow.

Safety belts or harnesses must always be worn when working around scaffolding. The only time you don't have to wear a belt or harness is if guardrails are in place on the scaffold. Of course, belts and harnesses aren't going to do you a lot of good unless you tie off with them. As soon as you reach a height of six feet, OSHA says you must tie off. In general, the ideal way to tie off is to the structure you are working on. This offers the most support. However, that's not always possible. Sometimes it's necessary to tie off to the scaffolding itself. In no case should you tie off to free-standing scaffold unless it is otherwise tied to something else that will keep it from falling.

Regardless of what you are tying off to, OSHA mandates that the anchorage point must be able to withstand 5000 pounds. And again, if guardrails are in place on the scaffolding, tying off is not necessary.

Other ways to ensure safety include making sure that the foundation is level and suitable for scaffolding.

- ▲ Always check the braces that hold the scaffold together and make sure they're locked down.
- ▲ On mobile scaffolds, the wheels must also be locked down with pins in case something is run over while the scaffold is being removed. That way the wheels won't come off and topple the scaffold.
- ▲ Of course, personnel should never be on the scaffolding when it's being removed.
- ▲ Toeboards should always be in place to keep tools from rolling off and injuring someone below.
- ▲ Ladders and gates should always be used to make sure you climb up and onto the platform with the least risk possible.
- ▲ Once on the scaffold, never overload it. OSHA says scaffolds must be able to support at least four times the intended load.

According to OSHA, 90 percent of fatal scaffolding accidents happen while workers are performing their normal jobs.

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Working From Scaffolds



A common unsafe practice which adds greatly to the hazards of working on scaffolds is throwing tools or materials to your partner or employee.

Remember, never throw, always pass, any tool or piece of material that you want another person to have. If you throw a tool, you may not only injure the other person or strike someone who is unlucky enough to get in the line of flight, you may break the tool and/or cause property damage.

When you're working on a scaffold, have a hand line and bucket or some other receptacle to raise or lower tools and light materials. When you have to pass anything to another person not on your scaffold and you can't reach him, lower the object to the ground with your line and have the helper transfer it to the other person's line.

Do not let anyone else throw something towards you. This applies not only to another person on the scaffold, but also to the ground person. If you need some tool or a piece of material, insist on raising it by means of your hand line or the material hoist.

Don't throw or drop anything to the ground. Sure, you can warn those below to get out of the way and direct the drop or toss so the object will strike within a given space, but how about the fellow who may walk or drive in from another area without having been warned?

If you unintentionally drop a tool or piece of material, be sure to warn those below with a "heads up" call so they'll have a chance to get clear underneath.

Remember, that some day you will be the person on the ground and another's carelessness and disregard of safe practices could cause injury to you.

Always consider the other persons' safety and most likely, they will consider yours.

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Rolling Scaffolds



A foreman was walking through a warehouse under construction one day when he heard a call for help. On investigation he found two men from one of the mechanical trades standing on a tilted rolling scaffold and hanging onto the bar joists overhead. After he had replaced the casters which had dropped out of the high side of the scaffold base, the mechanics were able to set the scaffold down on the level. They had been rolling the scaffold along when it started to tilt. Fortunately they held onto the joists so the scaffold did not overturn but it had tilted far enough to let the casters fall out and they could not set the scaffold down or it would have overturned in the opposite direction.

The Steel Scaffolding Institute suggests a number of safety rules for rolling scaffolds, including the following:

- ▲ Do not ride rolling scaffolds.
- ▲ Remove all material and equipment from platform before moving scaffold
- ▲ Caster brakes must be applied at all times when scaffolds are not being moved.
- ▲ Do not attempt to move a rolling scaffold without sufficient help-watch out for holes in the floor and overhead obstructions.
- ▲ The working platform height of a rolling scaffold must not exceed four times the smallest base dimension unless guyed or otherwise stabilized.

Questions for Discussion:

- ▲ What is the maximum number of scaffold sets that can be joined without going above a safe height?
- ▲ Which of the Scaffolding Institute safety rules had been violated by the men in the incident just covered?

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Ladders



Straight Ladders

- ▲ Always place a ladder at the proper angle. The distance from its feet to the base of the wall should be about one-fourth the length of the ladder.
- ▲ To keep the ladder from slipping-use ladder shoes...or hooks at top...or lashing at top or bottom... or nail a board to floor against ladder feet. For brief jobs, someone can hold the ladder.
- ▲ Be sure to carry the head of ladder high enough to clear any obstructions. Always carry with safety feet to the rear.
- ▲ It takes two men to safely extend and raise an extension ladder. Extend only after the ladder has been raised to an upright position. Never carry an extended ladder.
- ▲ Never use two ladders spliced together. Get one that is long enough for the job.

Step Ladders

- ▲ Open the stepladder all the way, and always lock the spreader to prevent collapse.
- ▲ Never stand on the top or next to the top step, unless the ladder has a guard rail for this purpose.
- ▲ Select a ladder that is high enough. Avoid makeshifts to gain additional height.
- ▲ Have another employee hold the base of the ladder if its height causes it to be unstable.
- ▲ Never use a stepladder as a straight ladder by leaning it against a wall or other support.
- ▲ Never straddle the top rung of folding or stepladders.

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Straight Ladders



Ladders are a simple device for safe-climbing—and that may be their biggest faults. Employees using them tend to mistake simplicity for harmlessness, forgetting precautions or rules of proper use. That kind of mistake every year causes thousands of accidents and disabling injuries.

Most accidents with straight ladders are due to slipping or skidding. They are easy enough to prevent; by equipping the ladder with a non-slip base like “Safety feet,” for example, or by blocking the base of the ladder. Lashing the ladder is another precaution against its moving or slipping, and to make sure the lashing is there when needed, at a safe angle, so that the distance from the wall to the base of the ladder is about one fourth the distance from the base to the ladder’s top support. Here are other safety reminders in using ladders:

- ▲ Make sure the footing is level and the ladder rests on a firm platform.
- ▲ Lean the ladder against something solid and unmovable—not against a windows sash or glass surface, for example;
- ▲ Make sure the ladder top juts at least 3 feet above a roof edge, beam plank, or scaffold so that the climber has plenty of side rail to hold onto when stepping off.

Once the ladder is properly in place, step onto it facing the rungs and grasping the rails with both hands. Do not hurry up the rungs, but climb one at a time. Never try to carry tools or anything else up a ladder, because hands should be free for climbing. It’s safest to hang tools in a sack or from a strap placed over the shoulder or to use a bucket or line to haul them up later.

While working on a ladder, don’t try to reach out too far but move the ladder as work requires. Never go higher than the third rung from the top on a straight ladder.

Those are the precautions, and if the ladder is in good condition and is the right one for the job, then a simple device for climbing is a safe one, too.

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Safe Use of Portable Ladders



When misused, ladders can also cause severe injuries. Most ladder falls are the result of both unsafe physical conditions of the ladder or unsafe acts by the person using the ladder. And like many accidents, falls from ladders can be avoided if you just follow these basic safety tips:

- ▲ If using a ladder outside, never use it in a high wind.
- ▲ When placing a straight ladder, always set it at approximately 75 degree pitch. (4:1 ratio). This means for every four feet of elevation on the ladder, set the base about one foot out to ensure stability.
- ▲ Always set the base or footings of the ladder on firm and level ground or floors. It is also a good idea to secure the top and bottom of the ladder when working from it.
- ▲ When positioned, straight ladders should be long enough so that you can perform your job without climbing above the third rung from the top. You should always plan to extend the ladder siderails at least three feet above any landing.
- ▲ A good, safe ladder should be equipped with safety feet that will prevent the ladder from sliding or moving while you are working on it or using it.
- ▲ Always keep the area around the base and the top clear of unnecessary materials and equipment.
- ▲ When climbing or descending the ladder, always face the ladder and use both hands.
- ▲ When using a step ladder, it should only be used in its full open position with the spreader bars locked to ensure that the ladder will not close.
- ▲ Ladders should not be set up in walkways, driveways or in front of doors where the swing of the door could cause the ladder to fall.
- ▲ Do not use metal ladders near electrical circuits or high voltage.
- ▲ If the ladder is damaged or badly worn and loose, take it out for service.

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Ladder Do's & Don'ts



- ▲ All ladders must be in good condition and of the proper length for the job at hand.
- ▲ Wooden ladders are not to be painted with anything other than clear paint or linseed oil. All metal parts must be hot-dipped galvanized.
- ▲ All straight ladders must be tied off, at the top, or held at the base by another employee. Personnel must not stand on the top and next to the top step of any stepladder.
- ▲ When climbing a ladder, personnel must face the ladder and keep both hands free for climbing.
- ▲ Set straight ladders so that the bottom is out from the vertical about one-fourth of the distance from the upper support to the bottom.
- ▲ All straight ladders must be provided with nonskid adjustable feet.
- ▲ The area around the bottom of all ladders must be free from slippery substance and tripping hazards.
- ▲ The top sections of extension ladders are not to be used by themselves. All extension ladders shall have one of the lower rungs of the upper section fastened securely to the adjacent rung of the lower section to prevent disengagement.
- ▲ Ladders are not to be used as planking or scaffold boards.
- ▲ Unacceptable ladders shall be removed from the job site immediately.
- ▲ Only one individual is permitted to climb a section of a ladder at a time.

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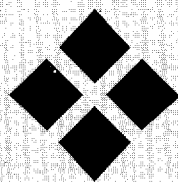
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Chapter Five



Welding

Welding and Soldering



▲ Welding, soldering and brazing materials such as welding rods, electrodes and solder may create hazardous fumes as flashing occurs.

▲ Do not inhale welding or soldering fumes. Make sure adequate ventilation is provided at the work station to remove the fumes. Natural or forced ventilation should direct the gases away from the workers' breathing area. If space is confined, use a respirator that provides proper respiratory protection.

▲ "Metal fume fever" can result from inhalation of fumes when welding various metals. The symptoms consist of chills and fever, easily confused with flu symptoms, which come on a few hours after exposure.

▲ Protect eyes and face from welding flash using proper shield glass and welding hood for face protection. Use protective gear such as leather gloves and jackets when welding. Avoid clothing made of synthetic material; use clothing made of heavy cotton or wool fiber with cuff-less work pants.

▲ Make sure a welding screen is in place to protect adjacent workers from weld flash and prolonged exposure to arc rays.

▲ Solder and brazing rods may contain cadmium, lead, tin, antimony and flux, which contains zinc chloride. These fumes are toxic and exposure may cause fatigue, sleep disturbances, headaches aching bones and muscles, and stomach pains.

▲ Cadmium fumes are highly toxic.

▲ Zinc chloride fumes can cause dermatitis, boils, conjunctivitis (inflammation of eyelids) and gastrointestinal (stomach and intestine) upsets.

Remember: Read the material safety data sheets and container labels to obtain the correct information on the health hazard posed by the different welding rods and soldering materials and follow the proper precautionary instructions for their safe usage.

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Three "F's" of Welding



Today we are going to discuss welding, mainly the three "F's" of welding-Fire, Fumes, and Face. Before you begin welding, carefully check the area around you. Remove wood, paper or flammable materials which could be ignited by a single spark. Don't start welding in any area or under any circumstances where there are flammable liquids unless you check with your supervision.

Wood floors should be swept clean and covered with metal or some other material that won't burn before you weld over them. In some cases, it may be advisable to wet the floor down-but remember that this causes an added shock hazard which you must guard against if you are using electric welding equipment. An insulated platform should be used if you must weld in wet places.

Make sure there are no cracks into which sparks or slag may fall, and never allow this hot stuff to fall into machine pits. Check to see if open doorways, broken windows, and similar openings should be protected with a welding curtain. Hot slag may roll along a floor, so be sure the curtain is in contact with the floor. Always keep a fire extinguisher at hand if you must weld near combustible materials. It may be necessary to have a worker stand by with a fire extinguisher to put out sparks that could, very easily, create a fire.

When welding, good ventilation is a must. Many welding operations produce fumes that are harmful in heavy concentrations, and good ventilation is the one best method of protecting yourself against this hazard. Place screens around your work area in order to obtain good air circulation. Sometimes special ventilating equipment is necessary. If you have any doubt about the adequacy of the ventilation on a job, request your supervisor's opinion. Don't weld in a small room, tank, or other confined space without first checking the ventilation. Eye protection is required on all welding jobs, and full-face protection is needed on many jobs.

Other operations performed by welders require the use of face and eye protection, that's why electric welders need goggles as well as the regular helmet. For instance, any welder may have to do a good deal of chipping and cleaning of metal, and this work, which may be done with the helmet raised, can still throw particles of metal towards your eyes.

