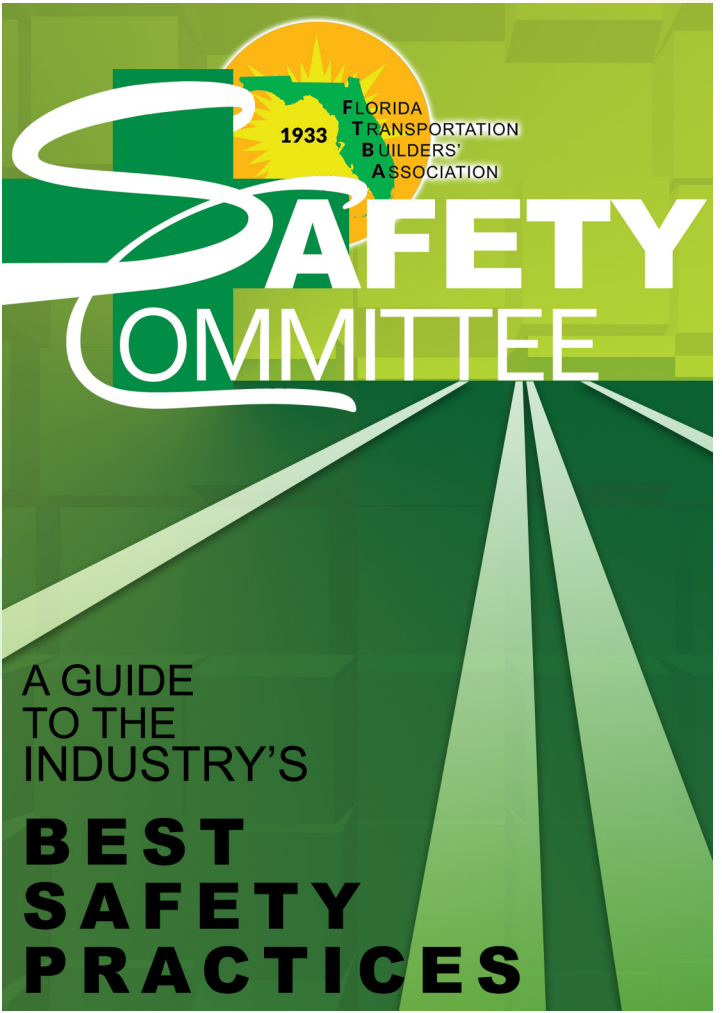

1933
FLORIDA
TRANSPORTATION
BUILDERS'
ASSOCIATION
SAFETY
COMMITTEE
A GUIDE
TO THE
INDUSTRY'S
BEST
SAFETY
PRACTICES

CONTENTS

INTRODUCTION

The Florida Transportation Builders' Association Safety Committee (FTBA SC) is a group of transportation industry safety professionals dedicated to providing relevant safety training resources and materials which can be used educate workers, protect the public, and promote safety within our industry. Whether your role in the transportation industry involves road construction, project management, asphalt production, quality control, administrative services, or management; we all want to build Florida's transportation future safely.

This handbook is intended to establish a general guide for the safety related work practices most common to the transportation industry in Florida. The policies covered in this handbook are the result of many years of experience in our industry. The FTBA SC believes this handbook will provide time-tested and proven guidelines to help ensure safety on our work sites.

The FTBA Safety Committee's Best Practices Booklet is for informational purposes only. It includes images and general information provided by the committee's members.

The information contained in this booklet is general in nature, and is not intended to and should not be relied upon or construed as professional or legal advice regarding any specific issue or factual circumstance. The quantity of information necessary to thoroughly address every potential workplace hazard is extensive and could not be covered in a publication of this size. The information contained in this booklet is subject to change.

1. *W*ear proper personal protective equipment (PPE) at all times.

2. *Y*ou must be properly belted into a driver's, operator's, or passenger's seat while riding in or driving all equipment and/or vehicles.

3. *E*xcavations: Do not enter a trench without proper sloping and means of egress. Never stand under an elevated load and never store anything within two feet of an excavation.

4. *M*aintain a safe distance from energized power lines.

5. *W*ork safely and with extreme awareness while working around traffic.

6. *D*on't work or drive drowsy or sleepy.

STANDARD SAFETY GUIDELINES

7. *W*ork safely and with extreme awareness while working around equipment.

8. *P*rotect your back.

9. *P*rotect yourself from falls.

10. *R*ecognize and avoid electrical hazards.

11. Drive Defensively.

12. *N*otify your supervisor and Safety Department *immediately* of any injury or accident.

13. *N*ever work under the influence of drugs or alcohol.

PERSONAL PROTECTIVE EQUIPMENT

Requiring every employee to wear Personal Protective Equipment (PPE) *for every task at all times* is an industry standard. Different PPE is designed to do different jobs; some PPE makes you more visible, some PPE protects you from flying or falling debris, and some PPE protects you from the things that you can't see such as harmful substances in the air. No matter what PPE you are required to wear, it will only work if you wear it properly. PPE is for your protection and to help ensure that you have a long and meaningful career.

OSHA requires all employees in the construction industry to wear certain PPE. OSHA also requires employers to require employees to wear the proper PPE that the employer provides to their employees. This employee is wearing proper PPE for the job he is preparing to do.

