

WORK ZONE **SAFETY IN CONSTRUCTION**

COURSE OUTLINE

- **Patching potholes, painting lines, maintaining bridges and drains, repaving and cutting back vegetation on the shoulder of the road:**
 - Construction and maintenance tasks like these are performed on highways, city streets and country roads every day.
- **Every year, hundreds of people lose their lives and thousands more are injured when vehicles plow into work areas where road construction or maintenance is occurring.**
- **The people who get hurt in these work zone incidents include:**
 - Those who are doing the work.
 - Drivers and passengers who are traveling on the roads.
 - Even pedestrians.
- **To prevent these incidents from occurring, contractors use different types of equipment and procedures to guide vehicles and pedestrians past their work areas safely.**
 - This process is called "traffic control".
- **The Federal Highway Administration of the United States Department of Transportation has established standards for creating and operating Temporary Traffic Control ("TTC") Zones, around roadway work sites.**
 - These regulations are contained in the DOT's "Manual on Uniform Traffic Control Devices".
 - The manual specifies how devices such as signs, cones and barriers and procedures such as flagging, should be used for different types of projects under different conditions.
- **The Occupational Safety and Health Administration (OSHA) requires contractors to comply with the Manual's standards and treat them as the minimum traffic control safety requirements for road work.**
 - Some states and municipalities have established more stringent work zone safety standards that should be followed in those areas.
 - If you're ever unsure about what standards apply when you are setting up or operating a TTC Zone, talk to your supervisor.

- **As a general rule, work zone safety depends on providing clear and positive guidance for drivers and pedestrians, while minimizing any changes to the normal flow of traffic around the site.**
- **A TTC Zone begins upstream from the work area, where signs such as "Road Work Ahead" or "Be Prepared to Stop" warn drivers about what to expect up the road.**
- **Closer to the work site, cones, barrels, barriers and barricades are used to outline safe travel lanes and "channel" motorists into them. These devices:**
 - Guide vehicles out of blocked lanes.
 - Separate them from the area where work is being performed.
 - Release them back to the road ahead.
- **In some situations, flagging procedures are also used to regulate the flow of traffic.**
 - For instance, on a two-lane road where one lane is blocked for drain maintenance, a flagger can alternately stop and release traffic from either direction, allowing vehicles to drive past the work zone in the open lane.
- **When drivers encounter a TTC Zone, it's easy for them to become confused, because they are used to the normal traffic patterns.**
 - Confused drivers can create serious hazards, both for themselves and for the people in the work zone.
- **Flaggers can help to prevent confusion by engaging with motorists directly, letting them know what to do and when.**
 - Adding the "human element" to the traffic control process can often be essential.
- **Before road maintenance or construction work is performed, a Temporary Traffic Control ("TTC") Zone should be set up to guide motorists and pedestrians safely around the worksite.**
- **Guiding drivers can be a serious challenge because they may be:**
 - Approaching the site at high speed.
 - Feeling tired, distracted or angry.
 - Impaired by drugs or alcohol.

- **To meet this challenge, traffic engineers use specialized equipment and procedures.**
 - Traffic control equipment includes things such as warning signs, cones, barrels, barricades, barriers and vertical markers.
- **Warning signs convey simple, direct messages, such as "One Lane Road Ahead" and "Be Prepared to Stop".**
 - These can be printed on reflective orange placards, or spelled out on lighted displays.
 - Some signs use images, such as a "flagger" symbol or an arrow, instead of words.
- **Traffic cones, barrels, barriers and vertical markers show drivers where they should and should not go.**
 - Cones are made of light and flexible rubber or plastic material so they will cause minimal damage to any vehicle that hits them.
 - Plastic traffic control barrels are also fairly light.
- **Metal drums, which can do substantial damage to a vehicle that hits them, should never be used for traffic control.**
- **Barricades are used to block off work zone areas, so they're solidly built.**
 - Many have metal frames with striped rails to catch a motorist's eye.
 - They can have signs, lights or other devices attached to them as well.
- **Some barriers are made of cast concrete, and are the heaviest traffic control devices.**
 - They need this weight because they are often used to create an immovable barrier between traffic and work zone hazards.
- **While equipment like this plays an important role in work zone safety, some situations require workers to regulate traffic directly, using "flags" or "paddles".**
 - Where work blocks one of a road's lanes, "flaggers" are often used to stop and release traffic so it can proceed safely through the open lane.
 - "Flagging" can also be used to slow traffic down as it passes a site.
- **Flaggers usually communicate with motorists by means of a "paddle" that can display a "Stop" or "Slow" signal and motioning with their "off" hand.**