Eye protection is designed to protect the eyes against sparks, slag and molten metal, and against the flash burns caused by radiation from the welding equipment. If you follow the rules for protective face and eye covering we give you, you will minimize your risk of an eye injury.

❖ SMACNA Safety Toolbox Talks ❖

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Electric Arc Welding



Safety in electric arc welding requires a thoroughly trained operator. These suggestions of reminders are for the trained welder. The electric welding machine with its built-in power source has many uses in the construction industry.

In electric arc welding, you are working with high voltage and amperage which emit harmful ultraviolet light rays and hot metals. Wear clothing that protects your body from these harmful light rays and hot metals. High top shoes covered by cuffless trousers, or by legging or spats that protect the feet and ankles from hot metals.

An arc welder's hood plus welder's goggles underneath will protect the eyes if and when all protection is in place before an arc is struck. Welder's flash is a painful experience. Hot metal in the eyes can blind.

Occasionally, you may be required to enter a confined space. An arc welding job should be well ventilated. In a confined area which has not been ventilated, special precautions are necessary. There may be a combustible or explosive air-vapor mixture waiting for just one spark. This can be checked safely with a standard explosion-meter checking device. If the test is positive, and if you have stayed out, you won't get blown out. There may be a lack of oxygen in the air of the confined space - not enough oxygen for breathing. This can be checked safely with a meter. If the test is positive and if you have stayed out, you've missed that drowning feeling. Make the confined area safe before you go in and strike a spark. Otherwise, for your life, stay out. When entry is safe, to protect yourself from welding fumes, wear an air line respirator, have a man stay outside of confined areas who has a lifeline attached to you and properly vent the confined area.

Ground the welding machine directly to the ground. Shield the work to protect others from harmful light rays. Support the work pieces on non-combustible material. Place rod stubs in a container to keep yourself from slipping and falling. Attach a fire extinguisher to the cart. Get a helper to observe, if welding around materials that burn. Inspect your equipment regularly and have it properly repaired whenever necessary.

A drum or container which has held gasoline, oil, fuel gas or some flammable liquid, can be a bomb waiting for just one spark. It can be a bomb even after ordinary cleaning.

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Gas Cylinders



If there was a bomb lying at your feet, you wouldn't bother to find out whether it was alive or dead. You would just get away.....fast. Yet, most of us pay no attention to the haphazard use and handling of an article that is about the equivalent of a bomb.

How many of you realize the potential danger of gas cylinders? On construction jobs they have been seen lying around in all possible positions and in all sorts of places.

It doesn't take much of a blow to break a regulator off a cylinder. When this happens to a fairly full cylinder, trouble starts. The cylinder will take off like a rocket. Cylinders have been known to travel a quarter of a mile. They have gone through reinforced concrete walls, smashed cars, and have caused all types of damage. Imagine what one would do to a man.

Everyone who does any welding or cutting should know the proper way to handle cylinders and should respect them enough to handle them that way. Just in case some of you may not know, have forgotten, or have become negligent, here are the rules:

- ▲ Handle every cylinder as if it were full.
- ▲ Never handle cylinders with greasy or oily hands or gloves.
- ▲ Securely block or tie cylinders when they are to be transported. Keep them standing up.
- ▲ Store cylinders securely so they can't fall. Put them in an area where they are not to be struck and not exposed to salt or other corrosives.
- ▲ Don't slide cylinders off a truck. Lift them.
- ▲ Handling cylinders is a two-man job....get help.
- ▲ When lifting cylinders with a crane, use a cradle or carrier.
- ▲ Avoid exposing cylinders to the sun or heat..
- ▲ If you don't have a carrier, tie the cylinder to a column.
- ▲ Protect the gauges from overhead work.

Remember that gas cylinders can be lethal weapons if mishandled, so treat them as you would any other high explosive. All bottles, empty or full, should be secured or stored in an upright position-never lying on their side.

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Respect Oxyacetylene



Recently a representative of a manufacturer of welding supplies stated his belief - "Only 10 per cent of the people using oxygen-acetylene equipment really know what they are handling or have any formal training." Listed below are facts about oxyacetylene that should be brought to the attention of all employees"

- ▲ Acetylene has an explosion range of 2.5 to 80 percent in air. (The widest explosion of any commonly used gas.)
- ▲ Acetylene cylinders are not hollow. (They are packed with diatomaceous earth, saturated with acetone.)
- ▲ Acetylene cylinders should never be use from a horizontal position. (They will lose liquid acetone from the cylinder, gum gauges, and ruin hoses.)
- ▲ Acetylene cylinders should never be used at a hose pressure gauge in excess of 15 p.s.i. (It defeats the purpose of the acetone in the cylinder making it safe to store and use.)
- ▲ Any amount of acetylene in an oxygen gauge is an explosive situation. (It can't stand the over 2,000 pounds pressure under which oxygen is stored.)
- ▲ Oxygen under pressure is explosive upon contact with oil or grease. (A little dab from the hands while changing cylinders could cause such an explosion.)
- ▲ Acetylene cylinder valves should be closed when leaving the job unattended. (Defective hoses are the most likely places for gas to escape into the room where a spark from any source can explode it.)
- ▲ Each cylinder has several heat safety plugs at both ends that will come out at the temperature of boiling water. (Don't store next to furnaces or allow slag to touch them.)
- ▲ The safety plugs are thin brass shells sometimes protruding from the cylinder in recessed tops. (Storage of tools in the top could break them off causing a fire from the hole in direct proportion to the pressure in the tank.)

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Care of Oxyacetylene Hoses



Safety in welding and cutting requires a thoroughly trained operator. These suggestions or reminders are for the trained welder regarding the care of oxygen and acetylene hoses.

- ▲ The standard color is green for oxygen hose and red for acetylene hose. This difference in colors is intentional, to help you to use each always for the gas for which it is intended. To do otherwise is to take a chance on having a fire inside the hose.
- ▲ Your experience will tell you that there's a limit on long lengths of hose for best welding and cutting results. When hose is too long, enough pressure at the torch end for welding and cutting will require too much pressure at the regulator end for safety. The hose may burst. Keep the hose at a reasonable working length.
- ▲ Examine the hose carefully before using welding and cutting equipment. Use soap solution to check for leaks. A leaky hose should be set aside and marked for proper repair or disposal.
- ▲ Return damaged or worn hose to your supplier for testing and repair, or for disposal and replacement.
- ▲ If a backfire occurs and extends into the hose, damage inside the hose will result. Return the damaged length to your supplier for testing, and for replacement if necessary.
- ▲ Brand-new hose is dusted on the inside with fine talc. This talc should be blown out before using new hose..
- ▲ Like all good working tools, oxygen and acetylene hoses requires good care and handling. Avoid tangles, kinks, mechanical abuse and location of hose where it can be damaged by traffic or by other construction operations. This will assure a longer, safe operating life for your oxygen and acetylene hose.

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Oxygen & Acetylene Regulators



Safety in welding and cutting requires a thoroughly trained operator. These suggestions or reminders regarding the care of oxygen and acetylene regulators are for the trained welder.

- ▲ Always use regulators or reducing valves on oxygen and combustible gas cylinders. They maintain the even flow of gases to the torch. Regulators reduce high pressures from inside the cylinders.
- ▲ Make sure your pressured regulators are protected by safety relief valves. When attaching and adjusting pressure regulators, stand clear so that if a safety relief valve opens, the resulting jet of high-pressure gas will not hit you.
- ▲ Make sure your oxygen regulators are marked "Oxygen-Use No Oil". Oily materials ignite spontaneous explosive force when in contact with oxygen under pressure.
- ▲ Always return oxygen pressure regulators to your supplier for testing, repairs and adjustments. This work requires a skilled repairman.
- ▲ Always use the special lubricants prescribed by your supplier for compressed gas pressure regulators.
- ▲ Keep your hands, gloves and clothing clean and free of oil materials when handling pressure regulators.
- ▲ Check compressed gas regulators carefully before each use. They are easily damaged when dropped, hammered, struck by falling objects, struck against objects during transit or tampered. The result may be leakage of gas, or uneven flow of gases to the torch. If you find something wrong, send the regulator to your supplier for repair or adjustment. Always use soap solution (not flame) when checking for leakage.
- ▲ Remember that gas pressures inside compressed gas cylinders are very high compared with working pressures in your welding torch. For this reason, adjust a pressure regulating valve to the "No Flow" position before opening the cylinder valve, then adjust the torch to the desired pressure. Adjust the pressure regulating valve back to the "No Flow" position while the torch is not in use. In this position, the pressure regulator provides protection against leakage of gas.
- ▲ Always match oxygen cylinder with an oxygen pressure regulator and combustible gas cylinder with a combustible gas pressure regulator.

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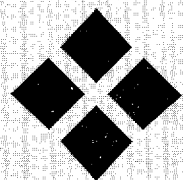
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Chapter Six



Personal Protection

Develop a Safety Attitude



Most of us have had some sort of safety training in our lives. As children we were taught not to play with matches and to look both ways before crossing the streets. As adults, we have been warned about smoking in bed, overexposure to the sun, and driving while intoxicated. How many of us can say that we are not guilty of breaking some type of common, everyday safety rule?

Employees often break safety rules while “on-the-job” as they do outside the job. Safety rules are often neglected by employees because they are in a hurry or just figure accidents always happen to other people. Whenever an employee engages in an unsafe act, they are taking the chance on being involved in an accident. Is your well being, or your life, worth such a chance?

When employees break safety rules that they are aware of, they have an UNSAFE ATTITUDE. Many employees work with unsafe attitudes. An example would be a technician working with harmful liquids without safety glass protection or an employee purposely lifting beyond their capacity. Knowing safety rules will not help you unless you choose to follow them everyday. We can break this bad habit of the UNSAFE ATTITUDE.

The next time you are getting ready to break a safety rule, stop and think of the impact it may have. Think about what may happen to you, your fellow employees, or your family. Then stop, and do it the safe way. It may seem to be slowing you down at first, but eventually safety will become habit and your chance of a disabling injury or even death will have been greatly decreased.

Here are a few safety rules to practice again and again until they become habit:

1. Report ALL accidents, no matter how small, to your supervisor. This gives the opportunity to correct any unsafe condition that exists.
2. Practice good housekeeping. Keep work areas clutter free and wipe up all spills immediately.
3. Know where fire extinguishers are located and know which types can be used safely on each class of fire. Using the wrong type of fire extinguisher can cause a serious injury. For example, using water on an electrical fire can cause a fatal shock.
4. Before using electrical equipment, always check to make sure it is in good condition. Any defective equipment or cords should not be used until properly repaired. Never touch switches, outlets, or any other electrical equipment while hands are wet.

Once you have developed a SAFE ATTITUDE, share it with your fellow employees and your family. Make it a part of your job to work safely everyday!

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A Lot of Bunk



Because I think Safety is a lot of bunk and because I have deliberately chosen to ignore my company's safety policies and my own good sense, I hereby certify that I prefer:

- ▲ Seeing Eye Dogs to Safety Glasses.
- ▲ Silence to Ear Plugs.
- ▲ Brain damage to Hard Hats.
- ▲ Lung damage to Respirators and Filters.
- ▲ Club Feet to Safety Shoes.
- ▲ Missing Fingers to Saw Guards.
- ▲ Broken Limbs and Backs to Safety Belts and Nets.
- ▲ Death and Disability to Common Sense.

I have decided that I can do without:

- ▲ Limbs
- ▲ Eyes
- ▲ Ears
- ▲ Life

Because I realize that my actions affect others than myself, I have:

- ▲ Assured my Family that They won't Miss Me.
- ▲ Found Someone Else to keep my Family Safe and Financially Secure when I'm Not Around.
- ▲ Assured my Family that my Being Crippled won't be any Hardship.
- ▲ Selected my Favorite Hospital and Burial Plot and made Arrangements for all Expenses.
- ▲ Informed my Employer and Co-Workers that I really want it this way.

Because no one can persuade me that being safe is better, I do hereby execute this document and waive all my rights to a Long, Happy, Fruitful and Productive Life.

HAVE FOOLS SIGN HERE

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Emergency Phone Numbers




It is very important to keep a list of emergency phone numbers posted near every phone. The time spent looking for a number can mean the difference between life and death, or minor damage and severe loss to your company. Equally important, is properly reporting an emergency.

Give Your Exact Location. A person making an emergency call may panic and accidentally give the wrong address. The caller should always repeat the address to make sure it has been stated correctly. The job site or office address should always be listed along with emergency phone numbers.

Identify Yourself. Giving your name and the name of the company will help in the event an emergency vehicle is lost. This way, if the driver must ask someone for directions, they may know where the building or location is, even if the street address is not familiar.

