

Improving Worker Visibility and Crash Reduction Strategies in Work Zones

Traffic Safety Summit 2008

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Improving Worker Visibility

Worker Visibility

- Who is considered a worker?
- Regarding visibility, a worker is a person who performs work in or near a roadway where the worker is in proximity to traffic or moving equipment.
- This includes construction activities, crash sites and traffic control areas.

Worker Safety

- Regarding being struck by a motorist, Michigan statistics are better than some states.
- On average, only one worker is struck and killed each construction season.
 - Typically, the worker is struck while occupying a lane that is open to traffic.

Statistics - Fatalities

- Per the U.S. Dept of Labor, Bureau of Labor Statistics (BLS), the top three causes of fatalities to workers in work zones is from:
 - Struck by Traffic (approximately 25%)
 - Struck by Construction Equipment (approx. 18%)
 - Construction Equipment problems (i.e.: rollover) (approx. 18%).

Statistics - Injuries

- Nationwide, the top three injury causes for workers in work zones are:
 - Overexertion - 27%*
 - Falls – 23%
 - Struck by equipment – 17%
- For MDOT, the top two injury causes are:
 - Lifting/Exertion - 26%
 - Slips, Trips, and Falls – 18%

■ *Refer to Health Risks 2005 Presentation on the MDOT Safety Administration website for more information.

Worker Safety

- Of those listed, 14 of those deaths were:
 - Run over
 - Crushed
 - Struck by
- If some of these people did not wear hi-visibility safety apparel, and it would have been appropriate to do so, could they be alive today?

Why wear hi-viz clothing?

Double click in middle of screen to start video.



FHWA Final Rule

- “All workers within the ROW of a Federal-aid highway, who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area, shall wear high-visibility safety apparel.”
- Compliance date: November 24, 2008.

New ANSI/ISEA Standard

- A new standard was released late 2006 specifically addressing high visibility clothing for public safety officials - **ANSI/ISEA 207-2006**.
- Primary difference between ANSI 207 and ANSI 107: required area of fluorescent background material (450 sq. in.) falls between ANSI 107 Class 1 (217 sq. in.) and ANSI 107 Class 2 (775 sq. in.).
- Not intended to replace or to be interchangeable with ANSI 107 (“public safety” vs “construction”).
- Incorporates the same amount of retro-reflective material required by ANSI 107.

ANSI 207-2006

- Incorporates some special features for the law enforcement and emergency response workers:
 - Adjustable sides
 - Access to belt-mounted equipment (guns and radios).
 - (Main reason for less background material.)
 - Microphone clips.
 - Chest pockets.
 - “Tear-away” features.
 - ID badge holders.
 - Means to identify public safety entities through the use of specific color markings.
- Law enforcement officers performing traffic control would still be directed to follow ANSI 107 Class 2 or Class 3 guidelines when possible.

Key Definitions

- **High Visibility Apparel:** “...clothing during daytime and nighttime usage, and that meets the (ANSI) performance Class 2 or 3...”
- **Workers:** “...people whose duties place them within the ROW of a Federal-aid highway...
 - Construction and maintenance forces
 - Survey crews
 - Utility crews
 - Responders to incidents within the ROW
 - Law enforcement when:
 - Directing traffic
 - Investigating crashes
 - Handling lane closures
 - Obstructed roadways
 - Disasters”

Narrative

- “...it is not the FHWA’s intent to impose funding sanctions on Federal-aid recipients as a result of non-compliance...by workers not subject to those recipients control or jurisdiction.”
- “...the rule is not an unfunded mandate; it is a requirement or standard applicable to highways that receive Federal-aid...”

Narrative (cont.)

- “...the rule applies to all workers, whether paid or volunteer, who are within the ROW... The Adopt-A-Highway volunteers are exposed to traffic...and should be afforded the same measure of safety as other workers.”

Class 1

- Recommended when:
 - Low hazards
 - Low speed (less than 25 mph)
 - Parking lot attendants, warehouse, etc.



Class 2

- Recommended when:
 - Close proximity to traffic
 - Speeds above 25 mph
 - Road Workers, Law Enforcement, etc.