PERSONAL PROTECTIVE EQUIPMENT

STANDARD PPE

Long Pants	Keep your legs covered and protected.
Shirts With Sleeves	Long or short sleeves are both acceptable.
Work Boots	Steel toe boots may be required in some cases .
Hard Hat	Wear it at all times, including equipment operators.
Safety Vest	Required any time you are working around traffic.
Hearing Protection	Requirements are based on a time-weighted average, but why take a chance?
Safety Glasses	You only get one set of eyes. Protect them.
Face Shields	Required any time material is leaving the surface on which you are working.
Gloves	Required any time you are handling rough, splinter-prone, or coarse material.
Respirators	Requirements vary according to work being performed.

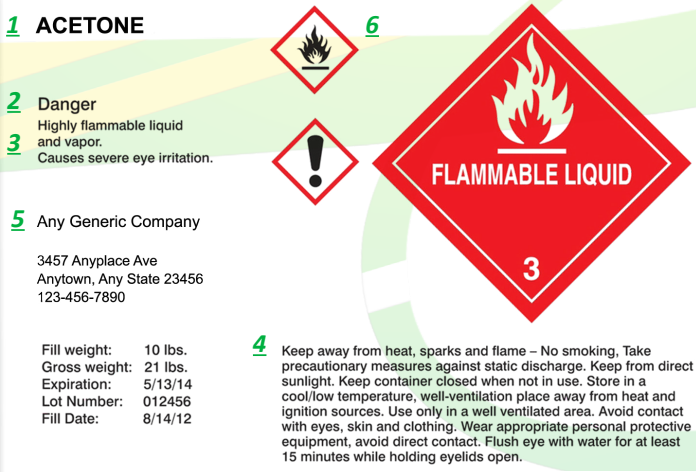
*ANSI Class 2 or 3 vests are required depending on conditions.

Different tasks require different PPE. The list above is an overview of general PPE used in the construction industry. Scan to see a comprehensive breakdown of construction PPE.

HAZCOM

It is essential to be informed about the safe use, handling, and storing of hazardous chemicals or substances to which you may be exposed in the workplace. Unless properly handled, many chemicals can cause injuries or death due to fires, explosions, or other serious accidents. Exposure to certain chemicals can cause serious health problems, including injuries and disabling illnesses. Safety Data Sheets (SDSs) contain important information about hazardous substances (*see figure one*). SDSs are found in key locations around the work place in either hard copy or electronic format. Questions regarding SDSs and requests for copies should be directed to your Safety Team.

***Figure 1**: The six elements of a GHS label include **1**) product identifier **2**) signal word **3**) hazard statement **4**) precautionary statements **5**) supplier information and **6**) pictograms*



SILICA

Silica is found in many materials common on construction sites, including sand, concrete, rock, mortar, and brick. When workers perform tasks that release dust containing crystalline silica into the air they are at risk of inhaling the dust. Silica can cause serious, sometimes fatal illnesses, including a lung disease called silicosis, lung cancer, and chronic obstructive pulmonary disease (COPD). Workers can prevent silica related health problems by taking the following precautions:

- Do not eat, drink, or smoke around silica dust. Wash your hands and face in a dust-free area.
- Do not use substances containing more than 1 % crystalline silica as blasting material.
- Use water or vacuums to reduce dust at work sites. When dust control is insufficient, use a respirator. Routinely maintain dust control systems.
- Remove dust from your clothing only with a vacuum, do not brush or blow dust off! Do not enter your vehicle or home wearing dusty clothing.

Scan the code for OSHA's guidelines on crystalline silica as well as links to videos, Powerpoints, and other helpful information.

Manufacturers have done extensive testing to determine what needs a seatbelt and what doesn't. If the manufacturer has installed a seatbelt it should be a clear indication that they have determined that it is safer for you to wear it than not.

BUCKLE UP

No matter what you are driving, operating, or riding in, a seatbelt is *always* a must.

All drivers and equipment operators should always wear seat belts. It is also the driver or operator's responsibility to require all passengers to wear their seatbelt(s) while riding in a company vehicle or piece of equipment.

The following acts are extremely dangerous. No driver or equipment operator should ever endanger themselves or others by doing any of the following:

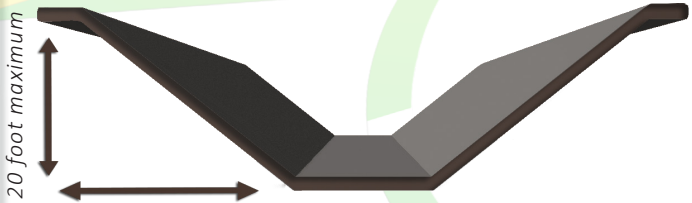
- **X** *Riding in, or on, anything being towed behind a truck or piece of equipment.*
- **X** *Riding on the side of a truck or piece of equipment.*
- **X** *Working from or riding in a machine bucket.*
- **X** *Riding in the bed of a truck (only permitted when placing cones or picking up cones).*
- **X** *Riding on a paving machine screed.*

Each type of equipment poses unique safety challenges. Scan the code for equipment-specific information and additional training materials pertaining to safe equipment operation.