Request the Specific Help Needed. In the event of fire, tell the fire department **WHAT** is burning so they can immediately send proper equipment. If you are calling for an ambulance, remain calm and be prepared to work with the operator in supplying required information. Be as specific as you can in letting the operator know what is wrong with the affected person.

Below Is a List of What Should Be Posted Near Every Phone:




1. Name of company

2. Address of your location

3. Ambulance phone number

4. Fire Department phone number

5. Police Department phone number



Copy this page, cut out the list and post near every phone.

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First Aid Kit



When composing a first aid kit for your workplace, consider the most common injuries, and the types of machinery, materials and hazards to which workers are exposed.

Two developments that have influenced first aid kit fills in recent years are increased concerns about infectious and contagious diseases-HIV, hepatitis, and tuberculosis-and heightened awareness of lost-time injuries. As diseases become more prevalent, many people, even those trained in CPR, are reluctant to give first aid to strangers. For that purpose, kits now contain latex gloves, antimicrobial solutions, wipes and sprays to protect against pathogens, and one-way valve airway masks (some new airways can filter out airborne bacteria to prevent the CPR giver from becoming infected).

Many companies also keep non-prescription medications like analgesics, pain relievers, antacids, cold and hay-fever remedies, and throat lozenges, to treat those ailments. Such medication not only keeps people on the job, but allows them to work more safely and efficiently than if they were in discomfort. Most of these medications are now unit-dosed in packets or pouches of two per-unit, with directions and cautions in self-dispensing boxes to reduce or eliminate any perceived liabilities associated with dispensing from a bottle.

As for the first aid kit itself, a gasket should make your kit water and dust resistant, and brackets should allow the kit to be hung on the wall and easily removed to take to the accident scene. Contents should be clearly labeled with easy-to-open packaging and clear instructions for proper use. Products should be so simple to apply that even an injured person could treat himself. Build your first aid kit the way you buy insurance: Hope that you will never need to use it, but be as best equipped as you can be, in case you do.

What's In a First Aid Kit?

Include these basic supplies for:

- ▲ Burns: hydrogel dressings, burn spray, ointments, cold packs
- ▲ Cuts: gauze, tape and bandages to stop bleeding, antiseptic items, cut cleaners, infection prevention ointment
- ▲ Eye injuries: *Eye washes, neutralizers;*
- ▲ Shock or fainting: *ammonia inhalants;*
- ▲ Fractures: *Splints, triangular bandages;*
- ▲ Contusions: *Cold packs, bandages;*
- ▲ Bee stings: *sting extractors, pain relief products;*
- ▲ Splinters: *splinter forceps;*
- ▲ Contagion control: *gloves, one-way valve mask, antimicrobial surface cleaner, skin cleaner;* and
- ▲ General wellness: *non-prescription cold medicine, head and stomach ache remedies.*
- ▲ **ADD ITEMS PARTICULAR TO YOUR WORKPLACE** to accompany these basic supplies.

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Giving First Aid



-
- ▲ Keep the injured person lying down.
 - ▲ Do not give liquids to the unconscious.
 - ▲ Control bleeding by pressing on the wound.
 - ▲ Restart breathing by giving mouth-to-mouth artificial respiration. (Only when trained in CPR.)
 - ▲ Dilute swallowed poisons only after consulting a physician, or reading on MSDS.
 - ▲ Keep broken bones from moving.
 - ▲ Cover burns with thick layers of cloth.
 - ▲ Keep heart attack victims quiet.
 - ▲ For someone who has fainted, keep head lower than heart.
 - ▲ Cover eye injuries with a gauze pad.

Always Call a Doctor

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When Not to Give First Aid



Timely and properly applied first aid techniques are credited every year with saving many human lives. However, the medical condition of injured accident victims can be made more serious through the use of inappropriate first aid techniques.

During many emergency situations, there is an overwhelming urge for the persons on the accident scene "to do something" to aid the injured victim. This is when the "HERO" MUST REMEMBER the most fundamental of all first aid rules: DO NO HARM!

In accident situations where the victim may have fractured bones, a head injury, major internal injuries, etc., and there IS NO DANGER TO THE VICTIM FROM SURROUNDING CONDITIONS, the general rule is, DON'T MOVE THE VICTIM. Whenever possible, seriously injured individuals should be moved ONLY by professionals with advanced training such as paramedics, fire rescue teams, ambulance personnel, doctors, etc. If the accident situation requires that the victim be moved immediately, do so keeping in mind that the degree of care in the movement will depend upon the urgency of the situation.

The application of splints, slings, etc. to accident victims is generally unnecessary. Rescue services are available within a few minutes in most areas, bringing needed equipment to the scene of the accident. Possibly, the extra movement involved with applying/removing splints and slings may even cause unnecessary, additional aggravation of the victim's injuries.

In summary, seriously injured accident victims should not be moved unless really necessary. When professional medical help is readily available, splints should not be applied to fractured bones. Before applying bandages, ask yourself if the bandage is really necessary to stop the bleeding or will it further aggravate the injury.

Every emergency situation is unique with each having its own special circumstances. A well trained first aider will do as follows:

1. Do no harm.
2. Check for major bleeding.
3. Check for breathing.
4. Check for pulse.

Moving the victim, splintering and bandaging should only be done when absolutely needed.

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Treat It Immediately



Small cuts and abrasions require immediate attention! Although they may be small, they may be the start of something big!

It is surprising how many people get infections from wounds left untreated when first aid supplies are so readily available in drugstores and supermarkets. It is hard to imagine the number of germs that are on things we work with and on our skin, some of them deadly. These germs are waiting to find an opening in the skin to enter the body. Tetanus and blood poisoning are 2 common killers that can enter the body through small, harmless looking cuts. Other more serious infections may lead to amputation of a hand, finger, or other body part.

Many of us know of cases in which someone has had blood poisoning that resulted from a simple scratch. Despite this knowledge, we still tend to let small cuts and abrasions go untreated. Not treating a cut seems silly when infection sets in and keeps you off the job. For example:

- ▲ An employee of a masonry company simply skinned his hand and ended up missing two weeks of work because of blood poisoning.
- ▲ A delivery driver missed four weeks of work after failing to treat knuckles skinned on a bumper.
- ▲ Another worker missed several weeks of work because of blood poisoning after cutting a finger on a grinding machine.

Here are a few tips on the care of minor cuts and abrasions:

1. The wound and surrounding area should be cleansed immediately with warm water and soap, wiping away from the wound.
2. Hold a sterile pad over the wound firmly until bleeding ceases.
3. The sterile pad and bandage should be replaced as necessary to keep them clean and dry.
4. You should NEVER put your mouth over a wound or breathe on the wound. The mouth harbors germs that could cause infection in the wound.
5. Do not touch the wound with dirty handkerchiefs, or other soiled materials.

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Personal Protective Equipment



You'll probably never see a football player in a game without a helmet, a baseball catcher playing without a mask or a firefighter putting out an oil-field fire without a special suit.

It would be about as unlikely to find an ironworker or any other skilled-trade worker on a major construction project without a hard hat.

However, depending on the job you are performing, there are many other kinds of personal protective equipment and guards that are just as important as the hard hat. Construction is a rugged business with rugged people working in it. Too often we confuse ruggedness with faulty safety practices. We fail to use a guard or protective device when we know better!

Speaking of ruggedness, professional football players take extra precautions; they not only wear every piece of protective equipment but they make sure that it's in good repair. Their jobs depend on their health and physical condition. Professional football players have plenty of chances to be injured and they're not about to add to those chances by not using the proper protective equipment. Why should you?

Think about the many different jobs you do every day and the number of times you have exposed yourself unnecessarily to hazards because you failed to wear the proper equipment that is provided for your protection.

Your eyes may be exposed to hazards such as flying objects, vapors, acids, splashing metal, radiant energy, sunlight and glare. That's why there are so many different types of safety goggles, face shields and hoods; they're provided for your protection.

Hands can also be injured by burns, puncture wounds, abrasions, incised wounds and amputations. Different kinds of protection are needed including gloves.

The torso may be exposed to injuries including burns, abrasions, punctures and incised wounds. Additional protection may be required, such as coveralls, wool clothing, a leather or canvas apron or an asbestos suit.

Your lungs can also be exposed to hazards, such as dusts, vapors, heat, smoke, caustics and a lack of oxygen.

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From Head to Foot



Business reviews would indicate that today, the average American is spending more for clothing than in any time in history. We take so much pride in the social aspect of our dress; what about the really important angle, what about the manner in which we dress for work. Do we have our personal safety in mind when we select our dress for work?

▲ Are we meticulous in the protection of our skull, the important guardian of our brain center, through the wearing of a hard hat?

▲ What about our eyes, our most important sense. Do we have them examined periodically...if necessary, do we use our glasses when reading...and above all, do we cover them with safety goggles when the occasion demands?

▲ The shirt, is an important piece of apparel. If we operate or are engaged around moving machinery and equipment, do we wear short sleeve shirts or have straight cuffs? The same goes for jackets. Never wear a loose fitting jacket, keep it buttoned or zipped shut at least chest high to prevent entanglement in the machinery or equipment.

▲ Our hands are a very vulnerable part of our body. If our job assignment requires it, do we wear gloves? Also remember, worn or tattered gloves can be more dangerous than no gloves at all.

▲ Wearing overalls or pants with cuffed or rolled up legs is a poor practice. If the legs are too long, they should be cut off and hemmed. Straight legs reduce the self-tripping hazard.

▲ How about shoes; they don't have to shine with a brilliant luster, but they must be practical. A safe working shoe has a thick sole; thin sole shoes can result in serious foot punctures. To protect against toe injuries, steel capped shoes are most practical. Shoe laces should not be too long.

▲ Accessories...fine for social life, but dangerous as part of our working attire. Never wear loose watch chains, straps, keys on belts, etc., or any item that might hook on something and place you in a hazardous position. Rings, wristlets and wrist watches belong at home and not on the job.

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Proper Head Protection



Historians tell us the concept of head protection is not new. The first known head protection used was a hollowed-cut turtle shell which certainly afforded some protection from stone throwing friends. However one of the most important features of present day safety hats was missing: the ability to absorb a portion of the force upon impact. Historians also tell us that some early miners took a derby hat and applied several coats of shellac to the outside to make it more resistant to impact and more durable. Even so, this was poor protection since it was easily crushed or penetrated by falling objects.

Today we are fortunate to have available safe and reliable head protection for just about every type of exposure. This is the result of many years of research and development. Manufacturers have worked diligently to design a hat or cap for a specific type of exposure.

“Specific type of exposure” is the crux to adequate head protection. There is head protection specifically designed for the electrician, the baseball player, the aircraft worker and, in fact, just about every industrial job. In each case the hat manufacturer had the hazards of the industry foremost in mind when this protection was engineered.

However, some people are using poor judgment in the selection of head protection and, as a result, lives are placed in jeopardy. Occasionally Bump Caps, and baseball type caps, appear on construction jobs. Unfortunately, such substitutes will not adequately protect field construction workers any more than the turtle shell or derby adequately protected their wearers in the early days.

Cave men and miners had no choice other than to improvise. We have. Our problem lies not in lack of availability but in poor selection, and also in misapplication of head protection.

Since there is adequate head protection available, it behooves us in the construction industry to exercise proper care in choosing the right hat or cap for the job at hand, as well as enforcing its use.

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Eye Protection



An Eye for an Eye

An employee asked his company to pay for damage to his glass eye. It had been broken when a nail he was driving flew up and struck it. When asked how he had lost his own eye in the first place, he replied: "The same way, a nail hit it."

Take Time to Select the Right Kind

Depending on your job, you may need goggles, an eye shield, a face mask or safety glasses. All it takes on your part is a little effort to select the appropriate type and to wear it.

Four Basic Types of Hazards

Basically, there are four types of particles that cause eye injuries on the job.

▲ **Unidentified Flying Objects:** These microscopic objects consist of dust and particles floating around in the air, generated by wind, equipment, or cleaning operation. When working in dusty conditions, wear eye protection. Even a small speck in the eye can lead to trouble.

▲ **Particles Resulting From Chipping, Grinding, Sawing, Brushing, Hammering or Using Power Tools:** These particles move at an amazing speed and strike with the force of a bullet. Wear eye protection any time overhead operations are performed. It may be advisable on some jobs to wear safety goggles under a full face shield.

▲ **Invisible Hazards:** You can't see the injurious light rays generated by welding operations or laser beams. And their effects often are not felt until hours later. Wear the eye protection required when using such equipment. And if you happen to be working nearby, don't look in the direction of welding arcs or where a laser beam is being used.

▲ **Liquids:** Hot liquids, such as tar or asphalt, solvents, paint, and solutions for cleaning masonry or metal, can cause serious eye injury if splashed in your face. The use of proper eye protection, and a full face shield is essential when transferring liquids between containers and when using caustic or acid cleaners.