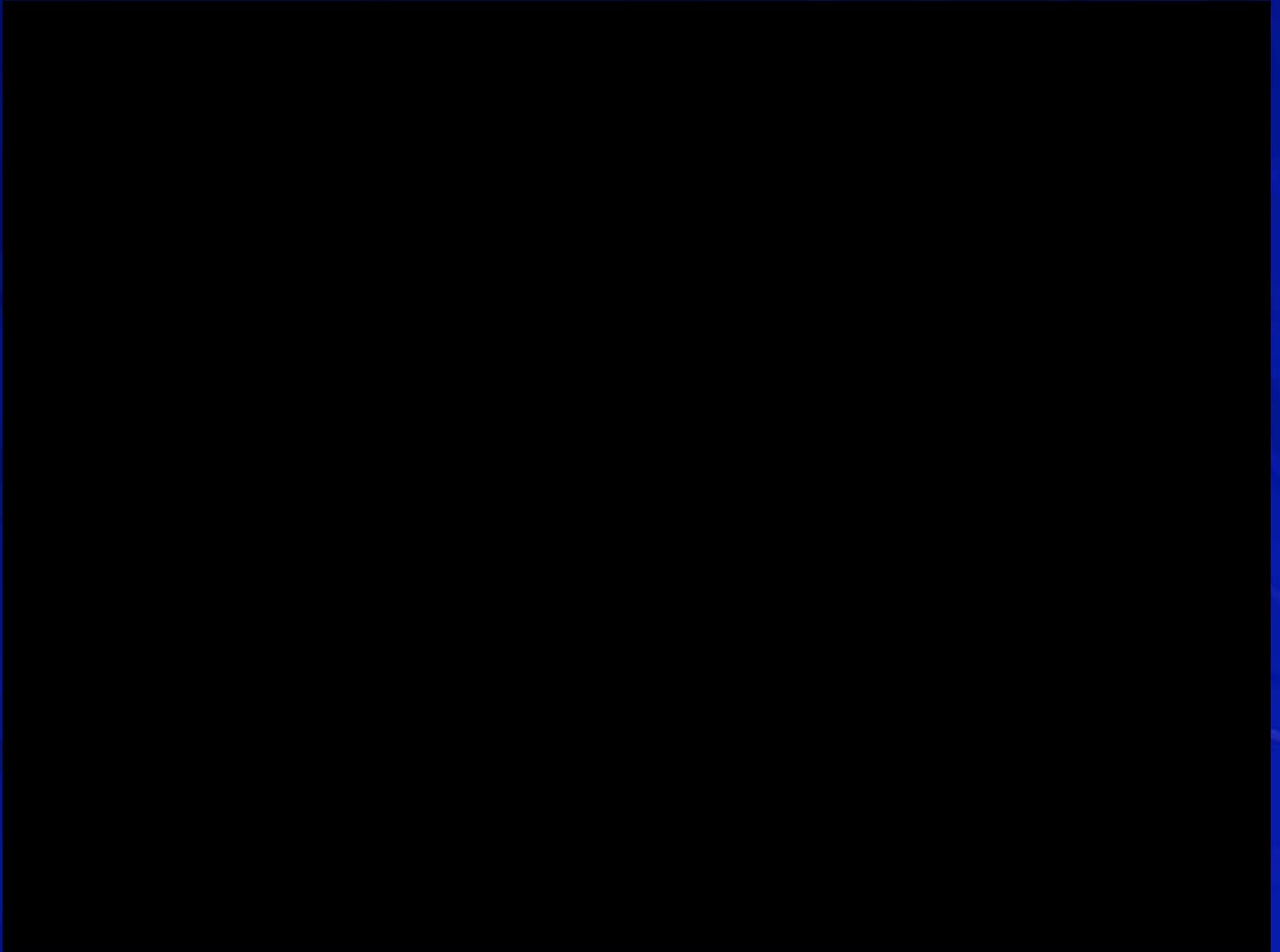
Class 3

- Recommended when:
 - No separation from traffic (no workzone)
 - high speed traffic
- Vests and pants; or Vests or jackets with sleeves



Why Reflective Material?

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Worker Safety

- What about the work area fatalities?
- As of November 30, 2007, there have been 31 fatalities in work areas, including work zones occupying the roadway.
- That means in the work area side of the business, for 2007, 97% of the worker fatalities were due to events in the work area, and only 3% were by motorists (1)

Worker Visibility

- Visibility recommendations?
 - Wear PPE appropriate for your job
- Do not wait for the November 24, 2008 implementation date, put it on now!!!!

Crash Reduction Strategies in Work Zones

Work Zone Safety

- The MMUTCD, Part 6 states:
 - The primary function of TTC is to provide for the reasonably safe and efficient movement of road users through or around TTC zones while reasonably protecting workers, responders to traffic incidents, and equipment.

