



# Engineering & Enforcement: Working Together in Work Zones

MN TZD Conference – November 2016



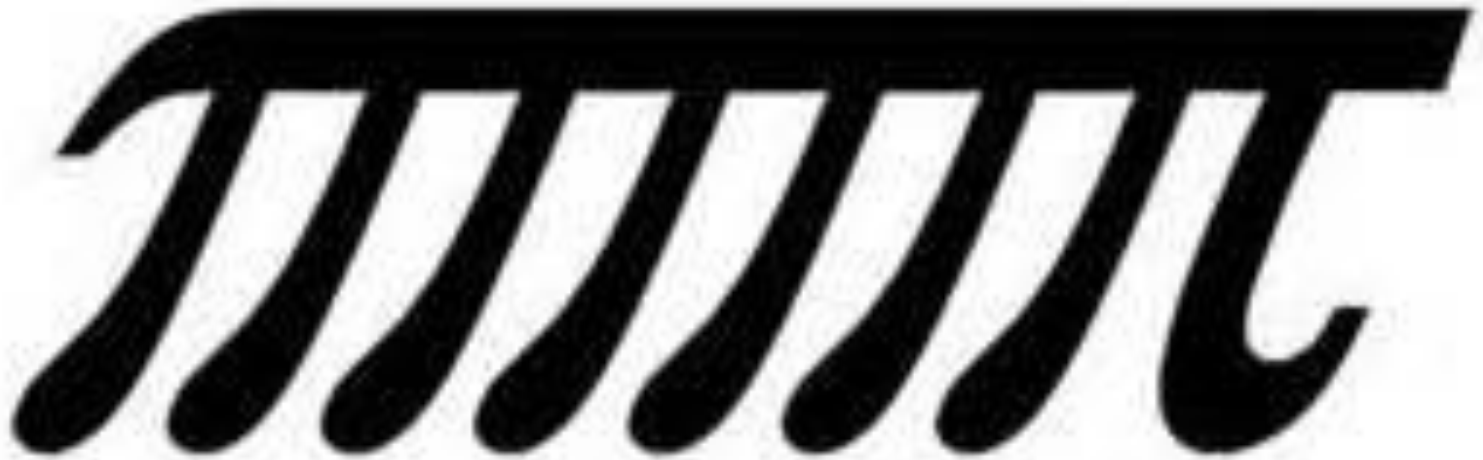
Captain Charles Lemon  
State Patrol

Ken E. Johnson  
MnDOT

We all have a stake in **A**  **B**



# Pop quiz



# What we'll cover...

- ▶ Highlight safety concerns in WZs
- ▶ Crashes – know
- ▶ Laws
- ▶ Speed limits
- ▶ Enforcement methods
- ▶ Engineering methods
- ▶ Working together



# Work Zone Crash Report



One key way Enforcement helps MnDOT

# Parameters

- Three years: 2012-2014
- Work zone crashes include any crash coded with a valid work zone type.
- Severe crashes are defined as fatal (K) or incapacitating injury (A) crashes.
- Percentages were calculated as the value of interest per total number of crashes.