Caught In or Between is one of OSHA's Focus 4 Hazards because of the inherent dangers and serious potential for death. Trenches have many hidden dangers such as cave-ins, utilities, and washouts to name a few. Trenches should be inspected each morning (prior to anyone entering the trench), each hour during the work day, and after any significant event such as rainfall. All soil in the State of Florida is considered Class C soil due to its round, granular composition, which makes cave-in more likely.

Before any employee enters a trench, proper protective measures must be taken. There are two common methods of protecting employees in trenches in Florida, namely, Trench Boxes and Sloping. Every trench that is greater than five feet in depth is required to have one or both of these methods in place prior to anyone entering the trench. All trench slopes must be at least a 1.5 to 1 slope angle or 34 degrees.

Figure 2 *Proper slope angle for a trench greater than five feet deep.*



Base must extend 1.5 feet out for each foot of depth.

Having a ladder in the trench that is greater than four feet in depth is not only a Best Safety Practices but also an OSHA regulation. A ladder must be within 25 feet of every person inside the trench. Trench ladders must be non-conductive to prevent electrocution in the event that it comes in contact with live power.

Storage around trenches is something every employee should be aware of. Additional weight around the top of a trench can cause a cave-in or a blow out within the trench. Storage consists of all materials, tools, equipment, trucks, spoils (dirt piles) and workers. OSHA states that nothing is to be stored within two feet of any trench. However, it is always good practice to keep anything being stored around a trench at least four feet away from the trench to prevent accidents. *The photo below is an example of safe trenching.*

WORKING SAFELY AROUND UTILITIES

Utilities are a common issue that we encounter in horizontal construction. Utilities can be found underground and in overhead construction. They can also be found encapsulated within concrete duct banks and even under sidewalks and tree roots. Utilities can consist of energized power, fiber optics, water mains, force mains and natural gas, to name a few. As a precaution, employees should always treat a utility as though it is live even when it is believed to be "dead". Striking a utility line may result in injury, death, property damage, service outages, fines, and repair costs.

Never work within ten feet of an overhead, energized power line. When working in the vicinity of power lines, maintain a safe distance. A safe distance depends on the voltage of the line and the requirements of OSHA, the power company, and your safety team. It is a good idea to use a spotter, even while maintaining a safe distance, to avoid contacting an energized line.

Water mains and sewer mains (commonly referred to as force mains) can be just as dangerous as energized power. In the event that a machine or hand tool ruptures either of these types of utilities, a worker may drown due to undermining or being swept up in a sudden rush of fluids. E-Coli is also a very real danger. If waste water is introduced into your system, you may become extremely ill at the very least.

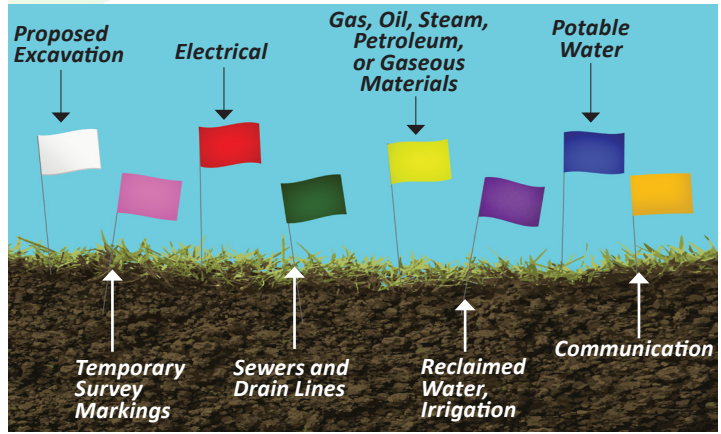
Another type of utility that we have to look out for are communications lines, especially fiber optics cables. Although these types of utilities are usually not harmful, they are very expensive to repair or replace.

CALL 8-1-1

Prior to beginning any sort of excavation, a call must be made to 811 (even if digging is to be done with a shovel). After 811 is called, a utility locater will mark the locations of buried lines with paint or flags.

1. ***Notify*** your local call center or make an on-line request 2-3 days before work begins.
2. ***Wait*** two full business days for all utility operators to respond.
3. ***Confirm*** that all affected utility operators have responded and marked utilities accurately.
4. ***Respect*** the marks.
5. ***Dig*** Carefully. Know the tolerance zone and use the correct tools.

Figure 3: *Uniform Color Code for Utility Locates*



Working near traffic for extended periods of time can cause you to become complacent to the danger around you from moving traffic. Continually remind yourself and your fellow workers of the dangers to which we are exposed.

Do not allow yourself or a fellow worker to become distracted. Potential distractions include music (using headphones) and using cell phones for texting or to have a conversation. Never listen to music or use ear buds at any time on the job site. Being able to hear warnings and horns is vital to your safety.

Do not attempt to talk on the phone when you are working near, or around, traffic. Remove yourself to a designated safe place away from all traffic if you need to talk on the phone.

If you need to walk near traffic, always make sure that oncoming traffic is facing you. Do not walk with your back to the traffic. Do not attempt to cross the road in high traffic areas at any time without using the designated pedestrian crossing area.

The following acts are extremely dangerous. When working around traffic, **never do any of the following:**

- **X** *Use a cell phone for any reason.*
- **X** *Wear ear buds or headphones.*
- **X** *Walk with your back to traffic.*
- **X** *Cross a busy roadway.*

Scan the code to read about preventing Struck-by accidents involving vehicles , falling or flying objects, and during the construction of masonry walls.