Worker Safety

- But what does work zone safety mean to the worker?
 - They do not want motorists going too fast, for fear that the motorist will not be able to recover if there is loss of control, and
 - If traffic is going too fast, the worker will not have time to evade the vehicle.

Motorist Safety

- What does work zone safety mean to the motorist?
 - No crashes
 - Minimal or no delays
 - A clearly defined path of travel

Motorist Safety

- In 2006 there were:
 - 316,899 total crashes statewide
 - 1027 total fatalities statewide
- Of those numbers:
 - 5,234 crashes in work zones (1.6% of all crashes)
 - 17 motorist fatalities in work zones (1.7% of all fatalities)

Crashes in Work Zones

Crashes in Work Zones

- Statewide, when crashes occur in work zones:
 - 75% during daylight
 - 66% during clear sky
 - 84% on dry pavement
 - 31% in an interchange
 - 36% in an intersection
 - 88% on the road

Crashes in Work Zones

- In order to determine if the crash data indicates if the crash that occurred was resulting from contributing conditions in the work zone, crash data reports were reviewed to determine cause and effect.
- UD-10 data typically does not provide direct answers, but does provide information to determine if the work zone may have contributed to the crash.

Crashes in Work Zones

- Work Zone Related indicates that in the crash report description, information on the crash indicated that conditions in the work zone may have contributed to the crash, such as:
 - Edge drops
 - Striking traffic control
 - Vision obstruction from traffic control
 - Backups

Crashes in Work Zones

- Non Work Zone Related indicates that in the crash report description, information on the crash indicated that conditions in the work zone may not have contributed to the crash, such as:
 - No lane closures
 - Work was not in the same area of the crash
 - Driver behavior

Crashes in Work Zones

- Unknown indicates that in the crash report description, no information was included in the crash report. Additional investigation would be required to obtain information on the crash.

Crashes in Work Zones

- Review of crash data reports suggests that the majority of **fatal crashes** in work zones may not be caused by the work zone.

Year	W. Z. Related	Non W. Z. Related	Unknown
2005	6	12	2
2006	7	9	1
2007	1	15	3

Crashes in Work Zones

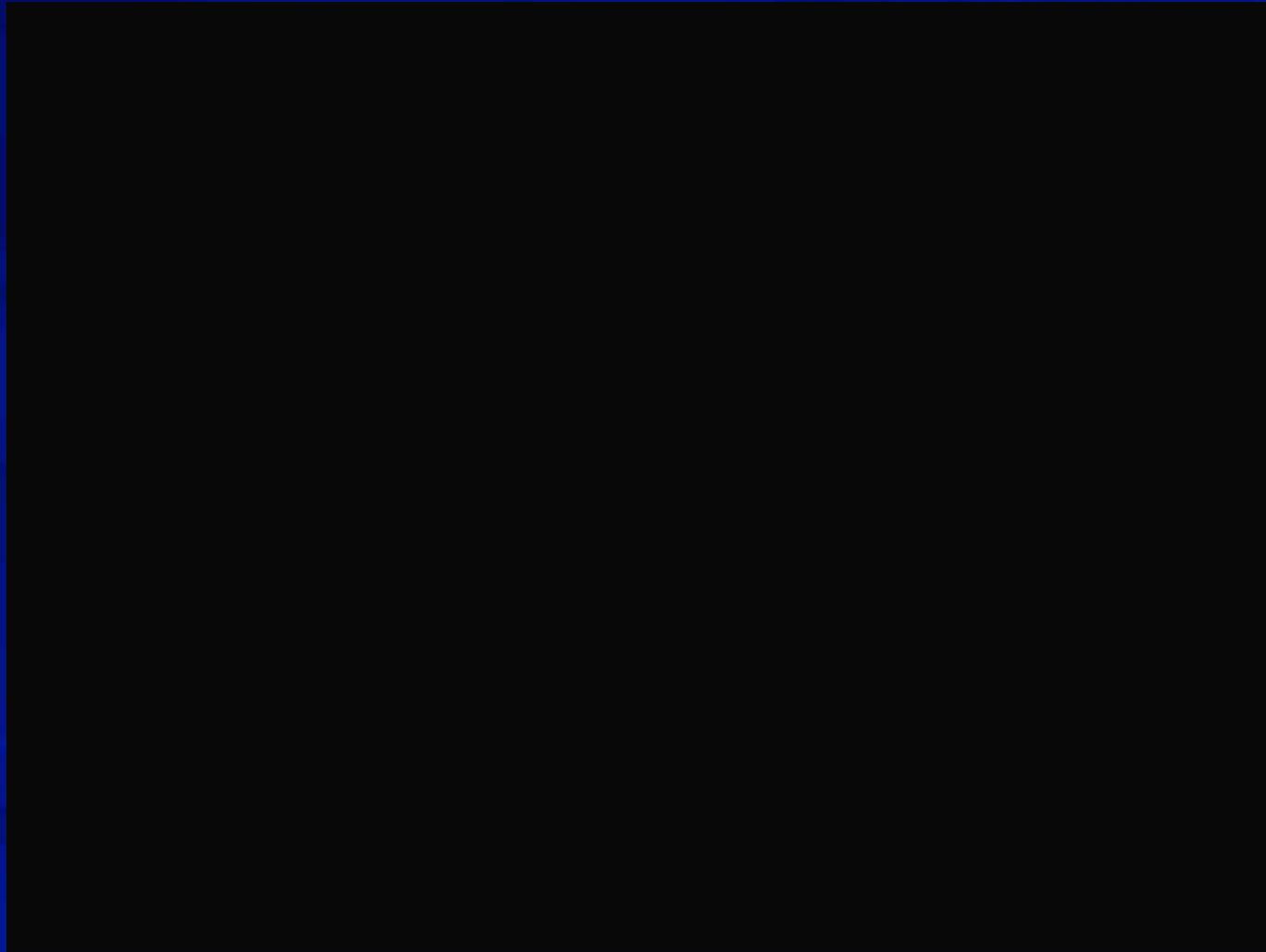
- Review of 2007 crash data reports suggests that the majority of **Incapacitating crashes** in work zones may not be caused by the work zone.