# By the Numbers (over 3 years)

Work Zones & Total

5,569 Crashes 226,405

58 Severe Crashes 3,963

24 Fatalities 1,179

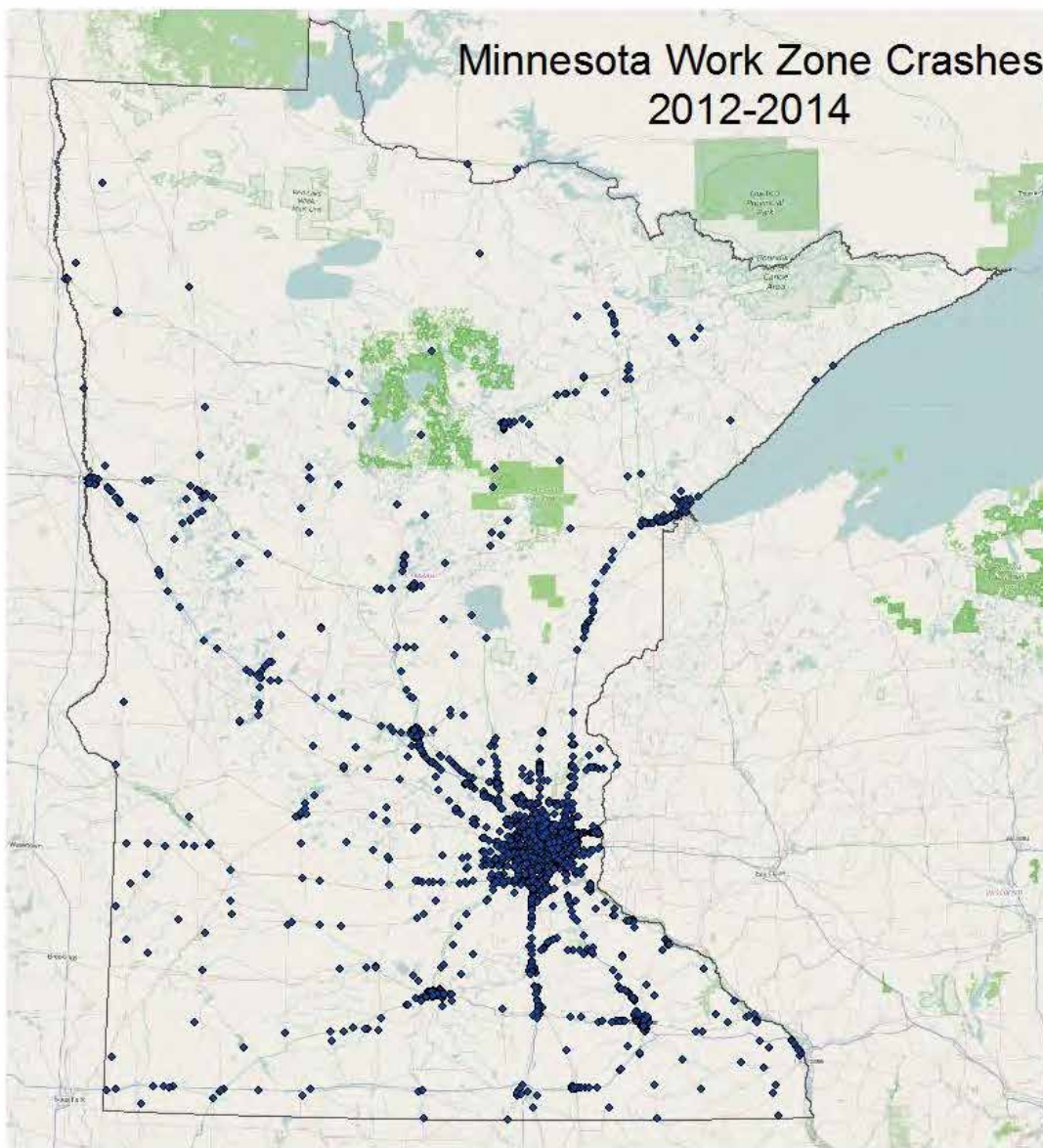
40 Incapacitating Injuries 5,753

2,270 Total Injuries 89,721

119 Vehicles (Severe) 6,212