WORK SAFELY
AROUND TRAFFIC

Wear reflective vests, and/or high-visibility clothing at all times when working near, or around, traffic. Consider the need for reflective strips if you work at night or in poor -visibility areas. If winter or rain gear is worn, make sure that the high-visibility clothing/vest is always the outermost garment.

This worker is wearing a halo light to increase his visibility to motorist and equipment operators.

Work zones are required to have traffic control identified by signs, cones, barrels and barriers. Traffic control devices, signals, and message boards instruct drivers to follow paths away from where work is being done. Approved traffic control devices including cones, barrels, barricades, and delineator posts are used inside work zones.

Various concrete, water, sand, collapsible barriers, crash cushions, and truck mounted attenuators can help limit motorist intrusions into construction work zones.

The best way to avoid danger from self-propelled heavy equipment such as loaders, backhoes, and trucks, is to keep your eyes open and stay out of the way.

A construction site, as you know, is not only busy, it's noisy. Often after working around frequent back-up alarms and noisy equipment, workers begin to tune them out. This is dangerous.

Construction equipment has many blind spots. Always assume that the operator cannot see you until you make eye contact. Being struck is the biggest danger in roadwork and at construction sites. Workers on foot must be alert at all times. *To help avoid accidents, take these precautions:*

- Wear appropriate high-visibility clothing, proper class of safety vest, and head gear.
- Check surroundings often. Listen for warnings.
- Know the traffic control plan and stay clear of vehicles.
- Work in only those areas necessary to carry out the job at hand. Where possible, stay behind barriers. Stay out of "blind" spots and outside a "safety circle" around equipment. If you can't see the operator, he/she can't see you.
- Communicate with operators by radio and/or eye contact and confirm acknowledgment.
- Use spotters when you must work with your back to equipment or traffic.
- Never take for granted that the equipment operator sees you.
- Never depend on hearing an alarm as a warning.
- Keep in the clear when the equipment is backing up.

WORK SAFELY AROUND EQUIPMENT

No matter how much of a hurry you are in, never, take a chance and dart behind a vehicle that is backing up. If you slip and fall, you may be seriously or fatally injured.

Don't ride on any vehicles or pieces of equipment except those that are designed to transport passengers. This applies to the running boards or steps of a backhoe, dump truck, mixer, or other moving equipment. Hopping in the bucket of a loader or skid steer is a serious no-no. Riding on top of a load is also dangerous. You may fall off or be crushed if the load shifts. When riding in passenger vehicles, keep your arms and legs inside.

Maintain as much distance as possible when walking beside or piece of moving equipment. You could be killed or severely injured if the machine makes a sudden turn, the load it's carrying shifts and falls, or if you trip over an obstruction on the ground and fall into the equipment's travel path. It is a good habit to make eye contact with the equipment operator of any machine that is moving in, and around, your work zone.

WARNING
YOU MAY BE IN A
BLINDSPOT

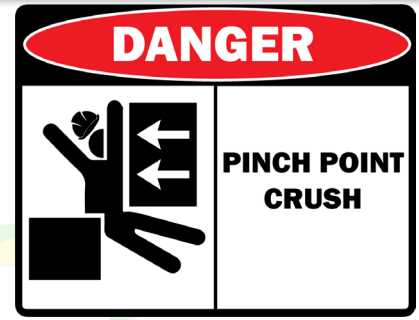
When working around heavy equipment, be aware of your surroundings. Know what is around you in all directions. Although you may be able to see the equipment, the operator may not be able to see you. Assume that the equipment operator can't see you and act accordingly. The more alert you are, the less chance you have of getting hurt.

Like all heavey equipment, cranes and have the potential to cause serious injuries and fatalities if proper safety precautions are not taken. Cranes are especially hazardous because of their height and swing radius. Workers may be injured of killed if any part of the crane comes into contact with a power line, if an overhead load falls onto them, or they are caught in the swing radius. The following safety measures should be taken when working with or around cranes:

- Only trained and qualified personnel should operate a crane.
- The crane itself and all controls must be inspected by a designated competent person before each lift.
- Ensure the crane is level and on a firm and stable surface.
- During assembly/disassembly do not remove or unlock pins unless sections are blocked and secure.
- Extend outriggers fully and barricade accessible areas within the crane's swing radius.
- Watch for overhead electric power lines and maintain at least a 10-foot safe working clearance from the lines.
- Inspect all rigging prior to use; never wrap hoist lines around the load.

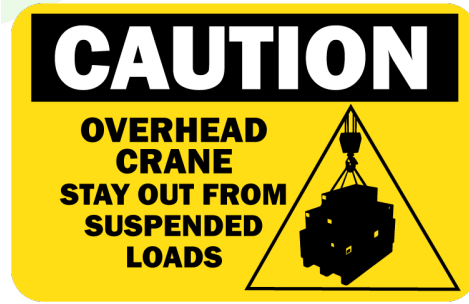
- Be sure to use the correct load chart for the crane's current configuration and setup, the load weight and lift path.
- Never exceed the load chart capacity for any lift.

- Raise load a few inches, hold, verify capacity/balance, and test brake system before delivering load.
- Do not move loads over workers.
- Be sure to follow signals and manufacturer instructions while operating cranes.