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Eyes



The one part of the body that we have gone to extensive means to protect are the eyes. Obviously, this had been done for good reason since they are life's most precious possession. They are also very vulnerable.

Safety glasses with sideshields are available for all employees performing hazardous job assignments. Monogoggles and faceshields are also available. Welding hoods are available for welding and chemical hoods are provided where chemical hazards are prevalent.

The disturbing thing is that we continue to have eye injuries, almost all of them being foreign bodies in the eye. What then is the answer?

Personal protective equipment will safeguard an employee up to a point. But the ultimate protection requires that employees recognize the hazards surrounding the job assignments they perform. Each assignment brings on a different set of conditions. The employee doing the job is the only person completely aware of the actions he is to undertake and because of this, he is in control of his destiny.

Everyone is instructed to wear monogoggles or a face shield when using power tools and in situations where flying particles may enter the eye. Because of this instruction and incidents that have occurred, many employees will now wear monogoggles when handling trash. But the point to make is, every mature adult should be capable of making that judgment without prompting from his supervisor. A sudden gust of wind on the sand pile should trigger that thought in everyone's mind. Everyday you see people grinding welds with monogoggles on and yet the welder standing next to him has not seen fit to put his monogoggles on.

We can eliminate eye injuries completely if everyone accepts the responsibility for protecting their own eyes. If a hazardous situation arises, don't spend your time interpreting the rules - do something about it - do whatever is required to minimize the potential injury to your eyes. Eye injuries can be eliminated, but it requires your awareness and cooperation.

Remember: Protect Your Eyes—You Only Have One Pair for the Rest of Your Life

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Excuses You Hear



Have you heard the excuses: “I don’t wear my safety glasses because they bother me.” How about the blind person? Maybe his blindness bothers him. You are bothered 8 hours a day, he is bothered 24. One thing about it, he saves electricity because he doesn’t need lights, but he can’t see his loved ones, watch a ball game, look at the scenery, read a newspaper or see the thousands of other things you take for granted. If you want to see if safety glasses are worthwhile put a blindfold on for half a day and try to carry on your activities.

“I don’t wear my ear plugs because they feel uncomfortable.” Ask the man who wears a hearing aid if it is comfortable, how he likes it in the wind, how much trouble it is, and how about when the battery runs down and he hasn’t got a spare battery when he is watching a ball game or trying to hear something important. It gets quite uncomfortable. Don’t you think ear plugs are worth wearing?

“I don’t wear my hard hat because it is heavy or messes up my hair.” How about the person who wasn’t wearing his hard hat and got hit on the head. Do you suppose he objected to them shaving his head to do surgery to repair the fractured skull or complained because the bandage was too heavy or bulky? Not for a while, because he was unconscious or was so glad he wasn’t killed. He will wear a hard hat and maybe a sort of permanent one, such as a steel plate in his head the rest of his life. It HAS happened before and it isn’t always the other guy.

“I haven’t got time to clean this area up right now. Do you suppose the man laying in the hospital bed in traction because of a back injury caused when he carried the load through the debris and slipped is thinking he hasn’t got time? He probably hasn’t because his pain and the worry about paying his bills, feeding his family and the hundred and one other things crossing his mind while he is laying there is keeping him busy.

“I didn’t tie the ladder off because I was only going to use it for a minute.” The man laying in the hospital bed with a fractured arm, leg or whatever, has a lot of time after the ladder kicked out from under him. Don’t you think it would have been better to tie the ladder off?

Don’t just read the above items, but stop and THINK for a minute, what it is like to be injured. Stop at a hospital and see the suffering because someone didn’t think, have time, or thought something was uncomfortable.

You only have one life to give, don’t give it because you didn’t THINK. There is, and always will be, ample time for safety.

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The Marvelous Human Hand



Did you know that the human hand, directed by the brain, chiefly determines how the life of a human differs from the lives of all other creatures on earth?

No other part of the body is so intimately associated with human behavior. With our hands we work, play, love, heal, learn, communicate, express our feelings and construct our civilization. The hand and our emotions are so closely linked that clasped hands in our country are symbols of faith, love, and friendship; and the clenched fist is the unmistakable expression of our strength and resolution.

The hand is a complex instrument and is an intricately engineered device composed of muscle, fat, ligament, tendon, bone, and highly sensitive nerve fibers. It is packed full of bones - eight in the wrist, five in the palm, and fourteen in the fingers of each hand.

Every waking moment we obtain a great deal of information about the things we touch by the "feel" of them. This is because the skin of the hand is wonderfully elastic and incredibly sensitive.

Because of its intricate arrangement of nerves and muscles, the hand is highly vulnerable to injury. Accidents to wrists, fingers, and hands account for nearly one-half of all industrial injuries. All lacerations of the hand are potentially dangerous because of the great number of bacteria that swarm over the things we are constantly touching. The unbroken skin of the hand is generally an impregnable barrier but if a scratch or puncture permits germs to gain entrance and the laceration is not reported and cared for immediately, serious infection may follow swiftly.

The greatest natural enemy of the human hand is injury - and you are the only one who can protect them. Your hands are the vital tools with which you earn a living and they are just as vital for all of your off-the-job activities. Remember, a person's hands are truly marvelous; as his hands, in partnership with his brain, forever separate him from the rest of the animal kingdom.

Your hands are precious....protect them!

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Handy Facts



A stressful day would be one during which you had to keep your hands in your pockets all day, not using them for any activity. Try it for just five minutes. There are very few duties that do not require the use or involvement of your hands.

Each hand has 27 bones, 24 muscles, 30 joints and pivotal points. Seven to eight muscles must coordinate to move one finger. Thirty joints and 50 muscles in the hands, wrist, arm and shoulder must coordinate for you to eat a bowl of soup.

Your hands are an outstanding tool, assisting you in nearly every function. Yet, there are those who carelessly expose their hands to extreme dangers without a second thought. Hands are brought into or too close to running machinery, allowed to handle energized electrical wiring and plunged into caustic solutions. They are abraded, cut, smashed, bruised and broken. They are allowed to dry out, crack and bleed in the winter, and are made to scratch and dig unprotected in the summer soil. What are we thinking about! We wouldn't treat any treasured possession this way.

Think about the jobs you ask your hands to do. Is there any risk involved? Your hands will age and get arthritic soon enough. Do not force them into early retirement.

As long as your hands remain productive, you remain productive.

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Lookout for Handtraps



Do you know how to catch a ring-tailed monkey? The Zulus of Africa have a system all their own. They set up a trap—a melon trap. A small hole is cut into a green melon on a vine. The hole is just large enough to admit a monkey's hand...but too small to permit him to withdraw his fist. The monkey sees the hole...puts his hand in to get some of the delicious melon seeds inside...but the doubled up fist, clutching as many seeds as possible, is too big to slip back through the hole.

The monkey will scream and struggle for hours, but never lets go of the seeds to escape the trap. As the Zulus know, a ring-tailed monkey doesn't have enough sense to keep his hands out of danger. He gets caught every time.

The ring-tailed monkey is not alone in failing to keep his hands out of danger. Hundreds of human beings get caught in "HANDTRAPS" every day... by placing their hands in hazardous areas and unsafe positions. Pain, anguish and lost-time injuries can be the only results of placing hands in unnecessary jeopardy.

We use our hands almost constantly—all of us, every day, on the job and off the job. Without our hands, most of us wouldn't have a job...that is why everyone should take every precaution to avoid putting his hands where they can be caught in a "handtrap".

Every time you are tempted to use your hands unsafely—every time you are inclined to take a chance—STOP AND THINK about pinch-points. Don't monkey with "HANDTRAPS"—use your safety-sense and follow all safe hand procedures.

To keep your hands out of danger in close areas—around moving equipment—while using hand tools—when handling objects of all types—THINK PINCH-POINT! AVOID PINCH-POINTS!

Never be like the ring-tailed monkey about "handtraps"—use your KNOW-HOW and don't place your hands in hazardous positions where they can be injured.

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Puncture Wounds



There have been a lot of comic pictures drawn and many jokes pulled about people sitting on sharp objects. All of us know the old gag about a school kid putting a thumbtack on a classmate's chair or the teacher's chair then laughing at the reaction. Maybe some of us did the same thing, not realizing what ultimate harm might be done—that blood poisoning and death could be the possible result.

Why are we talking about this? Because we want to discuss puncture wounds. Any puncture wound—that is, a deep penetrating wound caused by a sharp object—is dangerous. It's more dangerous, generally, than a scratch or cut caused by the same instrument because bacteria are carried deep into the flesh and the wound cannot be cleaned out by self-administered First Aid.

So if you suffer a puncture wound, don't fool with it or delay getting proper aid. Get medical treatment immediately, and keep returning until the wound is completely healed. If you notice any reddening, swelling, or increased soreness, see a doctor at once.

In construction work there are lots of sharp, pointed exposures, but nails are the worst of them. Whenever a temporary brace is removed, a guardrail knocked down, or formwork stripped, protruding nails remain in the lumber. Unless the lumber is cleaned at once and the scrap discarded into a pile, the protruding nails present a real menace. And even though we try to get things cleaned up right away, there are many times when we can't. There are also many times when a block or wedge will be knocked loose, fall into an out-of-the-way place, and be forgotten until the nail turns up in someone's foot.

Not only are your feet exposed to the hazard of puncture wounds. We know of cases of puncture wounds in just about every place on the body: hands, arms, legs, face, back and even the stomach. Not all puncture wounds are made by nails. Reinforcing steel tie wires are another source. Sheet metal trimmings, steel splinters and pointed ends of damaged lumber all have caused their share of puncture wounds.

For your own protection, get in the habit of bending down or pulling every protruding nail you see. Bend the end of every tie wire end you find to the inside. Cut off or turn in the jagged ends of damaged lumber. In short, try to remove every source of puncture wounds that you can find.

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Falls



At one time or another, you have probably read a newspaper and noticed big headlines about a plane crash. The more people who are killed, the bigger the headlines.

But did you ever pick up a newspaper and see a similar headline announcing

“Falls Kill 75 Today?”

In fact, every day, day after day, about 75 people are killed by falls. It's something to think about, don't you think?

We usually think of dangerous falls in relation to heights, but many people have died from falls from extremely low heights or even from falls on the same level on which they were standing.

There was an incident in which a man was killed by a fall from the bottom step of the stairs in his home. In another case, an employee fell 100 feet down an air conditioning shaft and suffered only minor bruises. Still another employee lost his life by falling only 10 feet. So you see, it's not only the height that can kill you, but how you land!

The employee that fell down the air shaft did so because someone had covered the opening with tar paper. He stepped on the opening thinking he was on solid flooring. The second employee fell because the scaffold was not properly braced. When he stepped out to the end of one of its horizontal member, an upright kicked out and the entire assembly toppled.

Other causes of falls are slippery spots, tripping hazards, horseplay, and even poor vision. Bifocal glasses are hazardous around places where there are exposures because the two different powered lenses sometime confuse the wearer. Anyone who must wear bifocals should be extra careful.

In addition to being careful ourselves, we can all help one another by calling attention to improperly or inadequately guarded structures, to weak or broken planks in scaffolds and platforms, and to other items which are fall hazards.

Let's see to it that there are no makeshift ladders on our job and that substantial handrails and toe boards are installed on all scaffolds, platforms, ramps and catwalks.

No matter how well we guard all these various exposures, we are still open to injury if we don't think about keeping ourselves and others safe from falls. Let's bear in mind the fact that serious injuries can and do result from falls.

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Fall Protection



On maintenance and construction work, falls from elevated positions create as much concern as all other injury causes combined, primarily because of the severity of such incidents. Listed below are some things that we must strongly consider in our job planning and implement into our work.

- ▲ Scaffold platforms must be protected by handrails and toeboards. Ladders must be provided to the platform with easy access from one to the other. Materials are not to be carried up and down the ladder. You must have full use of both hands.
- ▲ People working in aerial lift baskets must remain in the basket. Obviously, the same is true for other types of basket.
- ▲ All extension ladders must be tied off at the top and have safety shoes at the bottom. When climbing the ladder to tie it off, another person must hold it rigidly. If it is not possible to tie it off, someone must hold it while in use, and it must be taken down between uses.
- ▲ Step ladders are not to be used as straight ladders. They must be fully opened and the spreaders locked.
- ▲ All elevated work, not protected by platforms and guardrails, will require safety belts and lanyards.
- ▲ When working very high from a straight ladder, you should wear a safety harness and attach the lanyard.
- ▲ Scaffold builders must wear the harness/lanyard and use them whenever the job permits.
- ▲ Adopt a positive attitude. Work on means of protecting yourself rather than excuses for not doing so.