11,489 Vehicles (All) 410,216

# Minnesota Work Zone Crashes 2012-2014



# Crash Map

All Work Zone Crashes

## Legend

◆ Crashes

□ Minnesota

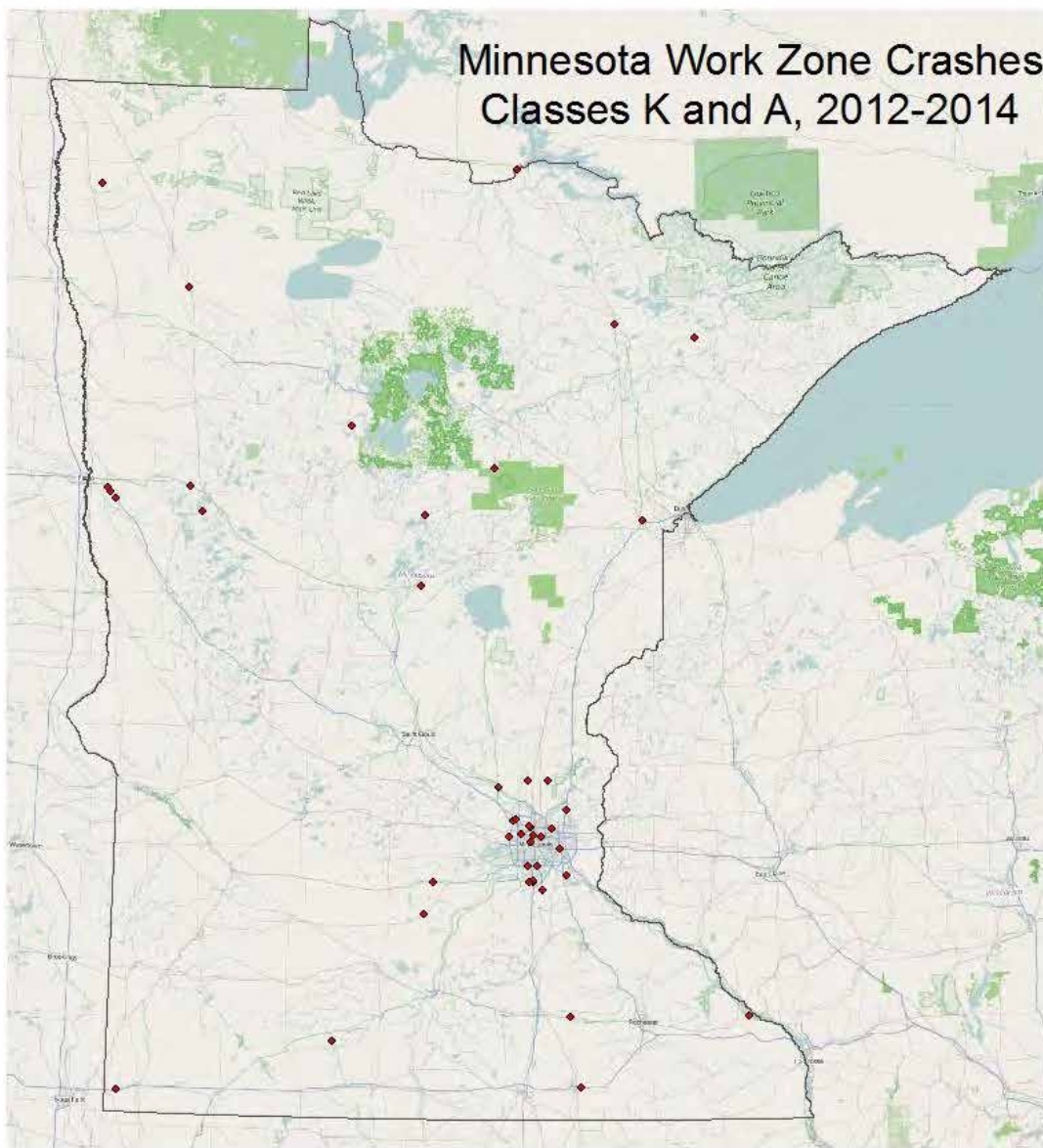
5,659 work zone crashes have taken place in Minnesota over the years 2012-2014.