Relationship	Non Trunk Line	Trunk Line
Non-WZ Related	14	38
WZ Related	8	21
Unknown	0	2
Total	22	61

Crashes in Work Zones

- In performing analysis of crashes in work zones, it is apparent that many crashes that occur on a roadway are “transferred” to a work zone, simply because the work zone exists, but does not contribute to the crash.

A Non Work Zone Related Crash



Motorist Behavior

- Motorist behavior needs to be affected in a positive manner when driving into or thru a work zone.
- Establishing improper traffic control can create inappropriate response from a driver.

Traffic Control Gone Bad



Motorist Safety

- In 2006 the three primary types of crashes accounted for the following statewide:
 - Rear End - 65,784 crashes (20.76% of all crashes)
 - Fixed Object - 39,706 crashes (12.53% of all crashes)
 - Side Swipe Same – 25,552 crashes (8.06% of all crashes)
- These 4 types of crashes account for 41.35 % of all crashes

Motorist Safety

- In 2006 the three primary types of work zone crashes statewide totals:
 - Rear End – 2,116 crashes (40.4% of all crashes in work zones)
 - Fixed Object - 536 crashes (10.2% of all crashes in work zones)
 - Side Swipe Same – 705 crashes (13.5% of all crashes in work zones)
- These 3 types of crashes account for 64.1% of all work zone crashes

Crashes in Work Zones

■ All Crashes Thru 12/31

Year	All Roads	Trunk Line
2005	6369	4553
2006	5030	3603
2007	5339	3710

Crashes in Work Zones

- Target reductions are in four primary areas
 - Rear end
 - Side Swipe Same Direction
 - Fixed Object
 - Other Object

Motorist Safety

- Rear end crashes in work zones may be indicators of:
 - Speed differential
 - Traffic volumes at or above capacity
 - Geometric design issues
 - Contractor ingress and egress

Contractor Ingress and Egress



Work Zone Crashes

■ Rear End Crashes Thru 12/31/07

Year	All Roads	Trunk Line
2005	2471	1873
2006	2045	1650
2007	2049	1582

A Typical Rear End Crash



Motorist Safety

- Side Swipe Same direction crashes may be indicators of:
 - Speed differential
 - Traffic volumes at or above capacity
 - Narrow traffic lanes with little or no shoulder

Work Zone Crashes

■ Side Swipe Same Crashes Thru 12/31/07

Year	All Roads	Trunk Line
2005	1005	778
2006	674	507
2007	819	616

Motorist Safety

- Fixed Object crashes may be indicators of:
 - Travel paths that may not be clear
 - Traffic lanes with width restrictions
 - Geometric design issues

