
Ethiopian

Work Zone Safety and Health

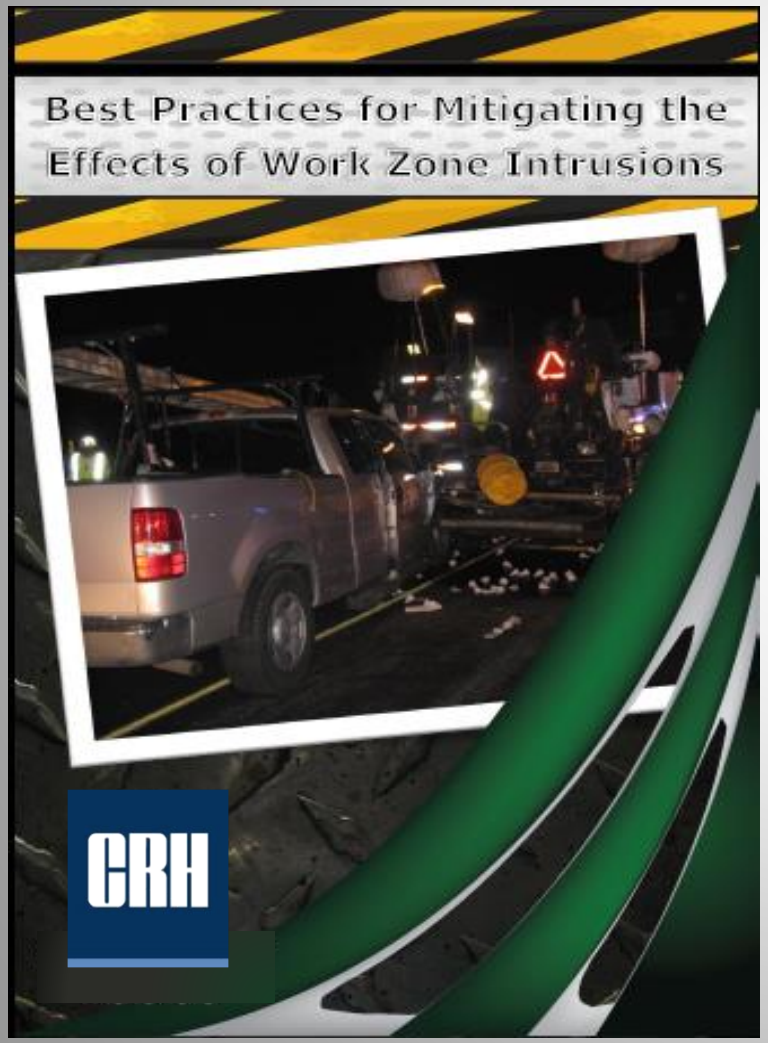
Nation wide Work Zone Fatalities

According to the Work Zone safety website,132 highway construction workers were killed in 2017.

Work Zone Safety

Compliance with all the laws and regulations alone will not provide the safest work environment for you.

Minimizing Work Zone Intrusions

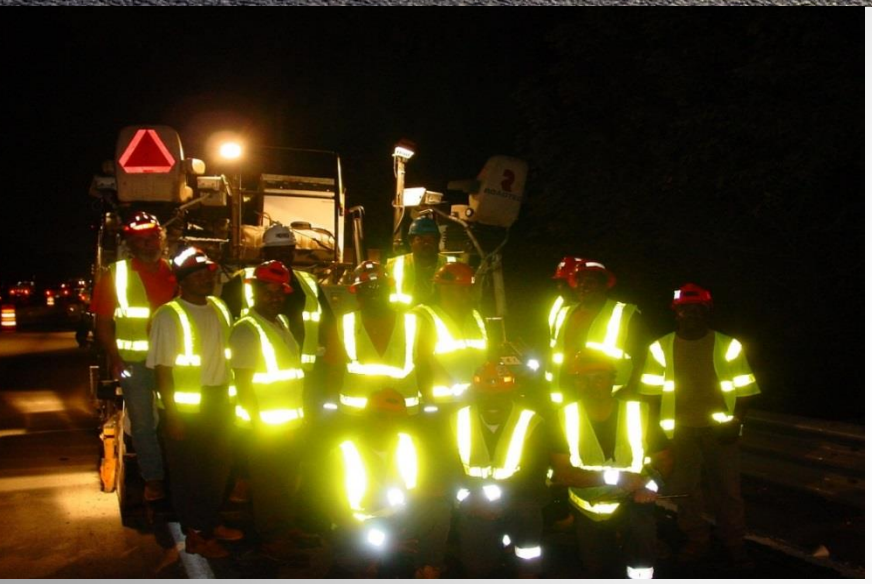


- Management – Traffic Control Supervisors, Local Management Engagement, DOT Partnering
- Risk Assessment – Job site/equipment evaluation, Pre-shift/Pre-task crew meetings
- Safe Work Practices –Personal positioning, equipment staging
- Personal Protective Equipment (PPE)- Hard hat, High-vis apparel, Illumination
- Equipment for Intrusion Prevention – attenuators, work zone lighting
- Maintenance of Traffic -Manual on Uniform Temporary Traffic Control (MUTCD), Internal Traffic Control Plan
- Beyond Compliance – temporary rumble strips, law enforcement, safety signage