0 25 50 100 Miles



Caitlin Johnson  
July 8, 2015

# Minnesota Work Zone Crashes Classes K and A, 2012-2014



# Crash Map

## Severe Work Zone Crashes

### Legend

◆ K,A Crashes

□ Minnesota

58 severe work zone crashes have taken place in Minnesota over the years 2012-2014, leading to 24 fatalities and 40 incapacitating injuries.

0 25 50 100 Miles

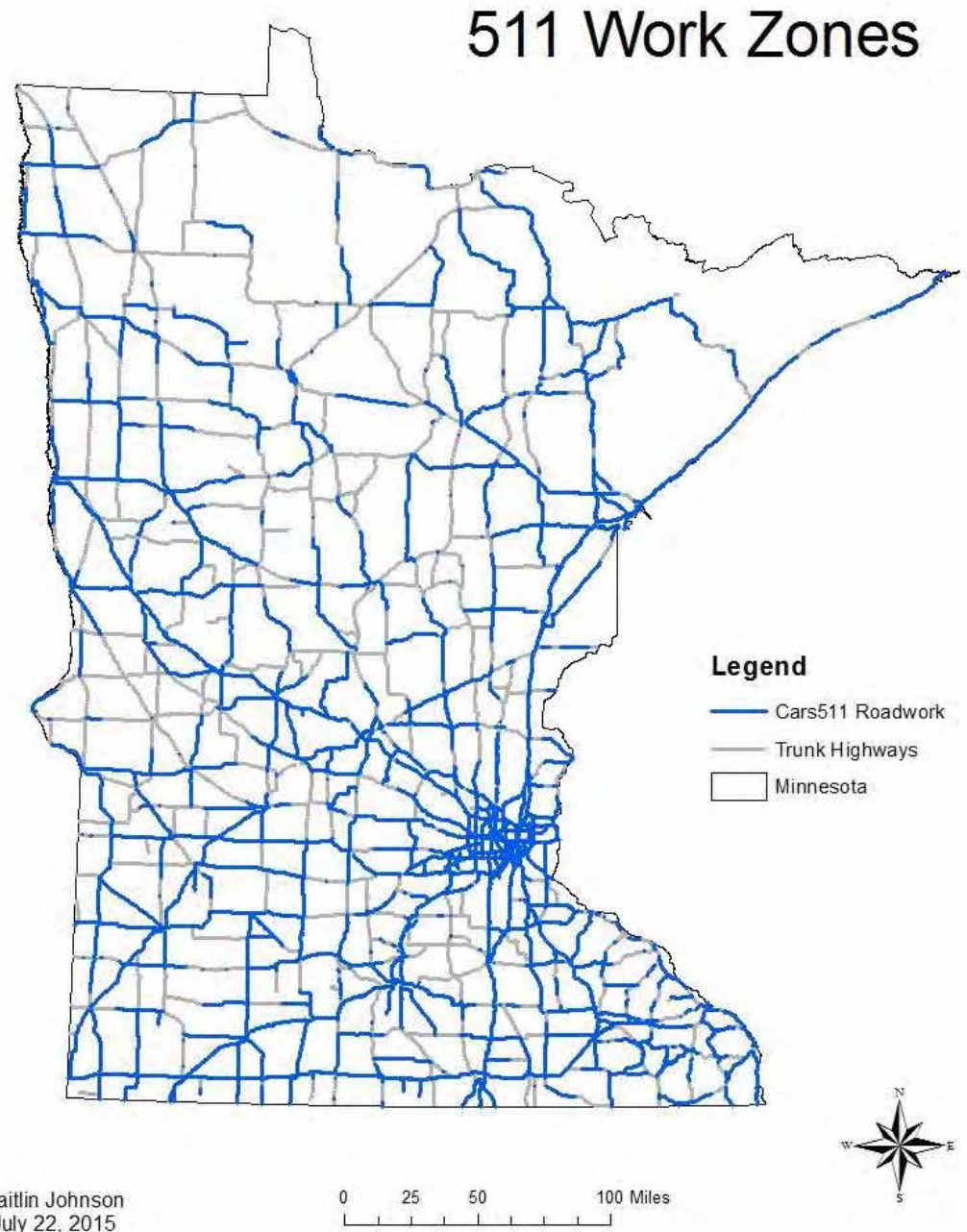


Caitlin Johnson  
July 8, 2015



# Exposure

- The map to the right displays 2012-2014 data collected by 511 regarding work zone locations.
- The dataset for 2012 is incomplete, but all records are included for 2013 and 2014.
- 511 does not include any mobile work zones. The data shown here may be any stationary work zone from a one-day project to a long term work zone.



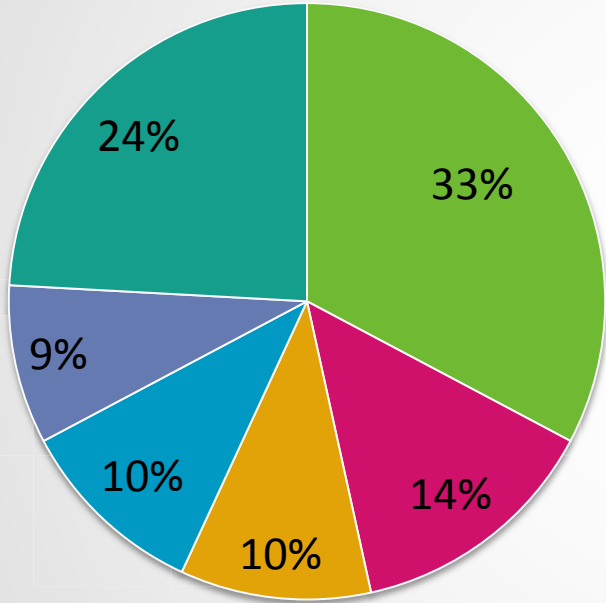


# WORK ZONE STATISTICS

Comparing Work Zone Crashes with Other Crash Datasets

# Work Zone Type

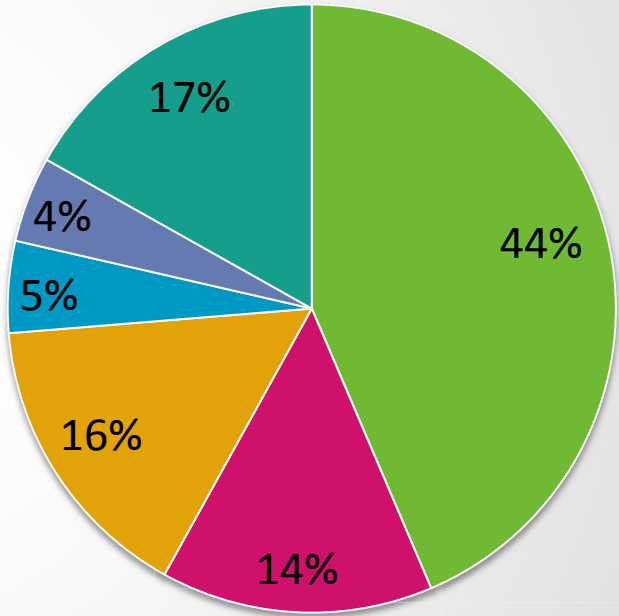
## Severe Work Zone Crashes



- Lane Closure
- Shoulder/Median
- Lane Shift/Crossover
- Moving
- Intermittent
- Other

