Work Zone Safety

Work Zone Intrusion Prevention
Introduction
Lee Cole

• VP Environmental, Health and Safety – Oldcastle Materials
• Over 36 years in road construction and materials industry
  – Asphalt production and paving
  – Construction
  – Aggregates
  – Ready Mix Concrete
Introduction
Oldcastle Materials

Locations 1,229
Employees 18,478

<table>
<thead>
<tr>
<th>Product</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td>No. 1</td>
</tr>
<tr>
<td>RMC</td>
<td>No. 2</td>
</tr>
<tr>
<td>Aggregates</td>
<td>No.3</td>
</tr>
</tbody>
</table>
Work zone intrusions?
Work zone intructions are like hunting gator
You wish you had done better risk assessment.
Work Zone Intrusion Prevention

- In memory of …

- Work Zone Intrusion

- What can we do?

- Going forward
In memory of these and many others
Highway and street construction workers are at risk of fatal and serious nonfatal injury when working in the vicinity of passing motorists, construction vehicles, and equipment. Each year, more than **100 workers are killed** and **over 20,000 are injured** in the highway and street construction industry.
What is a work zone intrusion?

- When an unauthorized vehicle or pedestrian enters into a designated work zone due to:
  - Speed
  - Distraction
  - Alcohol
  - Drugs
  - Confusion
Work zone intrusion
A poll of more than 2,800 American Adults revealed that:

- Approximately 86% of drivers often eat or drink
- Over 1/3 of drivers (37%) have sent or received text messages
- Forty-one percent of adult drivers have set or changed a GPS system
- Thirty-six percent of adult drivers have read a map
- One in five have combed or styled their hair
- Approximately 14% have put on makeup at least once
- About 13% have surfed the internet
- Younger drivers were more likely to engage in distracted driving
- Men were more likely to drive while drowsy, after drinking, reach a map, use a GPS and use the internet
- A large percentage of people said they know distracted driving is dangerous, but do it anyway
What are we doing about it?

- National Effort
  - Legislation
  - Public Education
    - Public service messages
    - Teen Drivers
  - Trade Associations
    - NAPA
    - ARTBA
    - AGC
In addition to positive projection, **Subpart K** provides an extensive listing of other traffic control measures that should be used as appropriate to improve safety in work zones. Several of these relate specifically to vehicle movements entering and passing through a work zone, and so have a direct influence on the safety of workers. Some of these measures are:

- Enhanced flagger station setups,
- Intrusion alarms,
- Pace or pilot vehicles, and
- Temporary traffic signals.
National Effort – Public Education

Addressing Driver Inattention
National Effort: Public Education

Turning Point: Roadway Work Zone Safety for New Drivers

• To address the growing problem of roadway work zone crashes and the fatalities and injuries they produce, Congress called upon the Federal Highway Administration (FHWA) to create a work zone safety awareness campaign for young drivers. FHWA then contracted with the American Road & Transportation Builders Association (ARTBA) to develop an educational campaign to reach teens of driving age nationwide.

• Turning Point: Roadway Work Zone Safety for New Drivers is a program with one goal in mind—keeping new drivers like you alive and safe in work zones.
National effort –
Public education
National Effort - consortium

- NAPA
- ARTBA
- AGC
- Contractors
- Others
What are we doing about it?

- Local Effort
  - Compliance
  - Training
  - Best Practices
  - Innovation
  - State associations and DOT’s
Local Effort - Compliance

• MUTCD: Manual on Uniform Traffic Control Devices
• The 2009 edition is the most recent.
Local Effort - Compliance

• The MUTCD contains standards and guidance on the application of signs, channelizing devices, and other traffic control devices required to guide travelers safely into and through the work zone.
Local Effort - Compliance

Part 6 –
Temporary Traffic Control

Effective: January 15, 2010
Best Practices for Mitigating the Effects of Work Zone Intrusions

Guidebook Training Video
Defining Risk

Risk

Frequency (Exposure Opportunity)

Likelihood (Chance of Occurrence)

Probability (Occurrence Opportunity)

Severity (Degree of Harm)
Working with Risk

Acceptable Vs. Unacceptable
What Is Our Risk?
History of Best Practices
Management

• Provide time for effective training for all employees working on jobsites.
• Meet with local and state law enforcement agencies to request additional visibility and enforcement presence.
• Meet with state associations and DOT’s regarding lowering speed limits in work zones/extra signage/etc.
• Communicate well with all contractors including contract trucking.
Training

Roadway Safety Program

version 11.