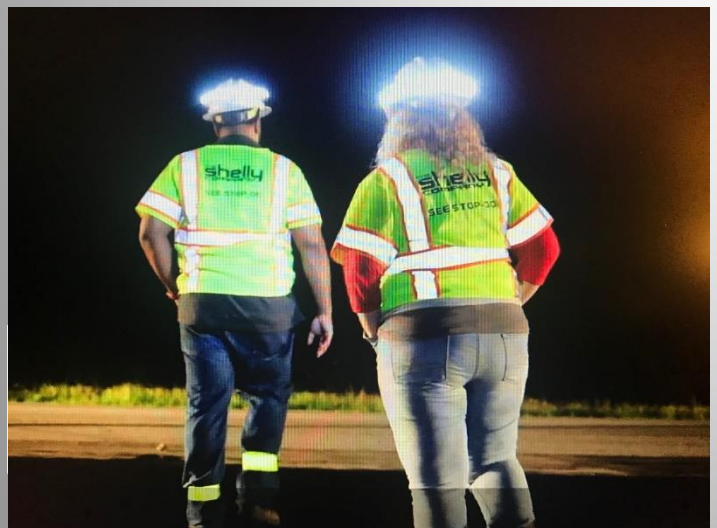
Assess the Risks

Always start the job/task (and as conditions change) with a safety huddle to either mitigate or eliminate hazards.

High-Visibility Safety Apparel



High-visibility safety apparel should be replaced when it becomes faded, torn, dirty, soiled, worn, or defaced, or if it is not visible at 1,000 feet day or night. The typical useful service life of high-visibility safety apparel depends on the type of work an individual performs while wearing the apparel. OMG has moved to a standard of Class III vests/T-shirts at all times.

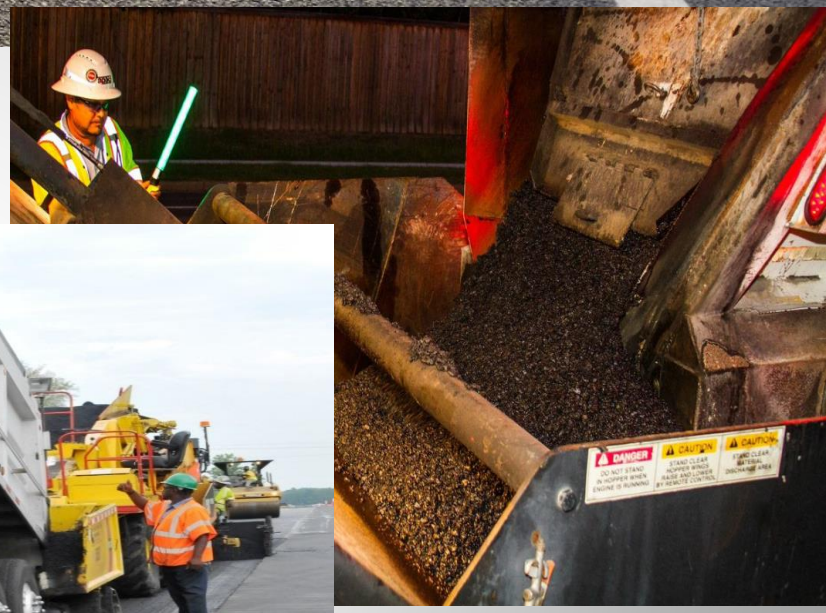


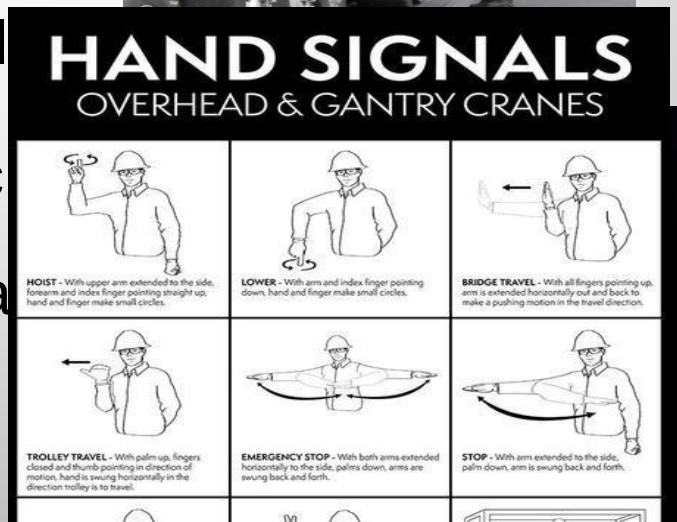
Audible Communications

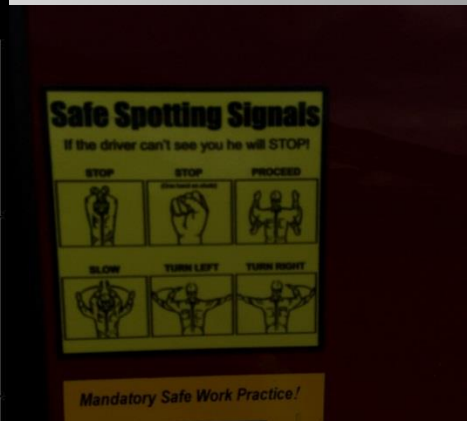
- Ensure back-up alarms are in good working condition
- Radios are in working order