- **Flaggers can also perform another valuable safety function, by giving their coworkers immediate warning about any traffic hazard that arises.**
 - Since flaggers are often stationed so closely to traffic, it's important for them to protect themselves by being visible at all times and following safe work practices.
- **It's important to remember that every stretch of road is unique, and any construction or maintenance project that is performed there will add its own set of challenges to the mix.**
 - Contractors need to have a detailed safety plan ready to go before work starts on a site.
- **The foundation of any work zone safety plan will be the creation of a Temporary Traffic Control Zone.**
 - This "TTC Zone" has to provide drivers with clear and positive guidance, because unfamiliar traffic patterns tend to confuse them.
 - And confused drivers can be dangerous.
- **Detailed instructions for setting up safe and effective TTC Zones under different conditions can be found in the DOT's Manual on Uniform Traffic Control Devices.**
- **Every TTC Zone has four sections, each of which performs an important safety function. They include:**
 - An "Advance Warning Area".
 - A "Transition Area".
 - An "Activity Area".
 - A "Termination Area".
- **A motorist sees the "Advance Warning Area" first.**
 - This section uses signs or lighted message boards to warn drivers about the work zone ahead.
- **These signs must be located far enough "upstream" to allow drivers to read and understand the message before they reach the work site.**
 - Just how far upstream this should be will depend largely on the road's speed limit.
 - Road conditions such as curves, hills, buildings or trees must be taken into account as well, because they can affect drivers' ability to see the signs and the road ahead.

- **Next, motorists encounter the "Transition Area", where traffic is moved out of the blocked lanes and away from the work area.**
 - A "Transition Area" usually includes barrels or traffic cones arranged in a diagonal "taper" that gradually closes off the blocked lane.
 - If flagging will be used on the site, the flagger will be located at the beginning of this taper.
- **Vehicles then encounter the zone's "Activity Area".**
 - Cones, barrels and barriers are used here to outline the travel lane, or "traffic space", and separate it physically from the "work space".
- **An open area called the "buffer space" is also located upstream from the work space.**
 - In case of emergency, this area gives vehicles a place to stop.
- **The site's "Termination Area" marks the end of the work zone and releases vehicles back onto the open road.**
- **Depending on road conditions, the "Termination Area" can be equipped with:**
 - A "downstream taper" to guide vehicles back into the lane that was closed.
 - An "End Road Work" sign.
 - Another buffer space.
- **When two flaggers are being used on a project, the second flagger will be stationed at the end of the downstream taper to control traffic coming from that direction.**
- **To guide pedestrians, work zone safety regulations require contractors to provide them with a convenient path around the site that will keep them safe from:**
 - Moving vehicles.
 - The work that is being performed.
- **Work zone safety depends on setting up a Temporary Traffic Control Zone around a site before construction or maintenance is performed.**
 - When the work is actually in progress, it's equally important to follow safe work practices at all times.

- **You need to keep safety regulations like those contained in the DOT's Manual on Uniform Traffic Control Devices in mind, and be sure to comply with them.**
 - More stringent standards can apply in some areas of the country.
 - Check with your supervisor if you're unsure which ones apply to the project that you're working on.
- **You need to start out by arriving for work well-rested, alert and ready to think "safety first" throughout your workday.**
- **Each shift should begin with a meeting of worksite personnel to discuss the safety and traffic control plans that will be used, and what should be done in case of an emergency.**
 - Since road work safety requires you to be visible at all times, everyone should make sure that they're wearing brightly colored, reflective garments.
- **If the traffic control plan includes flaggers, their lunch and rest breaks should be scheduled at this time.**
 - If two or more flaggers will be used on the site, a lead flagger should be designated, and communications procedures arranged among everyone.
- **Setup of the Temporary Traffic Control or "TTC" Zone should start upstream from the worksite with the first warning sign that a motorist will see, then continue downstream from there.**
- **You should make sure the traffic control devices, flagging stations and the sections of the traffic control zone are placed and spaced according to the standards that apply in your area.**
 - They should also be located where road conditions won't interfere with drivers' ability to see and react to them.
- **After the zone has been set up, the site supervisor should drive through the TTC Zone themselves to verify that it "works" and provides clear and timely guidance for motorists.**
- **During your shift you need to pay attention to "near misses" between vehicles as well as the sound of screeching tires.**
 - They can indicate there's something wrong with the TTC layout!
 - Based on feedback like this, you should adjust the layout as needed throughout the project, so that traffic flows smoothly and safely.