Work Zone Safety Awareness

Welcome!!
Traffic Control Supervisor
Training Course
Risk Assessment & Reduction

• Daily Work Zone Risk Assessment
  ✓ Safety processes to be used on-site
  ✓ Specific work zone training for all workers on-site
  ✓ Hazards/risks relevant to that work area and the applicable risk reduction methods
  ✓ Past and potential incidents/injuries/near misses
  ✓ Safety Equipment
Risk Assessment & Reduction

• Daily Work Zone Risk Assessment
  ✓ Proper PPE (high-vis clothing, reflective tape on hardhats, etc.)
  ✓ Daily meeting between the project supervisor and the project TCS
  ✓ Truck ingress and egress
  ✓ Dedicated spotters for intrusions
Risk Reduction Methods

• Before start-up or during maintenance work all equipment in work zone is parked on an angle to push traffic away from employees.
Risk Reduction Methods

• Intrusion alarms are impact-activated safety devices that warn/alert work crews and vehicle drivers simultaneously.
• Mounted on drums, cones, delineators, barricades, and/or machinery.
• Use of specific traffic control and intrusion alarms in QC work areas as a buffer determined by field conditions (normally set at a 500 ft. buffer).
• Finish Roller operators, or another designated person, should be charged with monitoring/maintaining the closed lane devices and the intrusion alarm system (horns, whistles, etc.)
• Train all company drivers and hired haulers to stop when they hear the warning horn and also sound their air horn in the truck.
Safe Work Practices

• In all cases, minimize your time spent working directly adjacent to traffic.
• Exit equipment on the side away from live traffic.
• When traveling on foot in the work zone, deliberately maximize your distance from live traffic.
Safe Work Practices

• Never walk down the middle of the lane or anywhere within the width of the lane if other options are available.
Safe Work Practices

• Walk as far off the shoulder as practical or in the grass off the roadway surface.

• If traffic is on both sides of the closure, walk closest to the side facing traffic for your direction of travel.

• If someone needs to work directly adjacent to traffic, utilize a spotter to watch oncoming traffic.
Safe Work Practices

• All idle or meeting time (T5) should be spent in a safe area far from traffic.

• If the paver is stopped for a period of time and workers need to be at the rear of the paver, park a roller on an angle immediately behind the paver.
Safe Work Practices

• When maintenance needs to be performed on equipment, it should be moved off the roadway and away from traffic or behind protective devices.

• If equipment cannot be moved off the roadway during maintenance, position other equipment at an angle as mentioned previously and/or a spotter to watch oncoming traffic during the activity.
Safe Work Practices

• Delineators can also be used as “Mid Lane Devices” to give the closed lane a three dimensional look.
Safe Work Practices

- Use extra delineators whenever possible to tightly close the radius at crossovers, side streets, and driveway entrances.
Safe Work Practices

• Ensure that flaggers position themselves properly on the shoulder in a safe location that is visible to the traveling public from at least 500 ft.
High Vis Apparel
Personal Protective Equipment (PPE)

High-Vis Apparel on Workers-Day

ANSI Class II Vest and Hard Hat with Retro-Reflective Material with 360° Visibility
Personal Protective Equipment (PPE)

Flaggers must wear ANSI Class III vests at all times (vest must have sleeves to be Class III)

High-Vis Apparel on Flaggers-Day
Personal Protective Equipment (PPE)

High-Vis Apparel-Night

ANSI Class III Vest and Class E Pants with retro-reflective material on hands (required for flaggers)