Spotters/Hand Signals

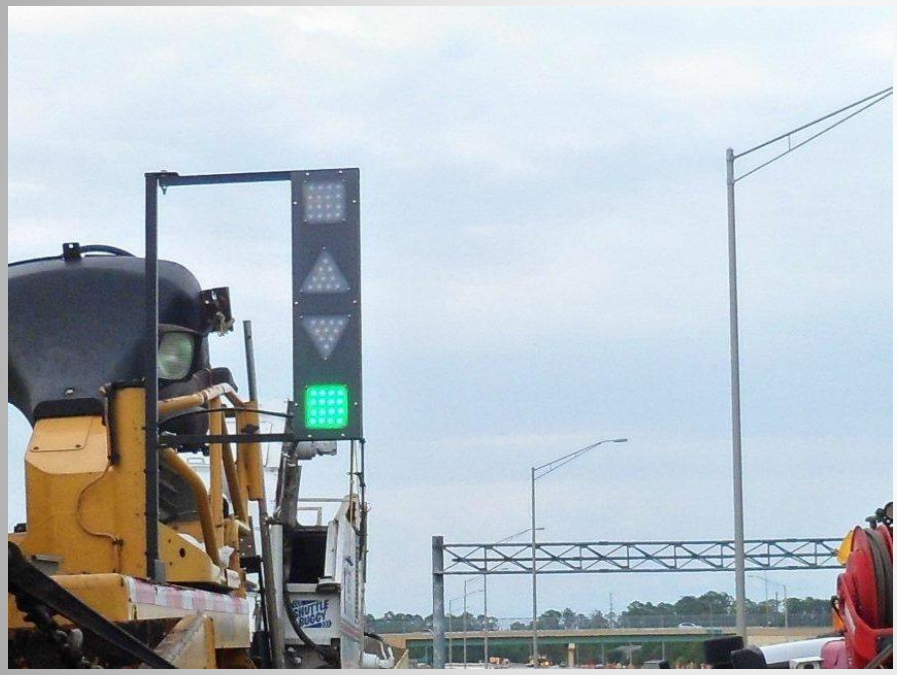
- Spotters/Signal Persons should not have any other work duties when directing operators.
- Spotters should not use cell phones, radios, headphones or any other distracting devices not related to their task.
- Only one person shoul give signals at a time.
- Hand signals require c understanding of the meaning of each signa







Paver Lights



Electronic Device Policy

Mobile Phone/Electronic Device Usage Policy
For
Oldcastle Materials, Inc.

The use of mobile phones or certain electronic devices are important tools, but there are certain restrictions we have to implement in order to keep ourselves and those around us safe when it comes to the use of these type devices.

This policy addresses the use of all mobile electronic devices at work, including but not limited to hand-held mobile/cordless telephones, laptop computers, mobile phones, mp3 players, iPods, tablets, etc.

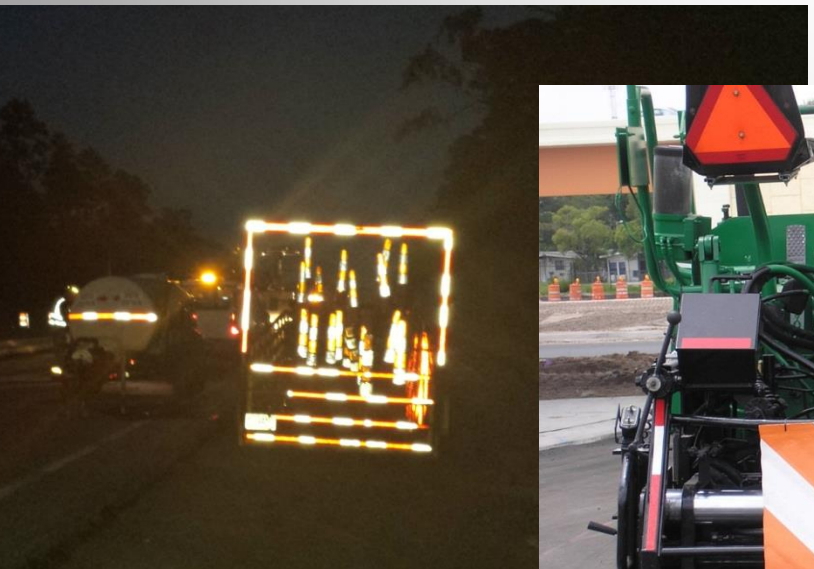
Using a cell phone while driving makes it four times as likely that you'll crash - while using either handheld or hands-free devices.

Blind Spots

Hidden behind the Door Post

He is standing up.