Total Crashes: 58

## All Work Zone Crashes

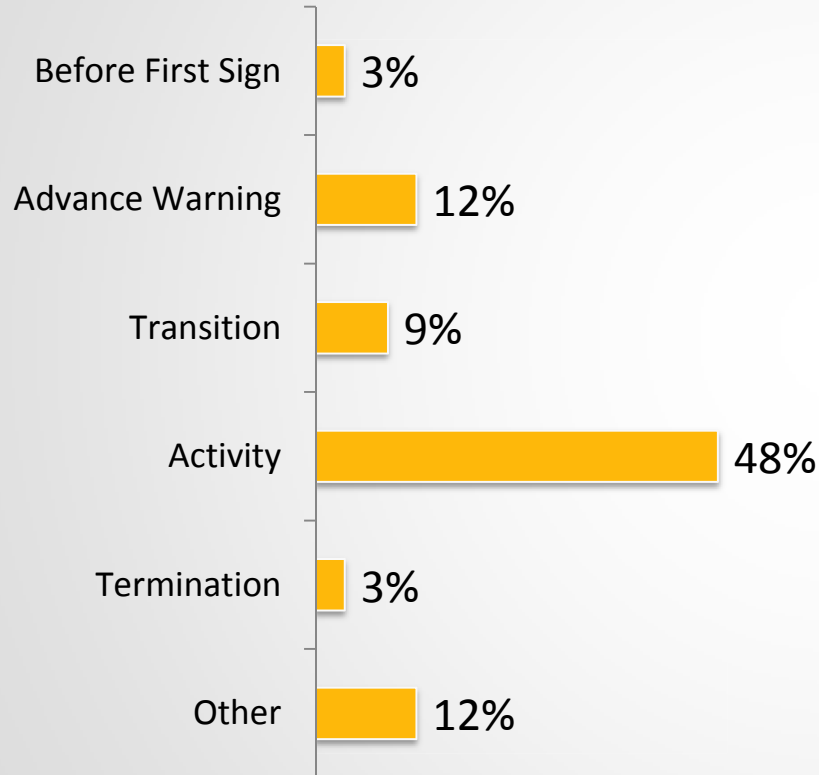


- Lane Closure
- Shoulder/Median
- Lane Shift/Crossover
- Moving
- Intermittent
- Other

Total Crashes: 5,659

# Location in Work Zone

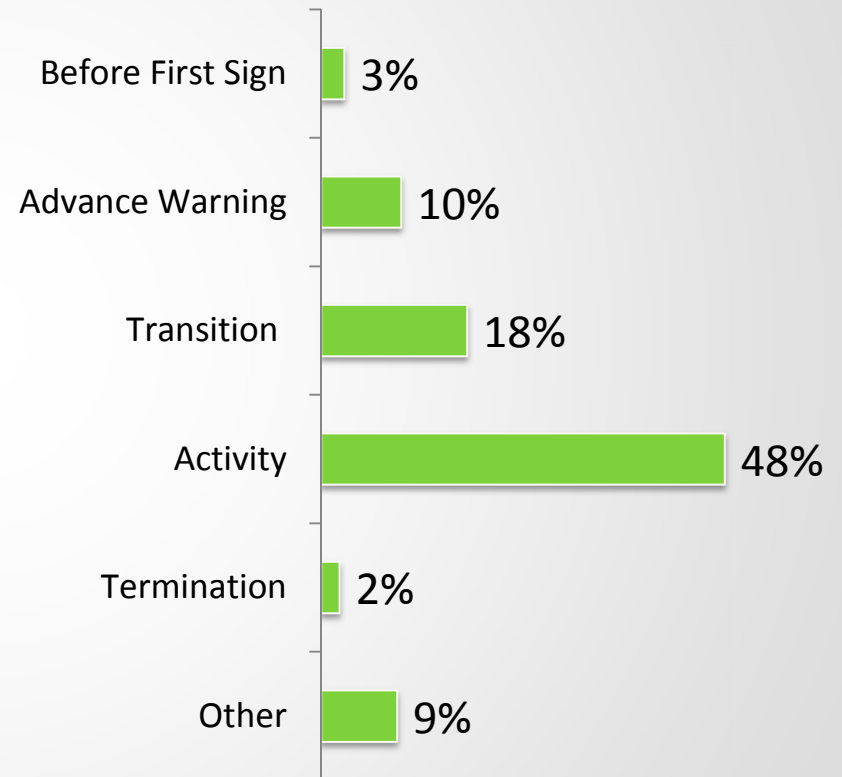
## Severe Work Zone Crashes



Workers were present for 6 (10.3%) crashes.

Total Crashes: 58

## All Work Zone Crashes

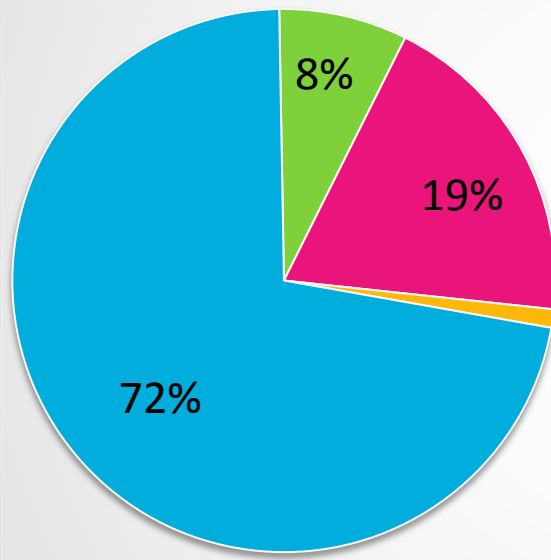


Workers were present for 1,703 (30.1%) crashes.