ANSI Class III Vest and OMG Ankle Bands with retro-reflective material on hands (option only for workers)
Equipment for Work Zone Intrusion Prevention

- Consider the use of crash attenuators on job sites that may be deemed as high hazard.
Equipment for Work Zone Intrusion Prevention

- Crash attenuators must be used strictly according to the manufacturer’s specifications.
- Using two attenuators when setting up and removing tapers on major highways is a good best practice.
Equipment illumination
Equipment for Work Zone Intrusion Prevention

- Work Zone Lighting
- Provide glare-free illumination for night work. Work vehicles should have appropriate beacons and lights to ensure visibility.
Equipment for Work Zone Intrusion Prevention

- Lighting added to rollers and other equipment behind the illuminated paving operation will enhance visibility.
Equipment for Work Zone Intrusion Prevention

• Installing additional lighting on QC and core drill equipment to both illuminate the work area and to make the operation more visible.
Equipment for Work Zone Intrusion Prevention

- LED lights can also be useful on the paver or strategically placed on ancillary equipment such as a distributor truck for better visibility.
Equipment for Work Zone Intrusion Prevention

- Hand tools such as rakes, shovels, lutes, and levels can also be enhanced to increase visibility.
Manual on Uniform Traffic Control Devices (MUTCD)

• Establish an **internal and external Traffic Control Plan (TCP)**. Follow MUTCD and state/local guidelines for the specific work zone.

• Use the proper lengths for tapers and buffers.

• Use the proper spacing of devices and when possible use extra devices spaced closer together for added protection.
## Manual on Uniform Traffic Control Devices (MUTCD)

### Speed Limit (MPH) Table

<table>
<thead>
<tr>
<th>Speed Limit (MPH)</th>
<th>Minimum Taper Length (L) Width (W) in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>30</td>
<td>95</td>
</tr>
<tr>
<td>35</td>
<td>135</td>
</tr>
<tr>
<td>40</td>
<td>185</td>
</tr>
<tr>
<td>45</td>
<td>240</td>
</tr>
<tr>
<td>50</td>
<td>450</td>
</tr>
<tr>
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<td>495</td>
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<tr>
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<td>540</td>
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<td>585</td>
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<tr>
<td>70</td>
<td>630</td>
</tr>
<tr>
<td>75</td>
<td>675</td>
</tr>
<tr>
<td>80</td>
<td>820</td>
</tr>
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</table>

### Combination Table for Multiple, Shifting, and Shoulder Taper Lengths

<table>
<thead>
<tr>
<th>S</th>
<th>L</th>
<th>2L</th>
<th>1/2 L</th>
<th>1/3 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>125</td>
<td>250</td>
<td>63</td>
<td>42</td>
</tr>
<tr>
<td>30</td>
<td>180</td>
<td>360</td>
<td>90</td>
<td>60</td>
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<td>35</td>
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<td>490</td>
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<td>82</td>
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<td>320</td>
<td>640</td>
<td>160</td>
<td>107</td>
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<td>400</td>
<td>800</td>
<td>220</td>
<td>180</td>
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<td>500</td>
<td>1000</td>
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<td>230</td>
</tr>
<tr>
<td>55</td>
<td>600</td>
<td>1200</td>
<td>450</td>
<td>300</td>
</tr>
<tr>
<td>60</td>
<td>720</td>
<td>1440</td>
<td>540</td>
<td>390</td>
</tr>
<tr>
<td>65</td>
<td>840</td>
<td>1680</td>
<td>630</td>
<td>480</td>
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<tr>
<td>70</td>
<td>960</td>
<td>1920</td>
<td>720</td>
<td>570</td>
</tr>
</tbody>
</table>

### Buffer Space and Taper Length

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Buffer Space*</th>
<th>Taper Length (12' Lateral Transition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>155</td>
<td>125</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
<td>180</td>
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<tr>
<td>65</td>
<td>645</td>
<td>780</td>
</tr>
<tr>
<td>70</td>
<td>730</td>
<td>840</td>
</tr>
</tbody>
</table>