Work Zone Crashes

■ Fixed Object Crashes Thru 12/31/07

Year	All Roads	Trunk Line
2005	596	440
2006	519	369
2007	608	433

Motorist Safety

- Other object crashes may be indicators of:
 - Debris in the roadway, either from
 - The motorist
 - Contractor activities

Work Zone Crashes

■ Other Object Crashes Thru 12/31/07

Year	All Roads	Trunk Line
2005	346	275
2006	307	238
2007	290	217

Debris in the Roadway

- Nearly 20% of all other object crashes in work zones were from contractor related debris that was in the open lane of traffic.
- In 2006, the only worker fatality occurred when the worker was in the open lane of traffic to remove debris from construction activities.

Corrective Strategies

The Future of Work Zones

- It is possible to reduce crashes in work zones.
- Goals:
 - Identify and create a best practice site where designers can go
 - Require certain treatments on certain projects, rather than allow options
 - Implement ITS strategies for improved motorist information on destination and delay

Safety and Mobility Initiative

- The Federal Rule on Work Zone Safety and Mobility requires us to:
 - Move traffic
 - Reduce worker injury and death
 - Reduce Motorist injury and death

Workers and Equipment

- For the workers and the equipment that is used to perform work on the roadways:
 - Internal traffic control plans will be required.
 - Internal traffic control plans include:
 - Pedestrian (worker) travel paths
 - Equipment travel paths
 - Control of ingress and egress points
 - Identification of danger areas
 - Worker safety training

Monitor Crashes

- Arrange with your enforcement community to retrieve work zone crash data on your project as it happens.
 - Getting the information while the project is in place allows you to take corrective action on the project while it is still there.

Best Practice

- Within an organization, develop a place where staff can go to find best practices established from other work zones that were effective in reducing crashes.
- Outside of an organization, be able to contact other agencies for best practices.

Best Practice

- Best practices are sometimes simple solutions that have a maximum result with a minimum expense.
 - Shoulder widening to avoid traffic flow next to embankment
 - Signing for objects near the travel path
 - Maintaining a clear travel path that is easy to follow
 - Maintaining reasonable lane widths

2007 Pilot Projects

- In 2007, a pilot project was established with similar characteristics of a 2006 project to determine if certain treatments on the project would reduce work zone crashes.

2007 Pilot Project

- On the 2007 project, improvements included:
 - Widening the travel path to include a temporary 3 foot paved shoulder
 - Application of object markers at fixed object locations within 8 feet of the travel path
 - Improvement of lateral offsets to fixed object locations

2007 Pilot Project

- The results of the 2007 pilot project?
- The 2007 project had a 57% reduction in crashes in the work zone from the previous year.

Specific Work Zone Treatments

- Apply work zone treatments consistently.
- Do not eliminate the treatment simply because money for the treatment does not exist, plan the treatment into the project during scoping when the level of money for traffic control can be established.

ITS Strategies – Travel Time

- In larger projects with significant amounts of traffic volume, develop strategies that provide the motorist with travel time and optional route information.
- Motorists have been shown to alter their travel paths if they are informed of the delay far enough in advance.

ITS Strategies – Work Zone Information

- For many motorists, the work zone is in a place where they must travel through it.
- Applying real time information systems that alert the motorist to changing conditions, such as delay or speed reductions, can be valuable in altering motorist behavior before they get to the area where the condition will change their behavior suddenly.

Motorist Safety

- Since motorists are involved in the highest percentage of incidents in a work zone, steps must be taken to:
 - Improve the travel path
 - Improve offsets to objects within the zone
 - Establish and maintain realistic speed limits
 - Improve the temporary lane widths
 - Provide real time motorist information

Other Work Zone Strategies

- Your project is continuing to have crashes and you have reviewed the project, crash data and cannot find potential solutions to reduce your crashes, your next step:
 - Within your organization, as other staff not involved in your project to perform a peer review

Other Work Zone Strategies

- If your organization does not have the capability of doing a peer review, ask other organizations to help out.
 - A city could ask another city or county
 - A county could ask another county
 - The agency could find a qualified consultant to perform a peer review
- Don't let your work zone contribute to the data reviewed at the end of the year after the project is complete.

Safety

- Remember, there is only 1 goal.
- **You, the motorist, bicyclist and the pedestrian must go home at the end of each work day.**
- **There are no other alternatives**

Questions?

If you have more questions, contact me.

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