The swing radius or hazard area of a crane must be clearly marked at all times. Pay attention to hazards signs and high visibility markings.

Any accident involving cranes, hoists, and rigging devices can be devastating and costly. Therefore, only qualified and certified individuals are permitted to operate cranes. Safety is not only the crane operators responsibility. Every person in the vicinity of the crane must be acutely aware and follow all safety precautions. Fore more information on crane certification visit the National Commission for the Certification of Crane Operator's at https://www.nccco.org/.



Another important aspect of traffic control in a work zone is *buffer space*. Buffer space separates the transition area and the work area, providing additional protection for workers and a recovery space for an errant vehicle. *Figure 4* shows the relationship between the buffer space, posted speed limit, and the length of the advance warning taper zone.

BUFFER SPACE AND TAPER LENGTH IN		
SPEED	BUFFER SPACE DISTANCE	TAPER LENGTH (12' Lateral Transition)
25 mph	155 feet	125 feet
30 mph	200 feet	180 feet
40 mph	250 feet	245 feet
40 mph	305 feet	320 feet
45 mph	360 feet	540 feet
50 mph	425 feet	600 feet
55 mph	495 feet	660 feet
60 mph	570 feet	720 feet
65 mph	645 feet	780 feet
70 mph	730 feet	840 feet

**Note: For speeds 40 mph or less the formula for determining taper length is $L=WS^2/60$. For speeds over 45 mph the formula is $L=WS$.*

Figure 4: Buffer space and taper length at various speeds

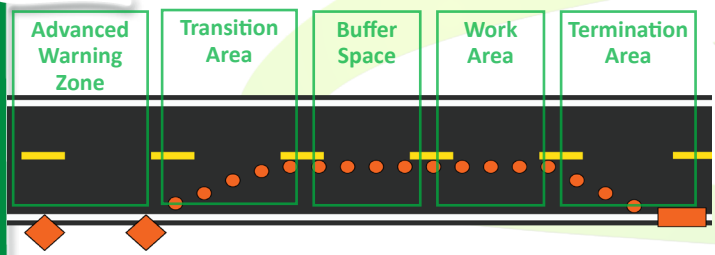
The proper placement of *advance warning devices* such as arrow boards, cones, sign-age, barrels, and delineators is essential for creating a safe work zone. FDOT also specifies the maximum allowable distance between warning devices in a work zone at various speed limits in tapers (angled line) and tangents (straight line), as detailed in *Figure 5*.

Figure 5: Maximum distance between advance warning devices

MAXIMUM DISTANCE BETWEEN DEVICES		
SPEED	CONES OR TUBULAR MARKERS	TYPE I OR TYPE II BARRICADES, VERTICAL PANELS OR DRUMS
25 mp	25 feet in taper 50 feet in tangent	25 feet in taper 50 feet in tangent
30-45 mph	25 feet in taper 50 feet in tangent	30 feet in taper 50 feet in tangent
50-70 mph	25 feet in taper 50 feet in tangent	50 feet in taper 100 feet in tangent

Different areas of the work zone require specific traffic control devices and placement. Signs and road markings are used in the *advanced warning zone* to alert motorist to changing conditions. The *transition area* provides motorists with instructions, also using signs and markings. The *buffer space* gives the motoring public additional time to prepare before entering the *work area*, where, maintenance or construction activity is actively occurring. Finally, the *termination area* uses signs to inform motorists that they may resume normal driving. See *Figure 6 on pg. 24* for more information on the five areas of a work zone.

Figure 6: Areas of a work zone.



Clear zones are the traversable areas outside of a traffic line in which an errant driver may be able to regain control or stop. The clear zone must be unobstructed; no equipment or materials should be present in the clear zone. The Florida Department of Transportation establishes regulations for widths of clear zones as detailed in *Figure 7*.

***Figure 7**: Proper clear zone widths at various speeds.*

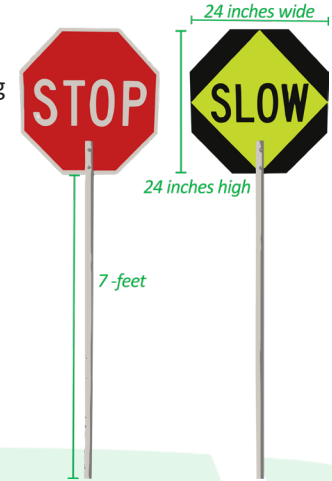
CLEAR ZONE WIDTHS FOR WORK ZONES		
WORK ZONE SPEED	TRAVEL LANES AND MULTI-LANE RAMPS	AUXILIARY LANES AND SINGLE LANE RAMPS
60-70 mph	30 feet	18 feet
55 mph	24 feet	14 feet
45-50 mph	18 feet	10 feet
30-40	14 feet	10 feet
All Speeds Curb and Gutter	4 feet behind face of curb	4 feet behind face of curb

The role of the flagger is to provide safe, authoritative instructions to the public and provide protection to personnel working in a construction zone. All flaggers should be trained on proper positioning, use of flagger tools, proper PPE, and correct flagging techniques and procedures.

High visibility is essential for safe flagging. Flaggers must wear at least a class 2 vest for daytime work and a class 3 vest at night. To further increase visibility at night, flagging stations should be illuminated.