### Distance Between Signs

<table>
<thead>
<tr>
<th>Speed</th>
<th>Spacing (ft)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph or less</td>
<td>200</td>
</tr>
<tr>
<td>45 mph</td>
<td>250</td>
</tr>
<tr>
<td>50 mph</td>
<td>250</td>
</tr>
</tbody>
</table>

### Suggested Clear Zone Widths for Work Zones

<table>
<thead>
<tr>
<th>Work Zone Speed [MPH]</th>
<th>Travel Lanes &amp; MultiLane Ramps [Feet]</th>
<th>Auxiliary Lanes &amp; Single Lane Ramps [Feet]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-70</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>55</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>45-50</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>30-40</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>All Speeds</td>
<td>4' Behind Face of Curb</td>
<td>4' Behind Face of Curb</td>
</tr>
</tbody>
</table>

*Check state and local standards for sign spacing requirements.

### Notes

- When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

- For lateral transitions other than 12', use formula for L shown in the notes column.

Where:

L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)
Beyond Compliance

• Close the road to traffic. Also, consider closing intersecting roads that would allow merging traffic to adversely affect worker safety in the work zone.

• Use impact-resistant protective barriers to separate traffic from workers. Place barriers between traffic lanes and workers.
Beyond Compliance

• Use approved Automated Flagging Assistance Devices (AFADs) or portable traffic signals per MUTCD guidelines.
Beyond Compliance

- Install temporary rumble strips along roadway, especially adjacent to the Flagger Ahead sign.
Beyond Compliance

• Illuminate tapers.
• Install vehicle speed indicators.
• Utilize vehicle arresting systems behind the taper or mobile type barrier systems.
Beyond Compliance - Speed Indicators
Beyond Compliance

- Use an intrusion alarm system that utilizes an air hose stretched across the closed lane that activates an audible warning device.
Beyond Compliance

• Inform, train and utilize law enforcement officers in our work zones (See Appendix A for Law Enforcement Guide).
Innovation - Positive signage

Slow Down
My Daddy/ Mommy
Workz Here
Innovation - Negative Reinforcement

Work Zone Safety – "beyond compliance"

World of Asphalt
Communicating with the Traveling Public

• Utilize the amber alert system to better communicate with the traveling public.

• Use Portable Changeable Message Signs (PCMS) to inform motorists of conditions ahead such as closed ramps, detours, or other regulatory information.

• Radio/TV spots for work zone safety.

• Utilize DOT Public information system.

• Utilize mobile devices for traffic construction work updates.
Emergency Strategy

• Identify emergency providers and meet with them prior to the start of the job.
• Consider how emergency services will access the job.
• Flaggers should have mobile radios so they can easily communicate with each other or their coworkers.
• Expect the public to follow the path of least resistance, which could mean that they will enter protected work zones to get around accidents. Secondary accidents can also be a result of initial accidents.
Appendix

• Provides guidance for properly utilizing law enforcement in work zones.
• Provides a standard form letter for requesting additional law enforcement presence in work zone.
• Provides a standard form letter for requesting extra measures for work zone intrusion prevention from state DOTs.
Take Home Point

Reducing Risk

Unacceptable to Acceptable
Local Effort - State associations and DOT’s

Do you request approval from the state DOT for additional traffic control devices/systems?
Is this documented?

It’s hard for others to say no regarding the safety of our employees and the motoring public.
Should we do more?

- What else can we do?
- We all have a common interest that goes beyond being competitors.....
We need your help.............

➢ Share best practices for the prevention of work zone intrusions so we all can benefit from each other.
➢ Think outside the box
➢ Take action – Speak up!
We need your help

- Create an industry wide best practice guide for the prevention/reduction of work zone intrusions.
We need your help

➢ To submit ideas please contact:
  Howard Marks
  Hmarks@asphaltpavement.org
  (301) 731-4748

Lee Cole
  lee.cole@oldcastlematerials.com
  (601) 953-1148
They need our help........

Thank you