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Body Harness Saves Employee



One day, a carpentry employee was working on a 9-12 pitch roof. Most of the work was to be done on the front of the roof and the front work area was about 20 to 25 feet from the tie-off point. Additionally, a few sections of plywood needed to be placed on the rear roof and tar paper was covering the majority of completed roofing. The employee tied off with about 30' of slack in the safety rope so that all work areas could be reached.

The employee decided to finish up the work on the rear roof area first. He went to the area, put the plywood in place and picked up the pneumatic nailer. As he moved to begin nailing, he stepped on a piece of tar paper and slipped. He landed flat on his stomach and slid off of the roof backwards. Toeboards would have stopped him, however, they had been removed by the roofers. As he was leaving the roof surface, he remembered the slack he had left in the safety rope and did not know if the rope would stop him in time.

He fell approximately 25 feet, narrowly missing a bay window base which was protruding about 3 feet from the house wall. He glanced off the side of a 6 foot high dumpster that was placed about 8 feet from the building. He stopped falling with his boots about 1 foot from the ground. His safety harness saved him.

Any number of differences in this scenario and one of your coworkers could have been permanently disabled or dead. If the safety rope was 3 feet longer he would have hit the ground. If his fall trajectory was slightly different, causing him to hit the window base or dumpster, this accident would have not been a "near miss". If the company did not insist on full body harnesses, as opposed to safety belts, this fall could easily have resulted in a spinal or internal injury. This employee was lucky.

When you are working in an area where fall protection is needed, make sure that the rope will stop you. Whenever possible, tie your rope in such a way that in the event of a fall, you do not leave the working surface. If you are working at the edge of a surface do not allow slack for a fall of more than 6 feet. You may need to adjust the safety rope often when working. Take the time to adjust your lifeline. Do not leave your fate up to luck.

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Emergency Signaling



A disabled truck stopped on the shoulder of the road, or on the traveled portion of the road, can create a hazardous traffic situation. The driver's immediate action in placing emergency signaling can greatly reduce this hazard.

Each truck should be equipped with 3 emergency triangles or flares.

If your truck becomes disabled, try to make it to the shoulder of the road before stopping and follow these DOT emergency procedures:

1. Activate the truck's hazard warning signal flasher.

2. Two-way traffic:

- ▲ Place 1 triangle at the traffic side of the stopped truck within 10 feet of the front or rear of the vehicle.

- ▲ One triangle at a distance of approximately 100 feet in each direction from the stopped truck in the center of the traffic lane or shoulder of the road.

3. Divided or one-way roads:

- ▲ Place 1 triangle at the traffic side of the stopped truck within 10 feet of the vehicle.

- ▲ One triangle at a distance of approximately 100 feet and another at 200 feet in the direction of approaching traffic in the center of the lane or shoulder of the road.

4. Hills, curves and obstructions:

- ▲ If the truck is stopped within 500 feet of a curve, crest of a hill or other obstruction to view, the driver shall increase the distance between triangles so approaching vehicles can slow or stop in time. The maximum distance from the rear of the truck to the triangle should not exceed 500 feet.

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Heat Stroke & Heat Exhaustion



It's time again for us to familiarize ourselves with the symptoms and treatment for the hot weather dangers: Heat strokes and Heat exhaustion.

Any time the temperature rises above 90 degrees, the danger exists that persons exposed to the direct sun may be affected with heat stroke or heat exhaustion. It is important that we know the symptoms and emergency treatment of these two different types of illness.

Heat Stroke

The symptoms of heat stroke often appear suddenly and are characterized by collapse, delirium or coma. Certain characteristics included diminished sweating; dry, hot skin and flushed face; headaches, dizziness and irritability, nausea and vomiting; an extra high body temperature ranging from 105 to 110 degrees; and an extremely rapid pulse.

The heat stroke victim should be taken to a hospital or doctor immediately. Attempts should be made to lower the body temperature. This can be done by removing all the patient's outer clothing and sprinkling the entire body with water. A fine spray of water evaporates more rapidly and produces a better cooling effect.

The patient's arms, legs and trunk should be rubbed briskly to increase circulation to the skin. If ice is available, an ice bag or towel wrung out in ice water should be applied to the head. This is an emergency.

Heat Exhaustion

The symptoms of the slightly less serious heat exhaustion are different from heat stroke in that the patient's skin normally is cold, clammy and covered with perspiration instead of hot and dry. The face is pale; other symptoms include a headache, loss of appetite, drowsiness, cramps of the limbs and abdominal muscles, faintness or unconsciousness. The pupils of the eyes sometimes are dilated.

To treat heat exhaustion, move the patient to a cool place to rest and keep the patient lying down with his head level low. If you have salt available, give the patient small amounts mixed with water. It's not a bad idea to suggest to the patient to see a doctor for a checkup after resting for a while.

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Stay Cool



Listed below are some common heat related illnesses including —heat rash, heat stress, heat cramps, fainting, heat exhaustion or heat stroke. Below is a brief description of these illnesses.

▲ **Heat Rash**—Although heat rash is not life threatening, it is unpleasant, and a sign that you are being adversely affected by the heat. When working in the heat, avoid wearing synthetic fabrics or heavy, poor blocking lotions, which may contribute to heat rash.

▲ **Heat Stress**—Symptoms of heat stress are thirst, dizziness, fatigue, and difficulty seeing. If you experience any of these symptoms, take a break and drink water or fruit juice.

▲ **Heat Cramps**—Heat cramps are painful muscle cramps that are caused by losing salt while sweating. If you experience heat cramps, cool down and drink juice. During the summer you should eat a diet that consists of foods to replace the lost salt.

▲ **Fainting**—Occasionally, extreme heat may cause a person to faint. This can be especially true when standing still in the sun for a long period of time. If you do faint, lying down in a cool place for a while should help you recover.

▲ **Heat Exhaustion**—Signs of heat exhaustion are weakness, dizziness, chills, rapid pulse, increased perspiration, headache, or nausea. If you experience these symptoms, stop working, drink plenty of liquids, and lie down in a cool place with your feet slightly elevated. Heat exhaustion is somewhat serious and should be followed by moderate activity for the next couple of days.

▲ **Heat Stroke**—Heat stroke is the most serious and can be life threatening. Signs of heat stroke are confusion and poor coordination, high body temperature, and dry skin. Heat stroke can be prevented by paying attention to the signs of heat illness before a heat stroke occurs. If a person experiences a heat stroke an ambulance should be called. Move them to a cool place and apply ice packs or cold soft drink cans, sponge with cold water, or immerse them in cold water. If conscious, offer water.

****During the summer, drink plenty of water, sports drinks or juice. Avoid alcohol and heavy milk drinks. Wear light colored, loose-fitting and nonsynthetic clothing. Eat fruits and lightly cooked vegetables to help replace sodium and potassium lost during perspiration.****

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Stress



As an adult, there are many daily frustrations and difficulties for us to face. In today's complicated world, even the most competent of people can become, nervous, keyed up, and totally "STRESSED OUT." When we become stressed out, our natural resiliency is lost.

When this happens we become more distracted and are much more likely to have accidents.

Below are a few tips for controlling stress:

1. **Eat properly.** Don't overdo fats, sugars and caffeine. Caffeine can aggravate symptoms of stress.
2. **Get plenty of sleep.** Sleep refreshes your body and cures tension. **LACK OF SLEEP CAN ACTUALLY MAKE YOU MORE ACCIDENT PRONE.**
3. **Do not expect yourself to be perfect.** Remember that humans are not machines and we are **ALL** going to make mistakes. Take it easy on yourself.
4. **Set aside time in your weekly schedule to play.** Take at least an hour or two once or twice a week to do whatever you find the most fun and **RELAXING**.
5. **Do not keep angry or hostile feelings bottled up inside you.** Speaking with someone about your feelings will keep them from festering and becoming hard to manage.
6. **Try to be helpful to others.** Giving someone else a compliment, advice, or a helping hand can amazingly help you feel much better.
7. **Proper breathing is a very significant key to stress reduction.** The more we allow our breath to become natural, the more relaxed we will be.
8. **Exercising regularly is another very important aspect of stress reduction.** If you are too tired for strenuous exercise then simply try stretching.

❖ SMACNA Safety Toolbox Talks ❖

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Shock



Shock is a term used with many meanings. Decidedly different conditions are electric shock, insulin shock, the temporary shock of simple fainting, and the psychiatric condition formerly called shell shock. The shock that we are interested in is traumatic shock, which is a depressed condition of many of the body functions due to failure of enough blood circulating through the body following serious injury.

Shock is associated with injury to body tissue from burns, wounds or fractures. In most instances it is caused by loss of large quantities of blood, either externally or into the tissues or body cavities.

In general, the greater the damage to flesh and bone, and the larger the blood loss, the greater the danger for shock to occur.

If a person develops shock and remains in it, death may result, even though the injury causing the shock was not fatal. Therefore, proper First Aid to help prevent or to deal with shock is essential when caring for any seriously injured person.

For general information, here are some signs and symptoms of shock. The most important evidence is the victim's weakness, coupled with a skin that is pale, moist, and cooler than it should be. Beads of perspiration may be noted about the lips, forehead, palms, and armpits. The patient may vomit or complain of nausea. His mental reactions may appear normal at first. Later, he may become restless or lose alertness and interest in his surroundings. Thirst is commonly present. The pulse is fast, but may be weak or impossible to feel. The patient may breathe faster than usual and occasionally take deep breaths.

The proper course is simple and one which we want to follow on this job in all cases: Give First Aid For Shock To All Seriously Injured People. The same First Aid measures apply to both prevention and care of shock.

Keep the patient lying down. The lying down position favors the flow of a greater amount of blood to the head and chest where it is needed most. It places less demand upon the body than sitting or standing, and is the most favorable position if there is an injury to internal organs, the head or a fracture. There Is One Exception To The Horizontal (Lying Down) Positions: If there is difficulty in breathing, the patient's head and chest should be elevated.

Elevate the lower parts of the body if the blood loss is great or the injury severe. Raise the foot of the stretcher eight to twelve inches. This elevation should not be done if:

1. There is a head injury.
2. Breathing difficulty increases.
3. If the patient complains of pain when it is attempted, such as pain from a fracture in the lower extremities or abdominal pain.

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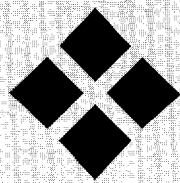
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Chapter Seven



Tools of the Trade

Chisels



There are many misconceptions about chisels and chiseling which result in misuse and abuse and could lead to possible injury.

Here is a list of do's and don'ts compiled by the Hand Tools Institute for the safe use of these tools:

- ▲ Before doing any kind of chiseling, put on safety goggles for eye protection. Also make sure the work is securely braced or clamped.
- ▲ Then check the condition of the chisel. It should have a sharp, properly ground cutting edge, not only to do a better job but to accomplish the work safer and quicker. Also check the head or striking surface. If the head is mushroomed, chipped or badly battered, the chisel should not be used.
- ▲ Next, never use a common nail hammer to strike a cold chisel because chipping of the hammer or chisel could result, causing eye or other bodily injury. Instead, use a ball peen hammer of the proper size. The face of the hammer should be larger than the head of the chisel.
- ▲ Finally, make sure you are using the proper chisel for the job. Cold chisels are used for cutting and chipping metal, and they should never be used on stone or concrete. Brick chisels are designed for scoring and cutting brick. They should be struck with a heavy hand drilling hammer, not a bricklayer's hammer which is used for cutting masonry. A brick chisel should never be used on metal.

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Defective Tools



There's an old-time basic safety rule that covers this problem: Don't use them. Simple, isn't it?

Defective tools are dangerous. Their use has resulted in a great many accidents, a lot of them serious and some fatal. Slipping wrenches have caused falls from ladders or scaffolds. Loose handles on hammers and picks have resulted in serious head and body injuries. Far too many have lost eyes because they used chisels or drills with mushroomed heads. It could happen to you but it won't if you follow this rule: Don't use them.

We don't have to list all the defects you may run into with small hand tools. You are all familiar with them - loose, split or cracked handles, even crooked handles; mushroomed heads on chisels, drills, steel wedges; files without handles; worn-out jaws on wrenches and many others. Let's just remember to check tools before we use them and replace defective ones.

Power tools, whether powered with electricity, air or gasoline, require considerable skill and certainly complete attention on the part of the user even when they're in A-1 mechanical condition. When defective, power tools become killers, so don't use them.