In addition to PPE, proper positioning greatly increases a flagger's safety. Flaggers should stand on the shoulder adjacent to the user being controlled or in a barricaded lane. Motorists are accustomed to seeing stop signs on the right shoulder of the road. For this reason, flaggers should position themselves on the right shoulder of the lane being controlled.

STOP/SLOW paddles should be used, except for emergency situations, in which it is acceptable to use flags. Paddles should have a shaft that is at least 7 feet in height with a sign that measures 24 x 24 inches with 6-inch letters. Emergency flags should be red and measure 24 x 24 inches with a 36-inch shaft.



Temporary traffic control (TTC) devices such as message boards, arrow boards, traffic signals, signs, barricades, barrels, and the like are use to communicate information to motorist in and around work zones.

A temporary traffic control signal system may be used when a project requires one-lane, bidirectional traffic. Using a traffic signal system instead of a flagging operation eliminates the risk of injury to flaggers. Temporary traffic signal systems are also used when flagging operations are not feasible or cost effective.

This mobile traffic signal is being used to notify drivers when it is safe to proceed and allowing all employees to remain behind the barricaded area.

Some circumstances call for a specialized temporary traffic signal system. The *driveway assistance device (DAD)* pictured above was one of seven signals placed at the end of resident's driveways. During this project, stopping mainline traffic for each driveway individually would have created long queues.

The DADs in combination with flashing arrows indicating the direction of travel flow and mobile signals at the mainlines, allow motorists on side streets to follow the alternating flow of traffic without interrupting the flow of traffic on the main road.

**DAD devices are available exclusively through Horizon Signal Technologies.*

Back injuries are one of the most common injuries found throughout the construction industry. Protect your back and reduce the risk of back injury by following proper lifting techniques.

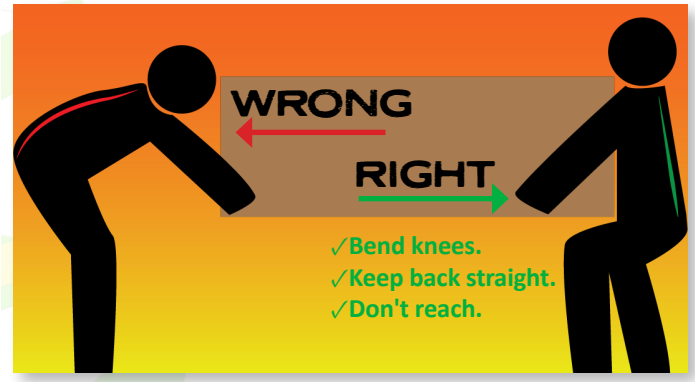
PREPARING TO LIFT...

- Stretch before you attempt to lift a heavy object or at the beginning of your shift.
- When possible, store materials at waist-height to reduce the strain on your back.
- Have materials delivered as close to their destination as possible.
- Assess the object before lifting to determine its weight and the best location from which it should be gripped.
- Ensure that your travel path is free of slipping and tripping hazards.
- Know your own lifting restrictions and capabilities.
- Ensure that you are wearing proper clothing and PPE (Work boots, gloves).

DON'T DO IT ALONE...

- Use carts, dollies, forklifts, and hoists to move materials.
- When lifting a load weighing more than 50 pounds, get help from a co-worker.
- Use carrying tools with handles for odd-shaped loads.

Scan for details on lifting heavy objects safely.



DURING THE LIFT...

- Your feet should be shoulder-width apart.
- Keep the object close to your body.
- Get a firm grip.
- Keep your back straight and elbows tight to your body.
- With a straight back and head up, straighten your legs to lift the object.
- At the same time, tighten your stomach muscles. Don't hold your breath.
- Do not bend or twist at the waist. Pivot with your feet and legs.
- Use the same technique to set the object down.
- Lift as smoothly as possible. Try not to jerk the load.

Motor vehicle accidents is the leading cause of occupational fatalities. Although you cannot prevent other drivers from making bad decisions, you can follow some basic principles to reduce the risk of being involved in an accident. The National Safety Council (NCS) defines defensive driving as *"driving to save lives, time, and money, in spite of the conditions around you and the actions of others."* Numerous organizations offer defensive driving courses for individuals as well as training programs for groups of employees. *For more information on the NCS's defensive driving*

CORE CONCEPTS OF DEFENSIVE DRIVING

1 CONTROL YOUR SPEED.

2 LOOK AHEAD AND ANTICIPATE.

3 STAY ALERT. AVOID ALL DISTRCATIONS.

4 SCAN THE ENTIRE AREA AND ROADWAY.

5 MAINTAIN A SAFE FOLLOWING DISTANCE.

6 BE AWARE OF EVERYTHING AROUND YOUR VEHICLE.

7 ADJUST FOR WEATHER AND ROAD CONDITIONS.

8 CREATE A SPACE CUSHION AROUND YOUR VEHICLE.

9 COMMUNICATE WITH OTHER DRIVERS (TURN SIGNALS, BRAKES LIGHTS, EYE CONCTACT).

10 STAY CALM. DO NOT ENGAGE AGGRESSIVE DRIVERS.

DEFENSIVE DRIVING

How long does it take to stop a moving vehicle? That depends on many factors such as speed, size of the vehicle, condition of the tires and brakes, and road conditions (wet or icy pavement). A safe driver maintains an appropriate following distance by adjusting to conditions. The most reliable method to determine how much time you have to stop before contacting the vehicle in front of you is to base your following distance on time. 3-4 seconds is considered a safe following distance.