Increase Equipment Visibility



- Use strobe lights
- Reflective tape
- Ensure all lights are working properly

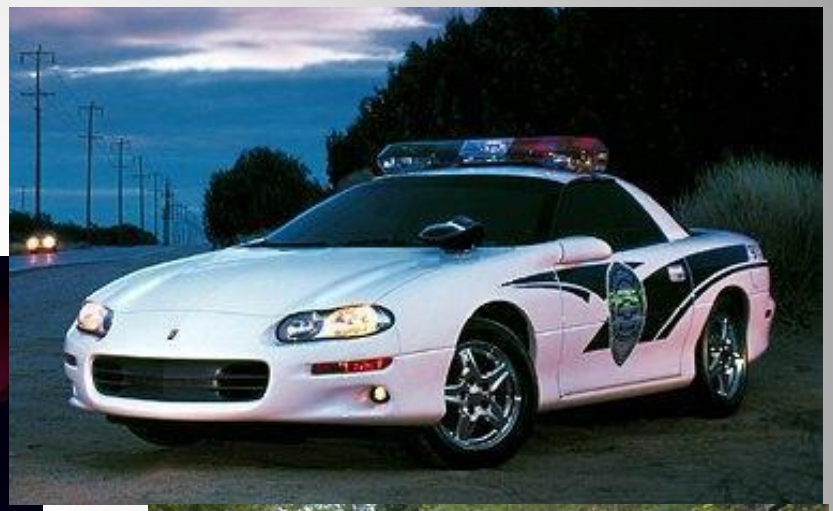
Examples of Work Zone Protection Devices

Walk Around Vehicle Before Backing

G. O. A. L.

GET OUT AND LOOK

Provide Additional Law Enforcement



Install Additional Warning Signs

Always Wear Your Seatbelt

Enhanced Lighting for Night Work

- Consider using glare-free balloon lights and glare screens
- Lower the height of lighting equipment
- Drive through the work zone during night time hours after setting up lighting

Ensure that Signage is Effective

Work Zone Checklist

WORK ZONE CHECKLIST

1. PAVEMENT DROP-OFFS & LOW SHOULDERS
   - All shoulder drop-offs and uneven lanes comply with the project specifications or as otherwise directed in writing by the engineer.
   - No shoulder drop-offs or uneven lane exceeds the limits set forth in the project specifications or poses a safety concern.
   - Notify the owner in writing of all excessive pavement drop-offs that will not be promptly eliminated by the project work or be protected by barrier walls.

2. TAPERS, CLEAR ZONES & TANGENTS
   - All tapers, buffer spaces, and tangents are the proper length and have the specified number of required devices.
   - All traffic control devices are properly located and spaced.
   - No vehicles, equipment, or materials are stored in a clear zone or buffer space. If possible, place vehicles, equipment, and materials behind a barrier.

3. CHANNELIZING DEVICES
   - All channelizing devices comply with the applicable specifications, including any specifications regarding reflectivity and crashworthiness.
   - All channelizing devices are properly located and spaced.
   - No ballasts are placed or anchored to the top of any channelizing device.

4. SIGNS
   - All signs comply with the project specifications and are in good condition.
   - All signs are properly located and spaced.
   - All signs are the proper size and height.
   - All signs are clean, legible, clearly visible, and crashworthy. (For example: No sign is hidden by vegetation, materials, or equipment.)

5. PAVEMENT MARKINGS
   - All pavement markings comply with the project specifications and are in good condition.
   - All pavement markings are placed and removed in accordance with the specifications or as directed in writing by the engineer.

6. FLAGGERS
   - All flaggers are trained, certified, using proper signaling procedures, and wearing personal protective equipment.
   - All flaggers are using proper equipment and are positioned correctly.

7. CRASH CUSHIONS, ATTENUATORS, & TEMPORARY TRAFFIC BARRIERS
   - All crash cushions/attenuators are in good condition and are properly located on the project.
   - All crash cushions/attenuators are assembled in accordance with the manufacturer's instructions.
   - All truck-mounted attenuators have a safe roll-ahead distance and are properly positioned on the project.

8. ARROW PANELS
   - All arrow panels comply with the project specifications and are in good condition.
   - All arrow panels are finished in nonreflective black and mounted at a proper height.
   - All arrow panels are capable of displaying the proper mode selections and dimming.
   - To the extent arrow panels are used to close multiple lanes, separate arrow panels have been used to close each lane.
   - All vehicles displaying arrow panels are equipped with high-intensity rotating lights or strobe lights.

9. CHANGEABLE MESSAGE SIGNS ("CMS")
   - All CMS comply with the project specifications and are in good condition.
   - All CMS consist of either 1 or 2 phases, with each phase having no more than 3 lines and no more than 8 characters per line.
   - All CMS are legible in varying light conditions and have a control system that allows a message to be reviewed before it is displayed on the sign.
   - All CMS are equipped with a power source and battery back-up to provide for continuous operation.
   - No CMS have messages that scroll or travel horizontally or vertically across the face of the sign.

10. DRAINAGE
    - If there is standing water or a noticeable flat spot on a project, check the cross-slopes and the associated drainage structures.
    - If there is a risk of standing water or drainage issues and the scope of work did not include altering the cross-slopes or drainage structures, notify the owner of the condition in writing.

11. MISCELLANEOUS
    - Review the Internal Traffic Control Plan (ITCP) with all project participants.
    - All traffic control devices that are no longer required have been removed or covered in accordance with the project specifications.
    - Safe ingress and egress has been established at the work site.
    - Law enforcement is enforcing a safe speed limit within the work zone.
    - Adequate lighting is being provided for night operations.
    - Advance notification of sidewalk, bicycle path, and bus stop closures has been provided or alternate routes/accommodations have been identified in accordance with the project specifications or as directed in writing by the engineer.
    - Document any changes to the Traffic Control Plan requested by the owner, engineer, or law enforcement in writing.
    - Contact your supervisor if you need to obtain a form letter to provide written notice of any problematic condition.