Although probably more accidents have occurred from the use of defective non-powered tools than from the use of hand-operated power tools, injuries from the latter source are usually more serious. Perhaps the most common defect with power-operated tools is a broken, displaced or inoperative guard. Guards are placed on equipment to prevent injuries. Using tools with inoperative or broken guards can lead to disaster. A power saw with the guard wedged back is just as defective a machine as a power saw with a cracked blade. Either one is dangerous.

Electric-powered tools can have defective switches, poorly insulated cords and, most often, no provisions for guarding. Air-powered tools and equipment show up on the job with valves that will not completely open or close. On gasoline-motored equipment, probably the most common defect is an out-of-order throttle.

To minimize accidents from defective tools, let's remember these three points:

1. Double-check all tools before you use them.
2. Replace all defective tools right away.
3. Never use a defective tool.

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Use & Care of Hand Tools



Improper use and care of hand tools cause hundreds of injuries each year in the construction industry. Each individual using hand tools can help prevent a large percentage of such injuries with periodic inspection for defects of personal and company-issued tools. The only one who can prevent any accident due to improper use is the individual himself.

Examples of Improper Use and Care:

- ▲ Chisels with mushroomed heads
- ▲ Wrenches with worn or sprung jaws.
- ▲ Slings or chokers with broken strands.
- ▲ Hammers, sledges, and mauls with loose handles.
- ▲ Gasoline equipment with leaky fuel lines.
- ▲ Electrical tools without grounds or with cords frayed and exposed.
- ▲ Using a pipe as a cheater on wrenches.
- ▲ Throwing tools from ground to scaffold, etc.
- ▲ Carrying knives and other sharp tools in pockets without covering points.
- ▲ Leaving welding rod stubs laying around on floors.
- ▲ Using ladders with broken rungs or ladders not tied off.
- ▲ Leaving tools on scaffolds where they can be kicked off.

Remember, you can prevent an accident involving hand tools. Stop and think before using a defective tool. Stop and analyze the conditions under which you are working before using a tool in a manner in which you can get hurt or hurt someone else.

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Needles That Fly



The needle-sharp chips that fly from hammers, and from tools that are being struck, cause many eye injuries. The danger is extremely great, because the worker usually has his eyes “focused” right on his work-the source of the chip. Hazards are further complicated because there is a general lack of knowledge about the hardness of the steel in the striking hammer and the hardness of the steel in the tool being struck.

Furthermore, there is widespread neglect in the wearing of safety goggles during these operations. Sometimes the operation is too small, or too infrequent, to demand the attention that it deserves. Sometimes it is regarded as an insignificant, brief operation that will be over in a few seconds.

Even after a steel chip does hit a man, unless it does serious injury, it may be casually castoff as a minor matter, and no attempt may be made to understand the cause or the seriousness of the problem.

The chances of serious eye injury are tremendous. Hammers and tools should be made of carefully selected steel, heat treated to withstand mushrooming, yet not so hard that they chip. For safety, it's better for such tools to be softer, rather than harder. Only experienced men should be allowed to form and temper such tools.

Employees should be warned about the hazards of using a steel (carpenter's) hammer on any hardened steel surface.

Since a man can't see how hard a tool is and he can't know if it has been properly treated and tempered, the best protection against “needles that fly” is to wear safety goggles without fail on all such operations.

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Powder Actuated Tools



A number of tools utilizing explosive charges to drive fastenings, cut cables and perform similar functions are available to make our jobs easier. The manufacturers of these devices provide detailed instructions regarding their use, and these instructions should be closely adhered to at all times. The following general recommendations apply to all powder actuated tools.

- ▲ Only properly trained and qualified operators should use powder actuated tools. Users should possess Qualified Operator's Cards which are issued by a particular manufacturer's authorized distributor or other competent source.
- ▲ A loaded tool should never be carried away from the worksite. The tool should always be left unloaded until ready for actual use.
- ▲ The tool should never be pointed at anyone, whether loaded or unloaded, and hands should be kept clear of open muzzle end.
- ▲ Powder actuated tools should never be stored or used in an explosive atmosphere or in the vicinity of highly flammable materials, or where nonsparking tools are required.
- ▲ Tool should be held firmly against and perpendicular to the surface being driven into.
- ▲ Safety goggles should be worn by operator, and face should be protected if there is danger of spalling materials. Transparent face shields provide both eye and face protection.
- ▲ Manufacturer's recommendations should be sought if there is any doubt about the material being driven into. Most manufacturers recommend against driving into very hard or brittle materials such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick, hollow tile and similar materials.
- ▲ To prevent flying hazards, no stud should be driven without first making sure that it will not pass completely through the material being driven into.
- ▲ Tool should be loaded only if it is to be used immediately.
- ▲ In areas where stud drivers are being extensively used, signs and barricades identifying the high hazard areas are recommended.

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Safety Rules for Power Tools



- ▲ **Ground all tools**—unless double insulated - tool is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle. Never remove third prong.
- ▲ **Keep guards in place** and in working order.
- ▲ **Avoid dangerous environment** - Don't use power tools in damp or wet locations.
- ▲ **Store idle tools** - When not in use, tools should be stored in a dry place.
- ▲ **Don't force tools** - Don't force small tools to do the job of a heavy-duty tools.
- ▲ **Wear proper apparel** - No loose clothing or jewelry to get caught in moving parts. Rubber gloves and footwear are recommended when working outdoors.
- ▲ **Use safety glasses** with most tools. Also face or dust masks if cutting operation is dusty.
- ▲ **Don't abuse cord** - Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil and sharp edges.
- ▲ **Secure work** - Use clamps or a vise to hold work. It's safer than using your hand and it frees both hands to operate tool.
- ▲ **Don't overreach** - Keep proper footing and balance at all times.
- ▲ **Maintain tools with care** - Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
- ▲ **Disconnect tools** - When not in use; before servicing; when changing accessories such as blades, bits, cutters, etc.
- ▲ **Remove adjusting keys and wrenches** - Form habit of checking to see that keys and adjusting wrenches are removed from tools before turning it on.
- ▲ **Avoid accidental starting** - Don't carry plugged-in tool with finger on switch.

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Using Screwdrivers



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- ▲ Don't hold the work in one hand while using the screwdriver with the other. If the screwdriver slips out of the slot (we told you to use the right size screwdriver!) you will be most likely to receive a gash on your hand.
 - ▲ Don't use a screwdriver with rounded edges or tips; it will slip and cause damage to the work or yourself.
 - ▲ A rounded tip should be redressed with a file; make sure the edges are straight.
 - ▲ Don't use a screwdriver near a live wire.
 - ▲ Don't use a screwdriver to check a storage battery or to determine if an electrical circuit is live.
 - ▲ Don't use a screwdriver for prying, punching, chiseling, scoring, or scraping
 - ▲ Use a screw-holding screwdriver to get screws started in awkward, hard-to-reach areas.
 - ▲ Use an offset screwdriver in close quarters where a conventional screwdriver cannot be used.
 - ▲ Use a ratchet-type screwdriver for speed and comfort when a great number of screws are to be driven.
 - ▲ Don't use pliers on the handle of a screwdriver to get extra turning power. A wrench should only be used on the square shank or bolster of a screwdriver that is especially designed for that purpose.
 - ▲ Don't expose a screwdriver blade to excessive heat as it may reduce the hardness of the blade.
 - ▲ Don't use a screwdriver with a split or broken handle.
 - ▲ Screwdrivers used in the shop are best stored in a rack. This way, the proper selection of the right screwdriver can be quickly made.
 - ▲ Keep the screwdriver handle clean; a greasy handle is apt to cause an accident.

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Striking Tools



There are some general rules that apply to almost all hammers and other striking tools. Never use a striking tool for any purpose other than that for which it was intended. Never use a striking tool with a loose or damaged handle or with a mushroomed head or dull cutting edge.

Some other rules that apply particularly to hammers are:

- ▲ Strike blows squarely-a glancing blow increases the chances of striking a finger or hand or chipping the head.
- ▲ Never strike with the side of a hammer.
- ▲ Never strike one hammer with another.
- ▲ Always wear safety goggles when hammering.
- ▲ When striking chisels, punches, wedges, etc., the hammer face should be larger than the head of the struck tool.

Struck Tools

Common rules for the safe use of struck tools include:

- ▲ Always wear safety goggles.
- ▲ Use the proper tool for the job-never use cold chisels on stone or concrete, hot chisels on cold metal, stone, or concrete, wood chisels on metal, etc.
- ▲ Never use a punch with a mushroomed head, or dull cutting edge-dull edges can be sharpened.
- ▲ Never use a punch with a mushroomed head, a slanted or chipped point, or a loose or damaged handle.
- ▲ Never use a drift pin as a punch or strike one if the struck end is chipped or mushroomed.
- ▲ Never use a star drill with a dull cutting edge or damaged head and never on anything but masonry.
- ▲ Use only wedges in good condition.

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Do's & Don'ts When Using A Vise



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- ▲ Use bolts in all the holes in the base of the vise.
 - ▲ Use lock washers under the nuts.
 - ▲ Do not use the jaws of the vise as an anvil.
 - ▲ When work is held in the vise for sawing, saw as close to the jaws as possible (to prevent vibration). Be careful not to cut into jaws.
 - ▲ When clamping extra long work, support the far end of work rather than putting extra pressure on the vise.
 - ▲ Avoid clamping work with heavy pressure at the corner of the vise jaws as this may break off a corner of a jaw.
 - ▲ Wear safety glasses when hammering or pounding on an object held by the vise.
 - ▲ Replace a bent handle.
 - ▲ Replace worn jaw inserts.
 - ▲ Adjust for play between nut and screw or replace them when excessive play develops in the handle.
 - ▲ Lightly oil all moving parts.
 - ▲ Never use an extension handle for extra clamping pressure.
 - ▲ Use jaw liners with a vise if there is any possibility of marring the work.
 - ▲ If the threaded part of the vise is exposed, keep it free of chips and dirt.
 - ▲ Discard any vise that exhibits the slightest hairline fracture.
 - ▲ Never pound on the handle to tighten beyond hand pressure.
 - ▲ Never try to repair a vise by welding or brazing.

❖ SMACNA Safety Toolbox Talks ❖

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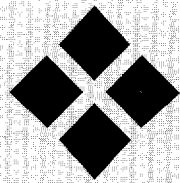
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Chapter Eight



Equipment & Machinery

Machine Guards



Today, most machines we work with are equipped with guards on parts that expose workers to hazards. This was not always the case in the past and many employees suffered unnecessary injuries.

Since guards are specifically installed to protect the employee and others from injury, it is baffling to realize that there are those who will put themselves in danger by removing or altering this safeguard. Any time that is saved can be offset by even one injury.

When it becomes necessary to remove a guard for service or adjustment purposes, disable the power source. If the equipment is electrical, turn off the power and make sure the switch is locked and tagged out. If the equipment is fuel operated, i.e. lawnmower, turn off the switch and remove the spark plug.

Do not get so involved in correcting a problem with your machinery that you put a solution before your safety. Protect yourself first. Then proceed with maintenance. Beware of pinch points, sharp edges, hot and movable parts. Always use caution around meshing gears, rollers, reciprocating parts, chain and sprocket drives, cams, rollers, pulleys, belts, flywheels, fans, rotating couplings and shafts.

Guards would have never been designed and installed if injuries had not been occurring. It is very dangerous to disable your protection.

❖ SMACNA Safety Toolbox Talks ❖

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Guarding for Your Protection



Do not look at machine guards as a hindrance to doing your job. Do you often think, if only that guard wasn't there, I could do my job easier and faster? If you do, take what might be the last look at your hands.

Statistics reveal that three out of every ten lost-time injuries involve the hands and arms and almost ten percent of all disabling injuries are caused by machinery. While machine guards cannot prevent all injuries to the hands, guards do prevent many accidents that in the past have crippled or maimed.

- ▲ Guards are designed to protect, not hinder. They are engineered to provide as much protection as possible, even to machine operators who take chances or who are distracted while on the job.

- ▲ Machine guards protect against direct contact with moving parts, flying chips, kick-backs, and splashing of metal or corrosive liquids. Guards are also used for machine operator protection in the event of a mechanical or electrical failure.

- ▲ A guard cannot be effective without the cooperation of the person operating the machine. It is very important that anyone working with or around machinery understands the following general safety rules.

- ▲ Before operating machinery always check to be sure that the proper guards are in place and in good condition.

- ▲ No machine should be operated without guards in place.

- ▲ If guards are defective or missing, report this unsafe condition to your supervisor, IMMEDIATELY.

- ▲ Only authorized personnel should make guard adjustments.

- ▲ Guards should never be adjusted or removed unless authorized by your supervisor.

- ▲ When guards are removed for adjustment or repair, the main power switch for the machine must be locked in the off position.

Remember, safe guards are installed on machinery to protect your safety and health. If they are to protect you effectively, they must be positioned and maintained in good condition.