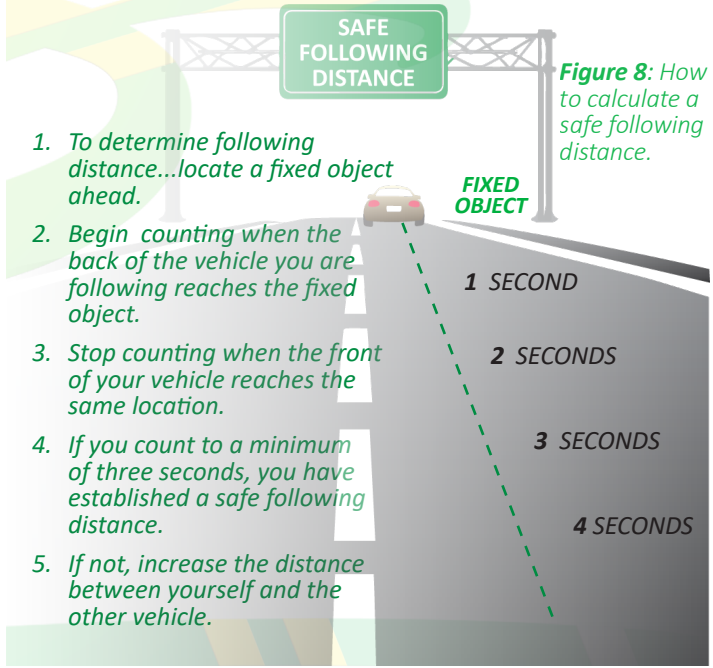


***Figure 8**: How to calculate a safe following distance.*

1. *To determine following distance...locate a fixed object ahead.*
2. *Begin counting when the back of the vehicle you are following reaches the fixed object.*
3. *Stop counting when the front of your vehicle reaches the same location.*
4. *If you count to a minimum of three seconds, you have established a safe following distance.*
5. *If not, increase the distance between yourself and the other vehicle.*

Falls from a different level are one of OSHA's *fatal four.* The fatal four are the construction industry's four most deadly types of accidents: falls, struck-by, caught-in-between, and electrocution. When working at six feet or above in construction, fall protection is required. Most common forms of protection are: safety harnesses, guard rails, and safety nets. Everyone that is exposed to working over 6 feet (construction) or 4 feet (general industry) at any given time must be trained on the use of appropriate fall protection equipment.

A safety harness must be fitted per the individual worker. It should have D -rings at both sides and one that is used for connecting the lanyard at the center of the back between the shoulder blades. Lanyards must be the proper size for the height from which you will be working. The retractable lanyard is the preferred type.

Guardrails must be between 39 and 42 inches in height. They must be equipped with a mid-rail approximately halfway between the walking/working surface and the top rail. A toe board should be 3 ½ inches in height. The top rail should be able to withstand a weight of 200 pounds, the mid rail should be able to support 150 pounds, and the toe board should support at least 80 pounds.

Safety nets are very seldom used, but when used, should follow the guidelines in place by OSHA and always be tested before placed in operation. *For more information on safety nets, scan the code.*

A worker does not have to be many feet in the air to suffer a serious injury or worse. Falls from ladders account for approximately 20 percent of workplace fall injuries annually. Portable ladders, by nature, are not conducive to the use of fall protection. Therefore, the worker must protect himself while using portable ladders by following these precautions:

PORTABLE LADDER SAFETY TIPS

1. Use the three-point-method: Two hands and one foot, or two feet and one hand at all times.

2. Your waist should never extend beyond the top of the ladder.

3. Always face the ladder when ascending or descending.

4. Never use the top three rungs as a step.

5. Never carry an object or load that could cause you to lose your balance.

6. Remember the 4 to 1 Rule:
For every four feet of ladder height, the base of the ladder must extend one foot horizontally. For example, 12 feet up = 3 feet out.

7. Always inspect the ladder prior to use. Make sure the ladder is secured on level ground and in a fixed position.

As mentioned previously, electrical hazards are one of the leading causes of workplace fatalities. Electricity poses a variety of risks: ***burns, electrocution, shock, arc flash or blast, and fire.*** Being able to recognize these hazards is key.

***Figure 9**: Types of electrical hazards.*

Electrical burns may be caused by a shock, an arc blast or flash, or by coming in contact with overheated electrical equipment.

Electrocution is the most deadly electrical hazard. Workers must use extreme caution not to come in contact with, or become part of a circuit with, high voltage power lines. Electrical energy can be released suddenly through the air in the form of heat, up to 35,000 °F. This is known as an arc flash or blast which occurs when there is a gap in the air between conductors in an electrical current. While an arc flash/blast happens without warning, other electrical fires may develop slowly as a result of faulty wiring and worn out cords. Follow the precautions on pg. 37 to avoid injury from electrical hazards.