- Utilize a Traffic Control Checklist

Keep Your Distance

Stay within 10 feet of moving equipment. Wait for a clear signal from the operator before approaching equipment.

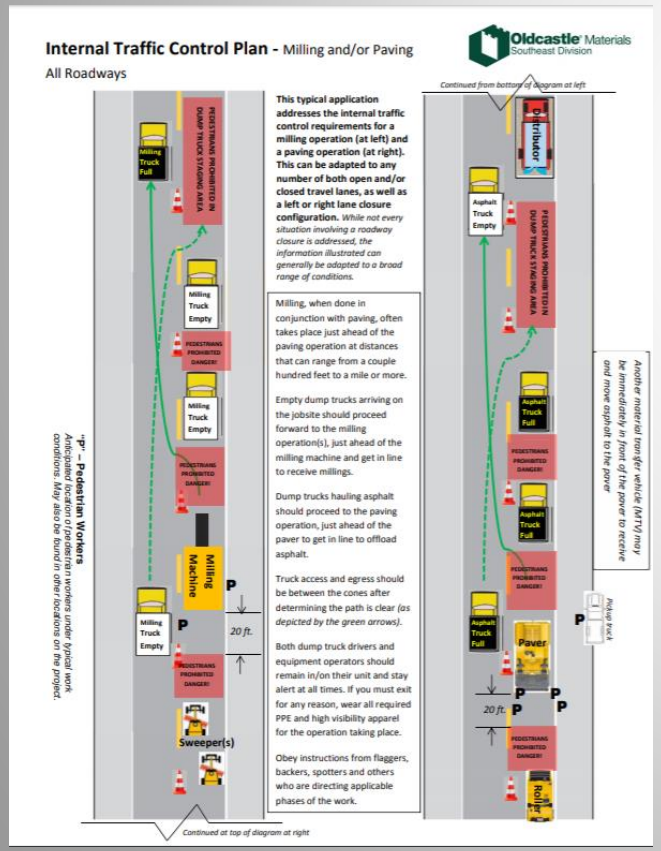
Technology Can Help

There are a variety of technologies—old and new—that have been developed to warn drivers and operators when workers on foot are near, including:

- Alarms
- Cameras
- Radar
- Sonar

Internal Traffic Control Plan

An effective internal traffic control plan (ITCP) informs all parties operating within the work space about the location of others. It creates zones designed to minimize interaction between workers on foot and construction vehicles/equipment

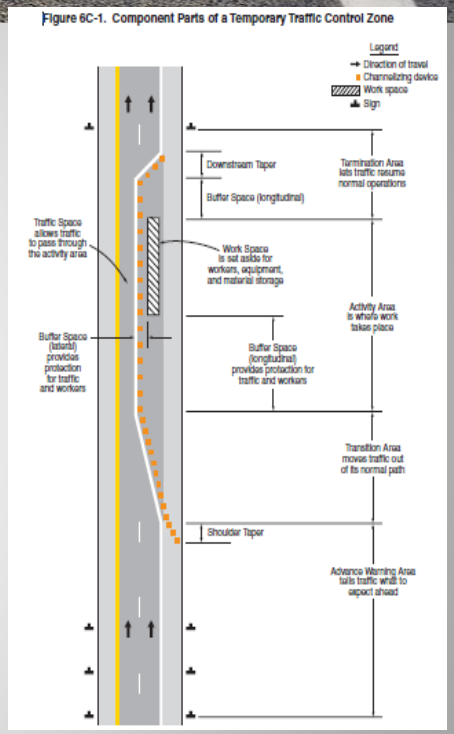


The ITCP should include things such as:

- Reduce the need to back up equipment
- Limit access points to work zones
- Establish pedestrian-free areas where possible
- Provide signs within the work zone to give guidance to pedestrians, equipment and trucks

Follow the MUTCD

The Manual of Uniform Traffic Control Devices (MUTCD) contains standards and guidance on the application of signs, channelizing devices, and other traffic control devices required to guide travelers effectively in and through the work zone.



Provide Additional Training

Specialized Training for:

- Maintenance of Traffic (MOT) personnel
- Flaggers
- Operators

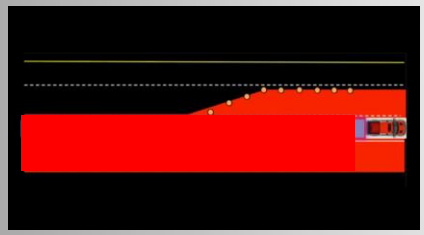
Work Zone Safety Training

Utilize the NAPA/ARTBA Roadway Safety Program for additional training.