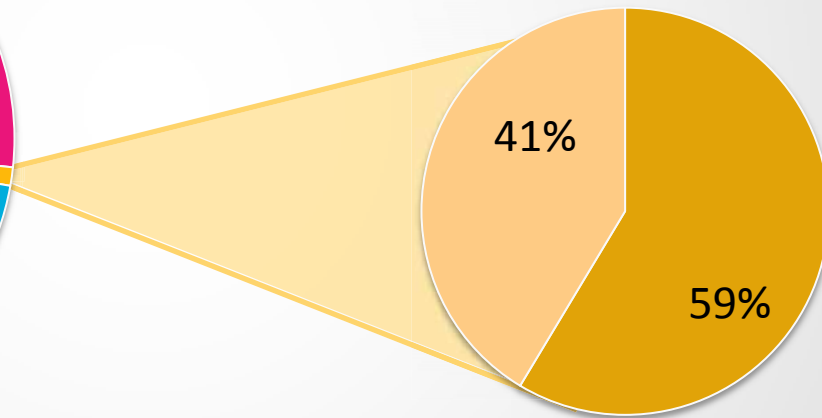
Total Crashes: 5,659

# Severity

## All Work Zone Crashes



## Severe Work Zone Crashes



- Non-incapacitating Injury
- Possible Injury
- Severe Crashes
- Property Damage Only