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Working on Motors



Internal combustion engines, as well as electric motors cause a lot of injuries every year. They shouldn't, and by following a few safe practice rules when working around them, we can help prevent accidents and injuries from these sources.

Employees get caught in moving parts—belts, pulleys, chains, sprockets, gears and other moving parts because they don't shut the machine off before adjusting, oiling or repairing it, or because someone else turns it on while it's being worked on.

Sometimes employees strain themselves trying to play the strong man. They attempt to move or lift heavy parts, like flywheels, cranks or cylinder heads, without getting help or using a hoist. They suffer burns from hot water, from coming into contact with hot parts of an engine or from unsafe use of gasoline.

To work safely on gasoline motors for instance, all you have to do is make sure parts can't move when the ignition is turned to the "off" position and the key is removed before starting to work on the motor.

Electric motors are different. You are exposed, not only to moving parts but also to electric current. For complete protection, the switch must be turned off and the master switch locked out. Of course, all electrical equipment should be grounded. Also, use only insulated tools and approved testing devices.

In any case, after you've finished the job and before you start a motor, think of the other fellow and do these things:

- ▲ Replace machine guards you had to take off.
- ▲ Make sure no one else is working on the equipment before restarting.

❖ SMACNA Safety Toolbox Talks ❖

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Refueling Equipment



In most cases, we give little thought to the process of refueling equipment, such as the vehicle we drive or a generator on the jobsite. We assume that gas stations and automobile manufacturers' have taken precautions in design and procedure to make it safe to refuel our vehicle because they are aware that a static spark while filling a gas tank could cause a major explosion.

Unfortunately, many of these safeguards are not provided for us on the jobsite. Listed below are several precautions that should be taken when refueling equipment:

- ▲ Shut off motors before refueling.
- ▲ Ensure the nozzle of the dispensing unit makes contact with the filter cap.
- ▲ No smoking in refueling area.
- ▲ Use ALL possible care to prevent running the fuel tank over. Be sure that no fuel is on the equipment before restarting.
- ▲ Fill the tank from the windward side whenever possible to prevent excessive burns in the event of ignition.
- ▲ Allow a sufficient vapor space in the fuel drum or tank to permit expansion of the liquid with changing temperatures. Gasoline expands at the rate of one percent for each 14 degrees F. rise in temperature.
- ▲ Equip electric motors having sparking contacts with explosion proof enclosures.
- ▲ Install adequate hold down devices to anchor each drum or tank to prevent movement. Turnbuckles, tie rod and eye bolt connections or similar positive action devices for drawing the tank or drum down tight on the truck bed are recommended.
- ▲ Mark each side and rear of the refueling truck with the words "Flammable-No Smoking" in letters three inches high. Each container should be marked as to its contents.
- ▲ Equip each vehicle with at least one suitable size extinguisher having a "C" rating.
- ▲ Take precautions to prevent ignition in locations where flammable vapors are present. Sources of ignition may be open flames, smoking, cutting and welding and hot surfaces.

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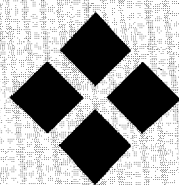
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Chapter Nine



Fire

Jobsite Fire Prevention



Fires are very costly to the construction industry. Each year they take many lives, cause employees and their families to suffer, and cost many millions of dollars.

Fire control is everyone's business. You can do your part by observing and complying with fire control regulations. If you notice any hazards or conditions that could cause a fire, report them to your supervisor immediately.

▲ Matches and cigarettes are principal causes of fires. Many fires have started because of carelessly dropped hot ashes, cigarette butts or burning matches. The temperature of the ash is often as high as 1,200 degrees Fahrenheit and if it comes in contact with combustibles, fire can result. Fireproof receptacles should be used to extinguish smoking material.

▲ Poor housekeeping is one of the major contributing factors that cause fires. Oily rags, paper, sawdust, solvents, paints and cartons should be disposed of properly. Trash should not be allowed to accumulate in the work area.

▲ Oil or gasoline that is spilled on equipment should be cleaned up immediately. Make sure that oil-soaked rags are placed in proper safety containers.

▲ Fires are also caused by the improper use of paints and solvents. Paint, paint thinner, alcohol, naphtha, lacquer thinner and gasoline should be used only for their intended purposes. Flammable liquids of any kind must be kept in approved safety containers.

▲ The thoughtless use of welding equipment can easily destroy our jobs. Fire-resistant covers, spark shields and a fire watcher standing by, plus the proper use of the equipment, are the only answers to prevent damaging fire losses.

▲ Defective wiring has caused many fires. Never try to repair wiring or equipment. Report defective items and have the repairs made by electricians.

▲ Fire extinguishers should be on the jobsite. Each of you should know where they are located and how to use them. You should also know where the fire alarm is located and how to turn in an alarm. Never try to extinguish a fire until you have turned in an alarm, and don't try to fight a fire alone.

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Preventing Fires in the Workplace



To help prevent fires, you can begin by following safe practices for storage. Flammable liquids should ALWAYS be put back in their proper places after usage. NEVER leave a flammable liquid in a more convenient spot to be put away later. You are causing a serious fire hazard and may forget to put it away later. Store them where they belong immediately after using them!

Oil or solvent soaked rags should NEVER be left laying around. After using, immediately place rags in a metal container with a self closing lid.

ALWAYS follow smoking rules exactly as they have been set forth by your company. Do not make the mistake of breaking these rules just because no one else is around to see. This may be the last mistake you make.

Another cause of fires is carelessness with electrical equipment. If you smell something burning, disconnect it immediately and report to a supervisor. Make it a habit to routinely check all electrical cords before plugging them in. If a cord is frayed or cracked, DO NOT USE the tool, appliance, machine etc., and make sure you report it for repair. Unsafe equipment should be labeled until properly repaired.

More fires occur during the winter months, attributed greatly to unsafe usage of heaters. ALWAYS keep flammable liquids away from heaters and make sure heaters are placed so they cannot be tipped over. Heaters should NEVER be placed in walkways. When leaving the WORKPLACE, don't just turn the heater off, actually unplug it. This will prevent the heater from automatically turning on when no one is there. If another shift is coming in, let them replug the heater when they arrive.

Remember to always keep walkways and exits clear of obstructions. In the event of a fire, you need an easy escape route without tripping and falling over boxes, machinery, etc. Although it may seem a nuisance, always keep doors to enclosed stairways shut. A door left open can let smoke into the stairwell, making it hard for people to escape during a fire.

If a fire does occur:

1. First, and most important, pull the fire alarm nearest you and immediately begin to exit building.
2. Never take an elevator during a fire. Use stairways instead. Many people have died from smoke inhalation, deadly gases, and heat trying to escape by elevator. Think ahead, identify at least two exits close to your work area today and learn these areas well. Smoke from a fire can become so thick you may not be able to see the route to the nearest exit.
3. In a serious fire, crawl on your hands and knees to the nearest exit. This will help you find breathable air and will help you escape some of the heat.

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Stop Fires



Most fires start small, but can rage out of control quickly. Stopping them before they start requires that we all work together to detect possible fire hazards and report them promptly.

Before fire strikes, let us look at how each of us can help make our fire protection program work.

▲ **Housekeeping**—Neat and clean work areas are not just for show. Good housekeeping helps prevent fires. How? When rubbish and other combustibles are disposed of properly and not piled in corners, fire doorways, or exits, there is much less fuel for a fire to burn. The same can be said and is especially true for paint-soaked or oily rags. Store them in approved covered safety containers or cabinets.

▲ **Flammable Liquids**—Be sure all flammable liquids are stored only in approved safety cans that are kept in a safe storage cabinet or room. Keep only a one days' supply of a flammable liquid only if necessary.

▲ **Smoking Materials**—Observe the "No Smoking" rule in all designated areas. Carelessly discarded cigarettes, cigars, pipe tobacco and matches are ignitions sources and start thousands of fires. Use ashtrays in smoking areas and always be alert for "stray" matches and cigarettes.

▲ **Know what to do if a fire breaks out**—This includes knowing your exits, how to turn on an alarm, where the fire extinguishers are located, and how to use them.

Here are four points to remember in case of fire:

▲ **Sound the Alarm**—Don't underestimate any fire; report it immediately.

▲ **Warn People**—Warn all people in the area immediately so they can get to places of safety. This is especially important in building fires.

▲ **Think Fast and Act with Caution**—When a fire is discovered, size it up fast. If it is from an energized source of fuel supply, immediately de-energize by cutting off the source of power or fuel supply.

▲ **Stand By**—Stay near the fire. Meet and tell the fire fighters where the fire is and how to attain access.

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Fire Extinguishers



Have you inspected your fire extinguishers lately? Are they fully charged, strategically located, accessible and ready for use? Or, are they laden with dust, obscurely hidden in some corner affording a false sense of security?

So often, fire extinguishers are purchased with enthusiasm, a vital need; and then, suddenly, because they are not regularly used, they are relegated to a secondary position in our operation.

The fact that fire extinguishers are our first line of defense in event of fire should warrant a periodic and thorough inspection. Fire extinguishers must be kept clean to attract attention, they must be kept accessible to eliminate lost time when needed, and the rubber hose, horn or other dispensing component must be checked to assure against blockage.

The following is a brief resume of the classification of fire and the recommended extinguisher to be used on each:

▲ **Class "A" Fires:** Ordinary combustibles such as rubbish, paper, rags, scrap lumber etc. These are fires that require a cooling agent for extinguishment. Recommended extinguishers are -Water through use of hose, pump type water cans, pressurized extinguishers and soda-acid extinguishers.

▲ **Class "B" Fires:** Flammable liquids, oils and grease. Fires that require a smothering effect for extinguishment. Recommended extinguishers - Carbon Dioxide, Dry Chemical and Foam.

▲ **Class "C" Fires:** Electrical equipment. Fires that require a non-conducting extinguishing agent. Recommended extinguishers -Carbon Dioxide and Dry Chemical. Many sources recommend the use of vaporizing liquid (carbon-tetrachloride) on electrical fires. However, because of the danger involved through the generating of a phosgenic type gas, we would advise against the use of this type of extinguisher.

❖ SMACNA Safety Toolbox Talks ❖

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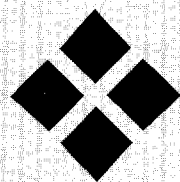
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Chapter Ten



General Safety

Unsafe Habits



The importance of developing safe work habits on the job is that we avoid certain exposures even if we are not thinking about the particular hazard. If we were always alert, never let our attention wander, and remembered to use all the safe practices and equipment required for a particular task, then habits would not be necessary. Under circumstances when complete attention is not always possible, safe work habits really pay off.

Potential hazards, and the safety habits that may protect you from being injured, are listed for your review.

▲ **Hazard:** The possibility of getting into the path of a moving object as it moves toward a stationary object.

■ **Safety Habits:** Check to make sure that the machine openings are guarded. Look for cross-overs or cross-unders and use them when they are needed. Pay attention to warning signals; there is a reason for such devices.

▲ **Hazard:** Catch points/shear points. These objects have sharp corners, splines, teeth or other rough shapes capable of catching the operator or work clothing. Examples: Rotating drills, reamers, spline shafts, broaches, keys and keyways, nails on the inside of kegs and packing crates, shears, and dies.

■ **Safety Habits:** Wear proper clothing. Make sure guards are in place, and used. Remove nails and staples from kegs and packing crates.

▲ **Hazard:** Squeeze points. These are created by two objects, one or both of which is in motion as they move toward one another. Examples: Machine tables at extreme traverse position forming squeeze points with other machines, walls, and building columns. Materials being moved on power conveyors create squeeze points with fixed objects along the conveyor.

■ **Safety Habits:** Maintain a minimum clearance of 18 inches between moving and fixed objects. Relocate equipment where necessary. Maintain proper guarding. Maintain sweep bars equipped with shutoff switches in the squeeze area.

▲ **Hazard:** Run-in points. Examples: Belts and sheaves, chains and sprockets, gears in mesh, rolls, conveyor chains, ropes and pulleys, cable and drums.

■ **Safety Habits:** Maintain and use proper guarding. Know your equipment. Never operate or work close to unfamiliar equipment.

Building safe habits is like turning on an autopilot in your body; you function with less mental stress in your thinking capacity.

❖ SMACNA Safety Toolbox Talks ❖

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Housekeeping & Safety



A truck driver jumped off the edge of a loading truck dock to take a short cut instead of using the steps. He jumped onto a discarded pallet that had been tossed on the apron earlier. When he landed on the pallet it broke causing him to lose his balance and fall. He broke his right ankle in the accident and was off work several weeks.