- **Also periodically check whether any cones or barrels have been displaced or knocked over, and reset them if they have.**
- **Tools, equipment and materials should be kept out of the way of traffic... and never stored in buffer zones.**
- **Flagging stations should not be located where shade or sun glare could make the flagger hard to see.**
- **A flagger should only leave their post when they are relieved by a replacement flagger.**
- **If a flagger is not on duty, any "Flagger Ahead" signs in the Advance Warning Area should be covered, laid flat, or turned parallel to the roadway, so that motorists won't see them.**
- **Performing construction and maintenance tasks on roadways is hazardous under the best conditions.**
- **But some work zone situations can create extra hazards that require you to take special precautions, such as:**
 - Working at night.
 - Operating a "mobile work zone".
- **When road work is performed at night, the darkness makes it more difficult for motorists to see, and drive safely through the work zone.**
- **So it's critically important to for workers, equipment and travel lanes to be as visible as possible.**
 - You should always wear brightly colored, reflective clothing that can be seen up to a thousand feet away.
 - The specific types of reflective clothing that are required can vary from place to place, so talk to your supervisor if you're unsure about what to wear.
- **Ambient light or the glow of streetlights is not sufficient when it's dark.**
 - At night a work zone should be equipped with temporary work lights.
- **Each flagging position should have its own lighting, and all lighting equipment should be positioned carefully, to reduce glare.**

- **Flaggers should be equipped with:**
 - Reflectorized or illuminated "Stop/Slow Paddles".
 - A flashlight with a glow cone, or an illuminated wand, for signaling with their free hand.
- **The traffic control equipment that is used to outline a Temporary Traffic Control Zone at night should be reflectorized and also have flashing or continuous lights attached to it if possible.**
 - Lights should be tested before work begins, and if any problems are found they should be taken out of service and replaced.
- **Special safety precautions are also required when a work zone has to move.**
 - "Mobile operations" can include trash and debris removal, pothole patching, line painting, street sweeping and rumble-strip installation.
- **When a work zone moves at an average speed of 3 miles per hour or less, federal regulations say stationary traffic control devices may be used, provided they are moved along with the work zone.**
 - But for greater convenience and safety, mobile traffic control devices are preferred.
- **For example, a "work vehicle" such as a truck can be equipped with:**
 - Rotating, flashing, oscillating or strobe lights to attract attention.
 - A warning sign that faces oncoming traffic.
 - A collision cushion known as a truck mounted attenuator or "TMA".
- **The vehicle should move along with the project's crew, to warn approaching motorists about the work that is being done as well as to provide some physical protection for the crew members.**
- **In some cases, another vehicle with similar equipment should follow behind the work vehicle.**
 - Called a "shadow truck", this vehicle provides an additional advance warning to oncoming traffic while creating a buffer zone between itself and the work vehicle ahead.

*** * * SUMMARY * * ***

- **Work zone safety depends on a system of "traffic control" to guide vehicles and pedestrians safely around a work site.**
- **Traffic control equipment and procedures such as cones and flagging are used to provide guidance for motorists in Temporary Traffic Control Zones.**
- **A worksite's Temporary Traffic Control Zone will always include four sections, each of which serves an important safety function.**
- **You need to know the equipment and safe work practices to use to keep yourself and your work zone safe under different site conditions.**
- **Special precautions need to be taken when work is being done at night or involves mobile work zones.**
- **Now that you understand the hazards that can be associated with work zones, and know the equipment and procedures you can use to avoid them... you can help ensure that you and your coworkers go home safe at the end of every day!**