WORKING SAFELY AROUND ELECTRICITY

- Never perform maintenance on energized equipment until all power is disconnected and grounds are attached.
- Always follow proper Lockout/Tagout procedures.
- Protect cords and cables from damage.
- Promptly replace frayed or worn electrical cords and cables.
- Use the appropriate extension cord for the job. When using power tools, the cord must have a third wire and grounding prong.
- All electrical tools that are not double insulated must be properly grounded.
- Maintain all electrical tools and equipment in safe working condition by inspecting them on a regular basis. If defects are found, the tool must be taken out of service until repairs can be made.
- Never bypass a device that is designed to keep you from coming in contact with electrical energy.
- Before working around overhead power lines, ensure that they are properly located and identified.
- Keep all ladders, scaffolds, equipment and materials a minimum of ten feet away from overhead power lines.
- Do not use multiple plug adapters.

Electric shock poses a threat to welders, in particular, either as a direct shock or a secondary shock while arc welding. Scan the code for more information on welding hazards and how to address them.

JOB HAZARD ANALYSIS

Job hazard analyses (JHAs) play a vital role in reducing the risk of injury to employees. Although the exact methodology used to preform a JHA varies among industry professionals, all JHAs should involve observing workers, tasks, tools, and environment in order to identify hazards and then taking steps to reduce or eliminate the hazard/s before work begins.

BASIC COMPONENTS OF A JOB HAZARD ANALYSIS

1. CHOOSE A JOB TO ANALYZE.
2. BREAK DOWN THE JOB INTO SPECIFIC TASKS.
3. DETERMINE HAZARDS AND RISK PRESENT IN EACH TASK.
4. IDENTIFY PREVENTATIVE CONTROLS AND RESIDUAL RISK.

JHA can be taken a step further by empowering workers with their own procedure for analyzing risk. The questions below are one method that employees can use to decide whether or not a task is safe.

A worker simply ask him/herself the following four questions before jumping into a task:

1. *Am I trained to do this task?*
2. *Do I have the right PPE, tools, and equipment to do this task safely?*
3. *Do I need help to do this task safely?*
4. *Is this the safest way to do this task or is there a safer way?*

JOB HAZARD ANALYSIS

4 SECONDS FOR SAFETY is one method of encouraging employees to stop and think, or reset, before preforming a task. It is an informal method of job hazard analysis, first implemented by CN Rail, that has been shown to significantly reduce workplace injuries.

For more in-depth information on Job Hazard Analysis or Job Safety Analysis (as it is sometimes called), scan the code.

Below is a snapshot of an example JHA for a paving crew member. It is not a comprehensive analyses of all hazards.

ACTIVITY	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Raking hot asphalt	Falling into hot asphalt	Proper footwear, long sleeve shirt, clean work area
Operating broom tractor	Colliding with other equipment	Be aware of surroundings, pay attention to spotter
Shoveling hot ashpalt	Straining back muscles	Use proper technique, take breaks, get help with heavy loads

Safety is everyone's responsibility. Your safety team and your supervisors will provide you with the knowledge, resources, and tools to work safely. It is your responsibility to follow the proper procedures and place your safety, and that of your fellow employees,above all else. Do your part to make sure everyone goes home safely every day by adhering to the following core principles.

PPE I understand that PPE may be required as part of my job duties. I also understand when I need to wear PPE, how to wear PPE properly, the limitations of PPE and how to properly store PPE.

FALL PROTECTION I understand that fall protection is required when I am working at a height of six feet or greater, and I understand how to properly use fall protection equipment.

DRIVER SAFETY I will abide by all company policies and state and federal laws and regulations regarding the safe operation and maintenance of company vehicles. I understand that all drivers and occupants of company vehicles are required to properly wear seat belts at all times when the vehicle is in motion.

TRENCH SAFETY I understand that I am never permitted to work in or instruct anyone else to work in a trench that is greater than five feet in depth that is not properly protected to prevent collapse by use of proper sloping, shoring or other approve means of protection, and I must always provide egress.

CONFINED SPACES I understand that I am never permitted to enter a confined space for any reason without first being trained, and that I must adhere to all PPE and safety procedures.

DRUGS & ALCOHOL I understand that I should never work under the influence of drugs or alcohol.

TOOLS & EQUIPMENT OPERATION I will not operate any tool or piece of equipment unless properly trained to do so, and I understand that if I am instructed to use a tool or operate a piece of equipment that I do so in a safe and responsible manner. I understand that I am not to operate any piece of equipment within 20 feet of an overhead power line or work within 10 feet of any energized power line. I will not erect a ladder or scaffold within 10 feet of an overhead power line.

UNDERGROUND UTILITIES I understand that I am never permitted to work around utilities without prior authorization and that safety precautions have been met. I understand that I am not permitted to disturb any earth (dig) either by hand or with motorized equipment unless underground utilities have been located prior to my activities.

M.O.T. I understand that I am to never work in or around the roadway without first having the proper M.O.T. installed to design standards or engineered drawings.

LIFTING I understand that I should never lift any object so heavy that I may become injured. I will always utilize proper lifting techniques by lifting with my legs and not my back.

REPORTING I understand that I am obligated to report ALL accidents, incidents and near misses to my supervisor immediately.

ELECTRICAL HAZARDS I will follow proper Lockout/Tagout procedures at all times. I understand that I must inspect electrical tools and cords regularly and remove damaged tools from use. I will never bypass any device intended to keep me from coming in contact with electrical energy.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