AWARE

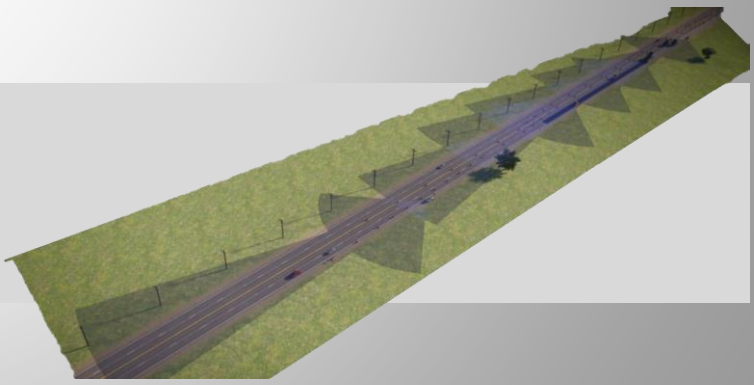
Three Basic Applications

- **Stationary Situation –** Flagging Station, Maintenance Crews, Lone Worker



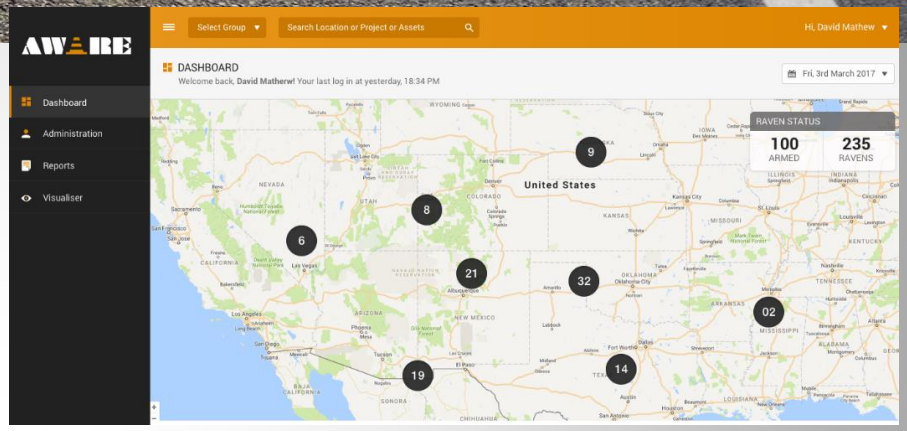
- **Merge** – MOT (cone) Trucks, Striping Operations, Sweeping Operations, Road Rangers, School Buses

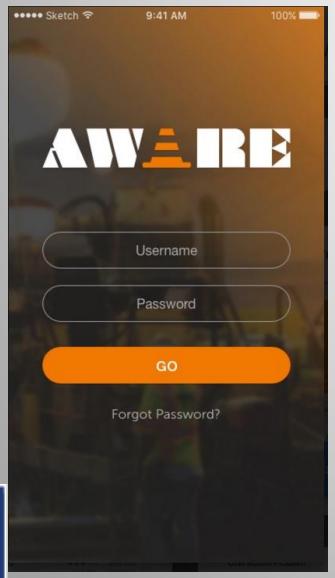
- **Active Work Zones** – Paving, Milling, or Construction Operations within (non-protected) lane closure

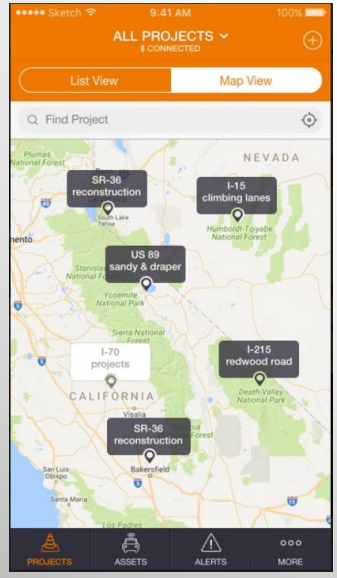


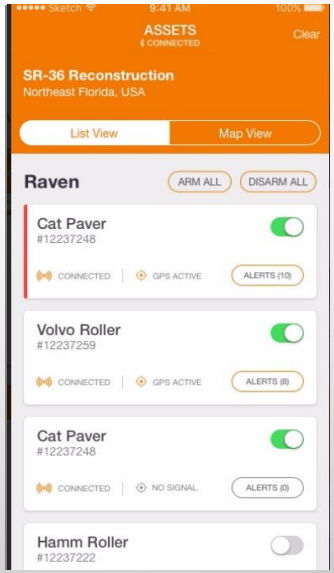
AWARE BASE STATION
Mobile, Web App & Database

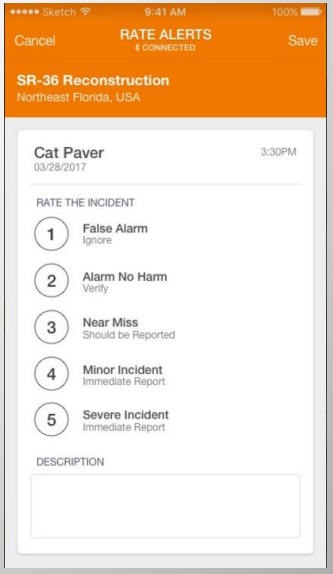
- Easy log in and UI on iOS or Android phone or tablet
- Real Time Event Data and Alerts
- Easy event rating
- Near time visualizations tools
- Performance Metrics and Protected Zone Overview
- Mapping with Status and location updates