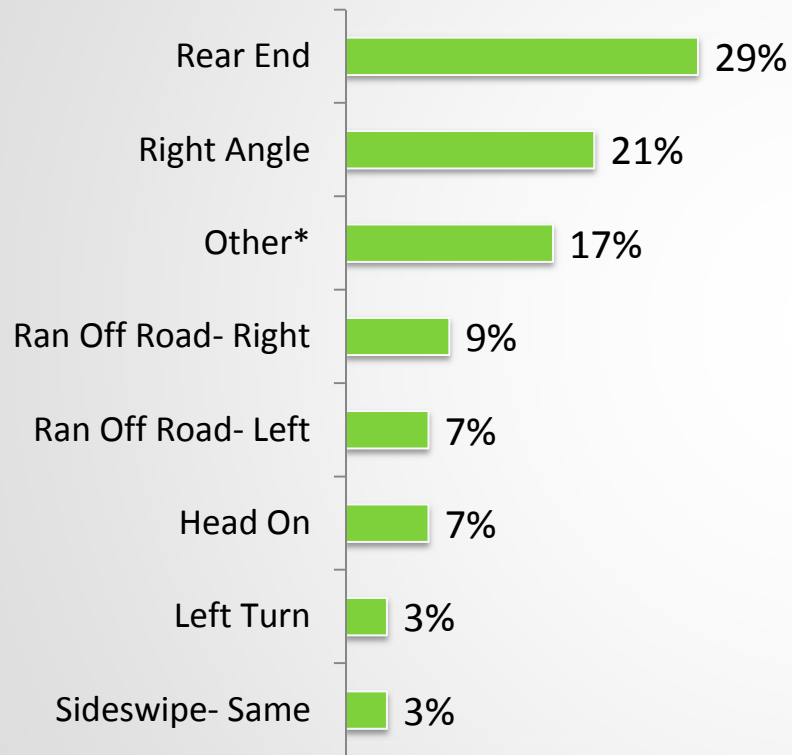
- Incapacitating Injury
- Fatality

Total Crashes: 5,659

Total Crashes: 58

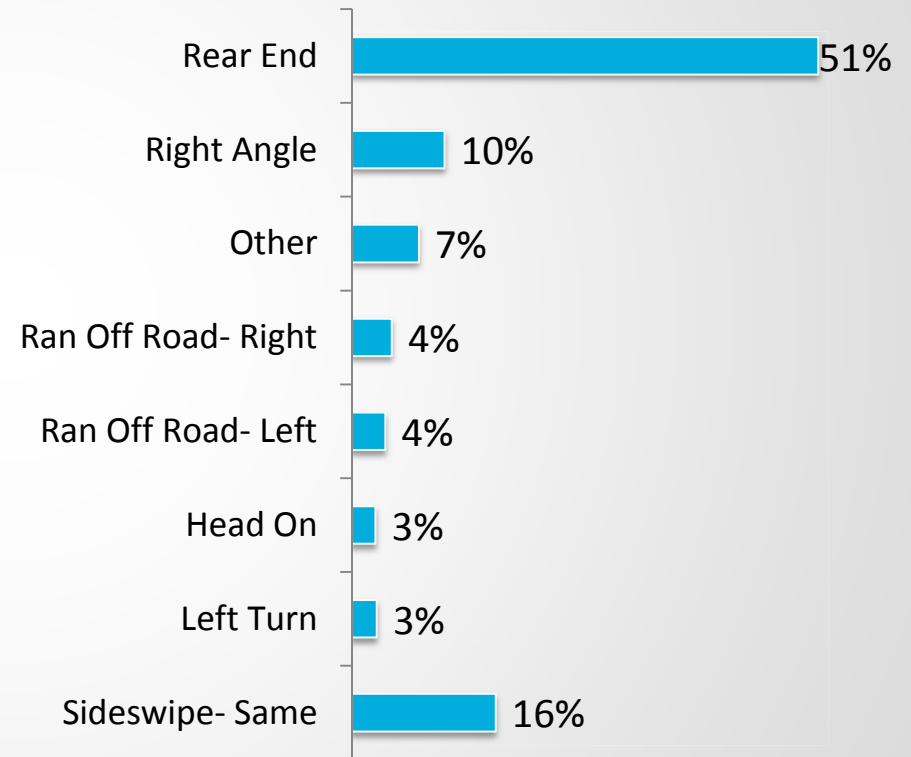
# Crash Diagram

## Severe Work Zone Crashes



**Total Crashes: 58**

## All Work Zone Crashes



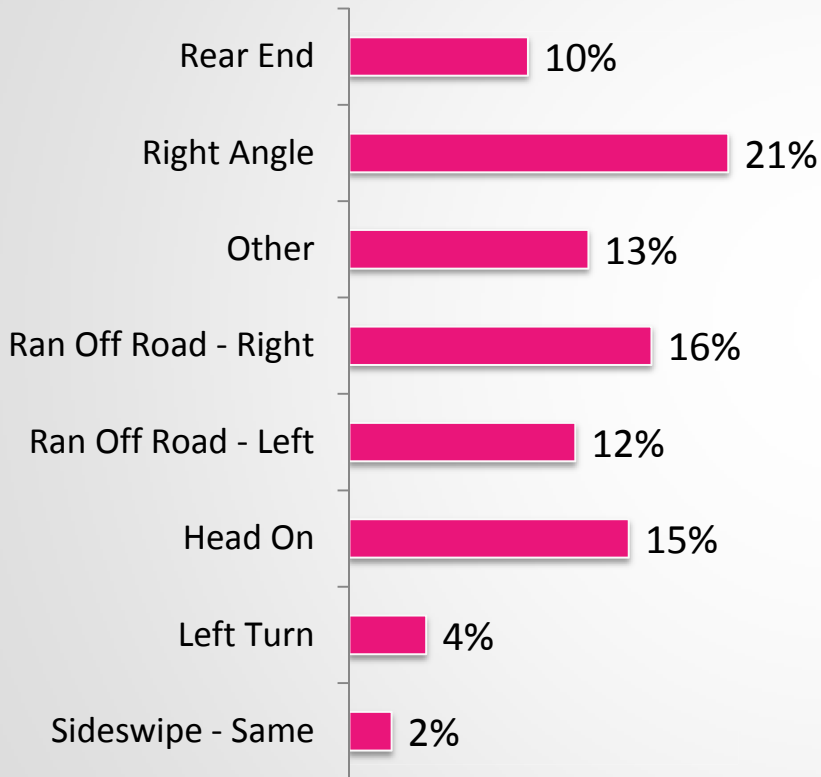
**Total Crashes: 5,659**

\* "Other" collisions included: 1 pile-up, 2 pedestrian, 1 construction equipment, 4 motorcycle (hit drums, median, milled pavement), 1 non-collision

Note: Sideswipe- Opposing and Right Turn crashes were omitted from the "All Work Zone Crashes" graph, for purposes of comparison, because no fatal or serious crashes were of these types of collisions.