In another incident, a machine operator was going to lunch. He shut off his machine, wiped his hands and started for the restroom. As he turned around he slipped on an oil spot on the floor, striking his head on the equipment, sustaining a severe head injury.

Paper and wood refuse from uncrating raw materials was allowed to accumulate on the floor of a warehouse. It was to have been removed the day before, but the job was not done. Someone apparently dropped a match or cigarette onto the pile and a fire started. Fortunately, the fire was later spotted and extinguished, but not before causing extensive smoke damage to stock being stored in the warehouse.

What do these three accidents have in common?

These accidents have one important thing in common, "**Housekeeping.**" There is no doubt that the accidents or damage could have been prevented had reasonable housekeeping standards been followed. In far too many accidents, poor housekeeping is cited as a significant contributory case.

Who is responsible for housekeeping? That's a good question, especially when you see how some people can create a mess and not make any effort to clean it up. It's not only true on the job, but even in our parks, streets, and other public areas. Apparently some people must believe that there is some magic force following them around to pick up their refuse and clean up after them. Unfortunately, there isn't, so every tax payer has to pay for the cost of this clean up.

Housekeeping is everyone's job! If we would take a moment to clean up our own mess, there wouldn't be any housekeeping problem. Remember, when it comes to job safety, far too many accidents are caused by poor housekeeping. You may prevent injury to yourself or to others by just making a reasonable effort to keep things neat. It doesn't take a great deal of time to keep the place clean and it is important.

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Removing the Hazard



A story is told about a farmer who used to go over his field the day before plowing and kill all the rattle snakes he could find. When asked if that wasn't a dangerous thing to do, he replied, "I reckon so, but if I don't kill 'em off today when I am looking, they might get me tomorrow when I'm not looking". There is a lot of logic in this old farmer's thinking. In fact, it's the basic principle of accident prevention.

Removing the hazard before it removes us is close to the starting point in safety. The starting point, of course, is our recognition and constant awareness of hazards. Recognition doesn't count, however, if action isn't taken to control the situation. That completes the safety cycle.

Accident experience in most companies shows the highest frequency of accidents occur on jobs where hazards vary. Since hazards do vary we should be prompted into "checking the field before we plow".

A work area should be evaluated step-by-step for hazards. Procedures must be set up to either eliminate the hazards or to control them. This is accomplished by applying basic safety principles to correct anything with accident producing potential.

Sometimes the control factor is as simple as housekeeping, sometimes it is just looking where we step or making up our minds to test our footing.

Whatever it is, it's hazard hunting plain and simple. It's looking for snakes before we plow.

Look Around and Be Aware!!

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Housekeeping



Professionals claim that just about everything a person does indicates something about his personality, his strengths, and his weakness.

In our business, housekeeping is about the best indication as to quality of work. Show me a workman who has a clean squared-away work area and I'll show you a good efficient worker—a man this company will want to keep around. Show me a sloppy work area and I'll show you a poor workman.

Most important, a clean work area, free of loose materials or tools, is SAFER. How many accidents have occurred because someone left a loose board lying in a passageway? If you don't already know, I know. Just about one out of every three injuries in construction work is caused by slips or falls. These are often the serious ones, involving death or permanent disability.

You have to be constantly alert to the dangers of poor housekeeping. A clean work area does not only increase your efficiency, but it also increases your chances of returning home at night—safe and sound.

Snow covers up boards with protruding nails, stumbling blocks of all kinds - but the danger is still there, so when you have to walk in areas where hazards are known to exist, walk with your eyes as well as your feet. **Look where you are going.**

The management of this company has set up an Accident Prevention Program. When a company is concerned enough with our safety to establish one, the least we can do is to perform the ingredient of any program and that is to keep the job clean. A personal injury is usually the result of poor housekeeping and is costly to the employee and the company. So do yourself and your family a favor.

Keep It Clean and Do Not Take Chances!

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Housekeeping



Adequate housekeeping is a constant problem throughout plants, job sites or work areas. It has a definite effect on accident prevention, worker morale, and the effective use of space, time material and effort. It further reflects the efficiency of work being done. Steps taken to achieve and maintain good housekeeping often improve production.

The Problems:

- ▲ Fire Prevention
- ▲ Inadequate cleaning
- ▲ Scrap accumulation
- ▲ Lack of management concern
- ▲ Congested aisles or passageway
- ▲ Oily or wet floors
- ▲ Cluttered work areas
- ▲ Temporary repair operations
- ▲ Improper material storage
- ▲ Faulty maintenance

Solutions:

- ▲ Provide better storage
- ▲ Provide adequate waste facilities
- ▲ Planned flow of material
- ▲ Clean-up campaign
- ▲ Reduce materials rehandling
- ▲ Reduce equipment breakage
- ▲ Reduce spillage
- ▲ Better equipment maintenance
- ▲ Maintenance program for piping
- ▲ Routine Individual clean-up
- ▲ Clean-up review and inspection
- ▲ Better job planning
- ▲ Efficient scheduling arrangement
- ▲ Designed worker convenience

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Horseplay



We all like a gag, we all like a laugh. But there are some situations in which a gag is no joke, and the laughs get turned into screams of pain.

Children think it is funny to push or trip another child and there are some adults who have never grown up and still think such actions are funny.

Children, generally, take falls much better than adults and can get up and keep going. However, adults working around machinery, equipment, etc. are exposed to a much greater risk of injury. Add to this formula the fact that adults don't take spills so easily and the chances of a crippling injury occurring are greatly increased.

Scaring someone is another favorite of children. On the adult level this can cause real trouble. We've all seen a little joke turn into bigger trouble. Any kind of a practical joke pulled in a busy work environment is a threat to everyone's safety.

Even the joke puller is at risk. Whatever the reaction, the jokester could be the recipient. He might get pushed into machinery, off a high work platform, cause a chain reaction involving other employees, and the list is endless.

So let's behave like grown up men and women learn to relate to fellow employees on a more mature level.

Horseplay and practical jokes are a questionable practice but there is no question that they do not belong on the job!

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Handling Gasoline



Gasoline is made for one purpose—to cause an explosion and thereby energy for power. If misused, it can cause serious injury or death. Improper use kills many people annually. Follow these suggestions when handling gasoline and you won't become a fatal statistic:

- ▲ Gasoline should always be kept in an approved container. The container must be red, labeled with the name of the product, and with the word "Flammable". Never use glass containers.
- ▲ Pouring gasoline from one container to another can generate a charge of static electricity. Bond one can to the other by use of an insulated wire.
- ▲ Build a dike at least 18" high around gasoline storage drums to control spillage.
- ▲ Wipe up gasoline spills immediately so that no vapors are allowed to form.
- ▲ Remove saturated clothing immediately. Wash affected area with plenty of soap and water; otherwise severe irritation or rashes will result. Stay away from ignition sources.
- ▲ Avoid inhaling vapors.
- ▲ Never use gasoline for cleaning purposes, whether it be clothes, tools, or your hands.
- ▲ Never smoke on service station drives.

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Alcohol Facts



Nearly one in five of all deaths on the road are caused by drivers who have been drinking. Every year, approximately 20,000 people are killed in alcohol-related traffic accidents in the United States.

THE TRUTH ABOUT ALCOHOL

FALSE

Some people can drink a lot and not be affected.

Eating before drinking will help you stay sober.

Coffee, fresh air, or splashing cold water on your face will sober you up.

Beer is not as strong as liquor or wine.

Alcohol is a stimulant that will increase your ability to drive.

The bigger you are the more you can handle.

Drive slower and you will be O.K.

THE TRUTH

Even one drink will have an effect on your driving ability.

Food will not keep you from getting drunk.

Only time will sober you up.

A few beers are the same as a few shots of liquor or wine.

Alcohol is a depressant that will make you less alert and reduce your ability to drive.

Impairment in motor reflexes can begin with your first drink regardless of size.

Slow driving will not compensate for impairment and can be dangerous.

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Beware of the Stairs!



Over the past year, improperly installed stairs have contributed to several accidents resulting in serious employee injuries. These accidents could have been avoided!

In one, an employee was descending to the basement to install a hot water heater when the complete stair section fell. The employee fell approximately 7 feet into the basement landing on the stairs. He severely sprained both ankles. The stairs were installed with two small finishing nails in the top riser that pulled out with the employee's weight.

In another, a carpenter was installing a section of stairs between the first floor and an upper landing. He tacked the top section of trim to the landing and proceeded to climb the stairs. The trim separated from the stairs and the stairs fell. He fell through a first floor opening into the basement. The stairs followed, landing on top of the carpenter. He bruised several ribs.

These accidents could easily have resulted in permanently disabling injuries or worse.

Here are several things to look for before you use stairs:

- ▲ You should always inspect stairs before you use them. When a set of stairs has been recently installed, look for the following:

- ▲ Be sure that the bottom of the stairs is blocked to prevent it from kicking out.

- ▲ Be sure that the top riser (vertical plate) is nailed to the top landing with substantial nails. Finishing nails are not acceptable.

When the stairs are fully installed, the bottom block is normally removed, but the stairs have additional support from the sides. Take the time to look and be sure that the support is there.

Take a good look at the slope of the stairs. When the stairs are at too steep or too flat, do not use them. It is extremely easy to fall on improperly sloped stairs especially when carrying materials.

Finally, a set of stairs rising more than 30 inches must be equipped with hand rails before it's ready for general use.

Do not take stairs for granted. Make sure they are safe before you take that step.

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Guardrails



In construction work guardrails as safeguards are all too often overlooked or made in a slipshod fashion.

Accidents due to lack of guardrails are much too frequent, and generally result in either serious injury or death. When such an accident occurs, you are likely to hear such alibis as "It was just a temporary job," "Others would have knocked it out anyway," "I didn't think it was needed," or "The job was too short."

Well, we don't want to be "Alibi Joes," so let's put up guardrails wherever they are needed. Let's bend over backward when we are deciding whether or not we need them. Let's be sure every exposed place and floor opening is guarded.

When we erect a guardrail, we want to be sure that it will withstand any load that may be put on it. It should be made of good sound lumber, free of knots and shakes. Guardrails should be 42 inches high with an intermediate rail and toe board. They should be so fixed and braced that there will be no chance of their becoming insecure.

The intermediate rail and toe board should be of 1 x 6 material. The intermediate rail should be placed midway between the bottom of the top rail and the top of the toe board. Joints of both the intermediate rail and the toe board should be made at uprights. All guardrail members should be securely nailed.

Each guardrail should be checked for proper construction and security before men are allowed to work in the guarded area. No railing thrown up just as a "get-by" will be approved.

Anyone can work more efficiently if he knows he is protected from serious falls. Good guardrails at exposed places will give the men this assurance.

When you start to erect a guardrail, bear in mind that you're exposed to the danger for which you're providing protection and act accordingly.

All of us want our jobs to be as safe as we possibly can make them. Sound, well-built guardrails will contribute a lot toward that end.

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Confined Spaces



We define a confined space with three criteria:

- ▲ Enclosures having limited means of entry and exit such as storage tanks, tanks, tank cars, bins, boilers, and other tank-like compartments usually with only a manhole for entry
- ▲ Open-topped spaces not subject to good natural ventilation, more than four (4) feet in depth, such as pits, vaults, and vessels
- ▲ Underground structures such as septic tanks, sewers, and pipelines.

The following guidelines must be followed for entering confined spaces:

- ▲ Do not enter if work can be done on top or outside.
- ▲ Blank-off inlet and outlet lines; lock all valves in closed position and all switches "off"
- ▲ Remove manhole covers or entry doors; avoid breathing vapors when removing covers; ventilate space.
- ▲ Purge by blowing air, steam, or both into space to be entered, to exhaust the confined space. Do not enter space until space is certified as safe

Test for:

- ▲ Combustible Gas
- ▲ Oxygen deficient atmosphere (carbon dioxide)
- ▲ Carbon monoxide
- ▲ Suspected toxic gases

Always put on harness and life line (two men "on top") when going into an inadequately ventilated confined space. Continue to test air when entering any confined space. Electrical equipment must be explosion proof if flammable mixtures could be present. Guard stationed outside confined space must not enter in rescue attempt until other help has been called.

If the atmosphere is potentially dangerous or oxygen deficient, in addition to the harness and life line, wear an approved air line or self-contained breathing apparatus.

REMEMBER: Continue to mechanically ventilate the space at all times while inside.

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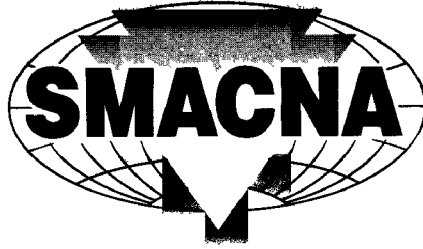
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