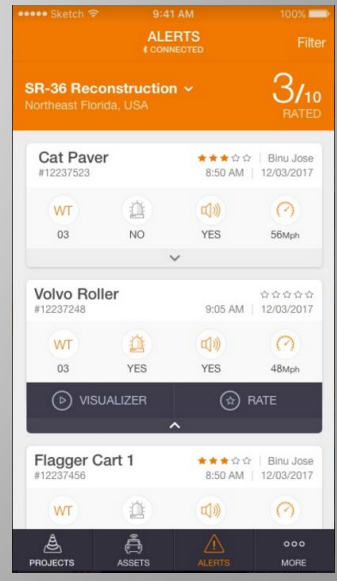






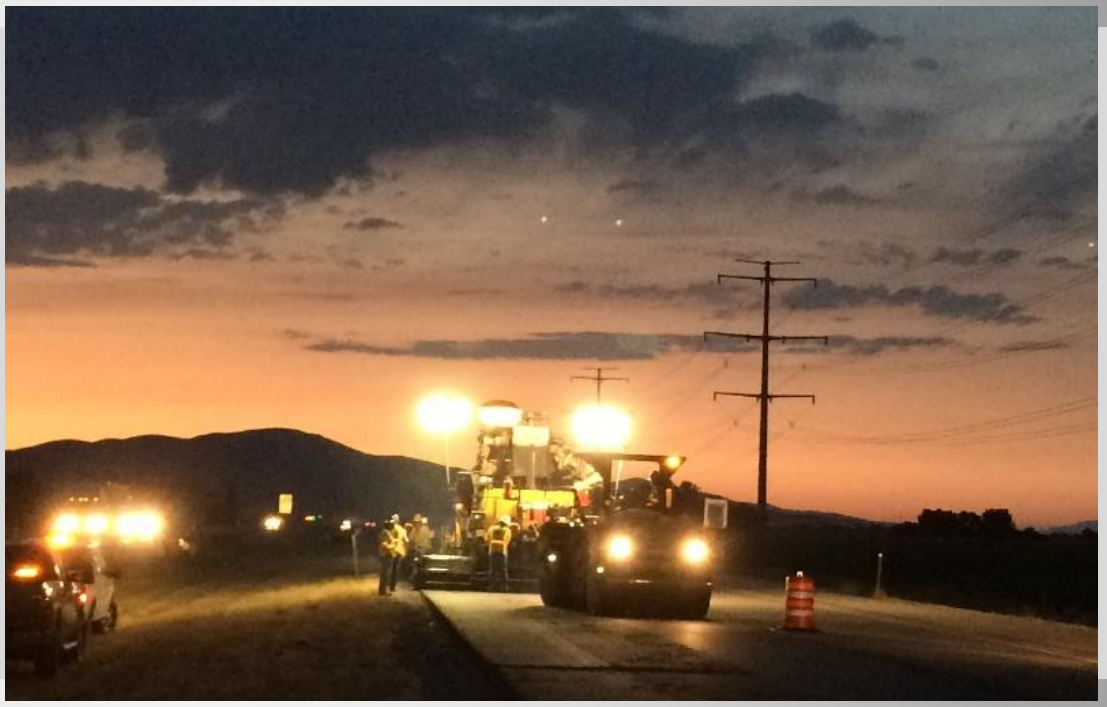






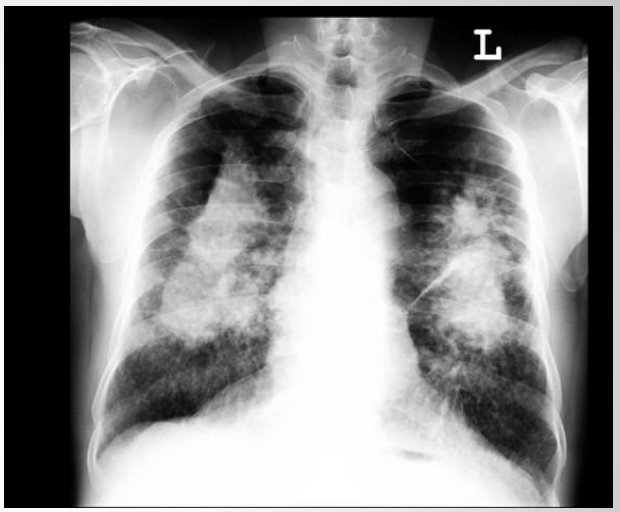
Next Steps

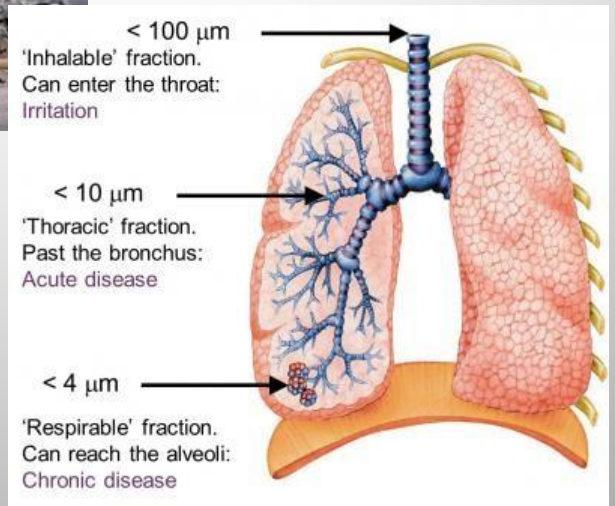
- Final Testing
- Broader CRH Deployment
- Sentry Unit Crash Testing
- MnDOT Lane Intrusion Pilot
- Colorado DOT Specifications
- 2020 Product Launch



Brigham City, UT I-15

Silica Exposure





Key Provisions of Crystalline Silica Standard

- Reduces the permissible exposure limit (PEL) for respirable crystalline silica to 50 micrograms (or 0.05 mg) per cubic meter of air, averaged over an 8-hour shift**.** (Previously 100 micrograms)
- Requires employers to:
  - **Utilize specified exposure control methods (Listed in Table 1) that combine engineering controls and possibly respiratory protection**

  OR
  - **Alternative exposure control methods:**
    - **Limit worker exposure to below the PEL**
    - **Exposure Assessment**
    - **Methods of Compliance**

Construction Standard – Specified Exposure Control Methods

- Table 1 in the construction standard matches 18 tasks with effective dust control methods and, in some cases, respirator requirements.
- Employers that fully and properly implement controls on Table 1 do not have to:
  - Comply with the PEL in any additional manner unless exposure conditions for a given process change
  - Conduct exposure assessments for employees engaged in those tasks

Exposure Control Methods in Construction

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None None	None None

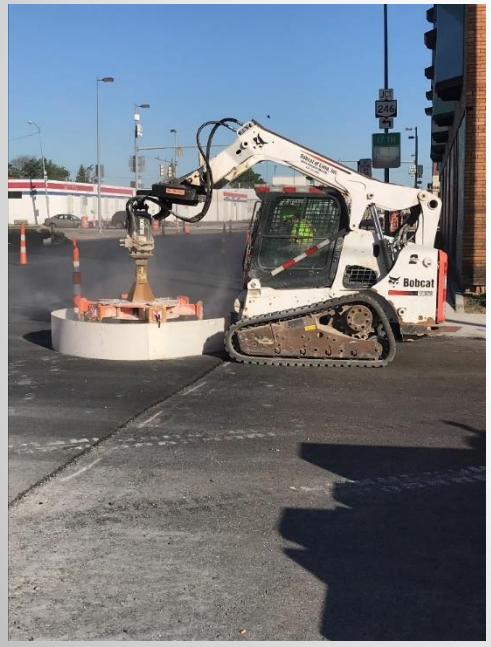
- In the Construction industry, employers can either follow a control method as listed in Table 1 or they can measure workers' silica exposures and determine which dust controls work best to limit exposures to the PEL.

Tasks for Construction in Table 1

- Handheld power saws
- Handheld power saws for fiber cement board
- Stationary masonry saws
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tools
- Handheld grinders for mortar removal (tuckpointing)
- Handheld grinders for other than mortar removal
- Walk-behind milling machines and floor grinders
- Small drivable milling machines
- Large drivable milling machines
- Crushing machines
- Heavy equipment and utility vehicles to abrade or fracture silica materials
- Heavy equipment and utility vehicles for grading and excavating

Techniques to Minimize Exposure

Mr. Manhole Cutter mounted on Skid Steer with Enclosed Cab (HEPA Filtration)



Brooming operations with enclosed cab and using water

Techniques to Minimize Exposure

ZHP WATER WETTER

SURFACTANT

- Transform water into an effective dust control agent.
- ZHP water Wetter is a non-ionic surfactant that breaks the surface tension of water to maximize coverage, penetration and moisture retention.*
- Economical and environmentally safe. Introduced at (1) part ZHP Water Wetter to 1,500 - 2000 parts water.

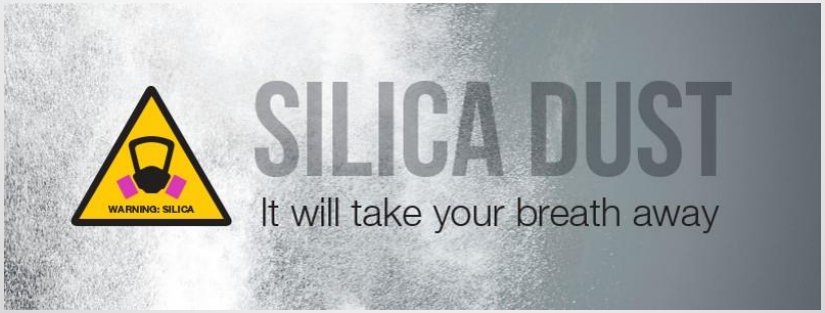
APPLICATIONS:
WATER ADDITIVE FOR DUST CONTROL FOR ASPHALT MILLING MACHINES.

1. Asphalt Milling Machines are now REQUIRED to be equipped with a water spray system and MUST add surfactant to the water system to control dust or crystalline silica.
2. Non-compliance leads to worker respiratory exposure and medical claims, EPA fines, etc.
3. New Milling Machine OSHA spec 1926.1153 Aspirable Crystalline Silica.

ZIRCON INDUSTRIES, INC.
(800) 547-4328

Construction – Written Exposure Control Plan

- The plan must describe:
  - Tasks involving exposure to respirable crystalline silica
  - Engineering controls, work practices, and respiratory protection for each task
  - Housekeeping measures used to limit exposure
  - Procedures used to restrict access, when necessary to limit exposures



Take Action!

Evaluate Tasks at your jobsites

Align Tasks with Controls

Develop a Written Exposure Control Plan/Designate a Competent Person

Our Safety Pledge