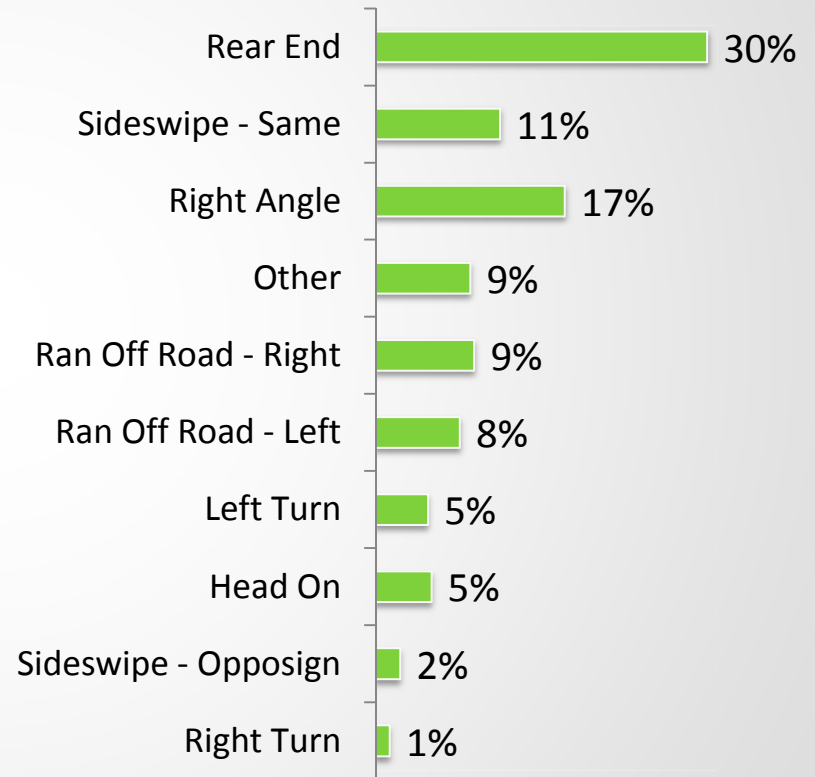
# Crash Diagram

## All Severe Crashes



**Total Crashes: 3,963**

## All Crashes

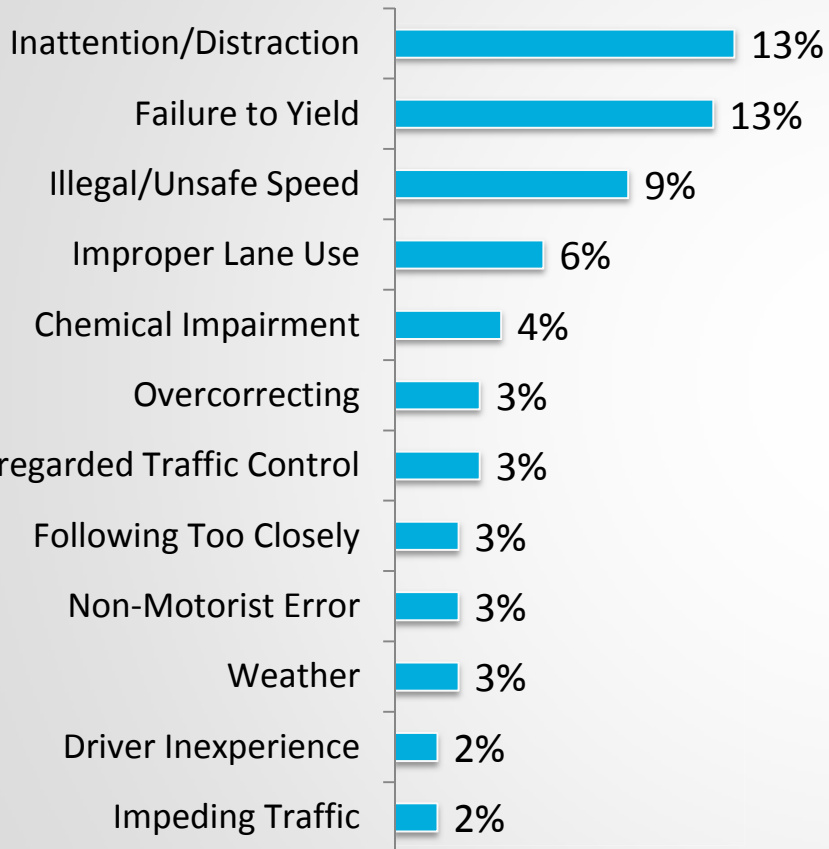


**Total Crashes: 226,405**

Note: Sideswipe- Opposing and Right Turn crashes were omitted from the "All Severe Crashes" graph, for purposes of comparison, because none of the severe work zone crashes were of these types of collisions.

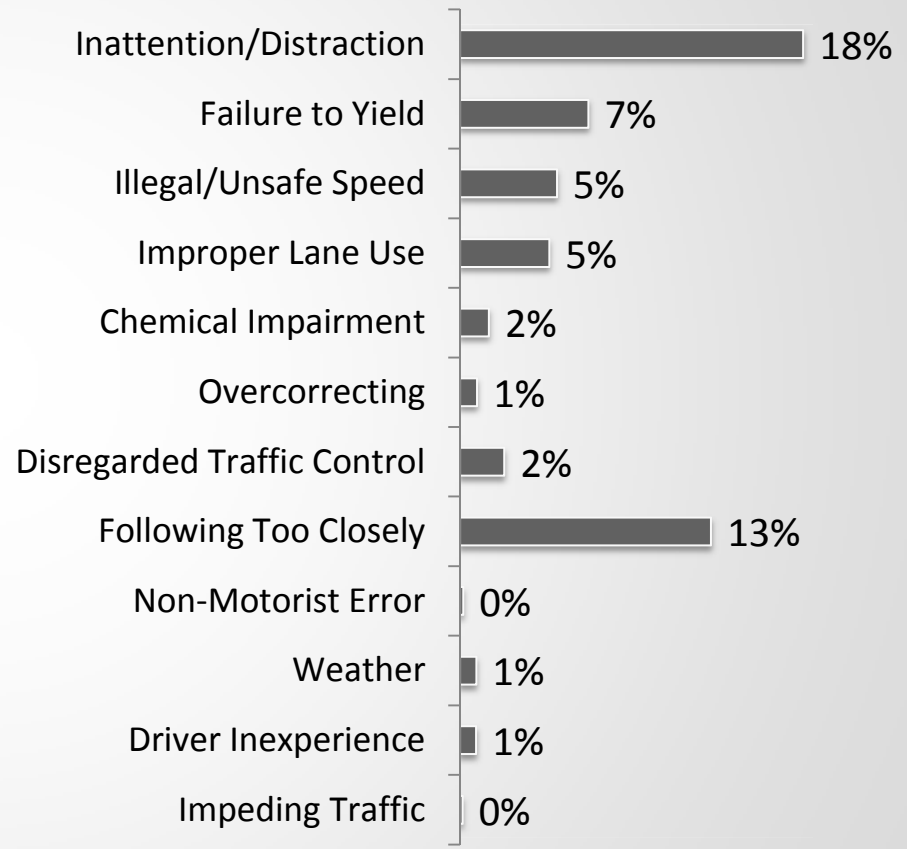
# Contributing Factors

## Severe Work Zone Crashes



**Total Vehicles: 119**

## All Work Zone Crashes



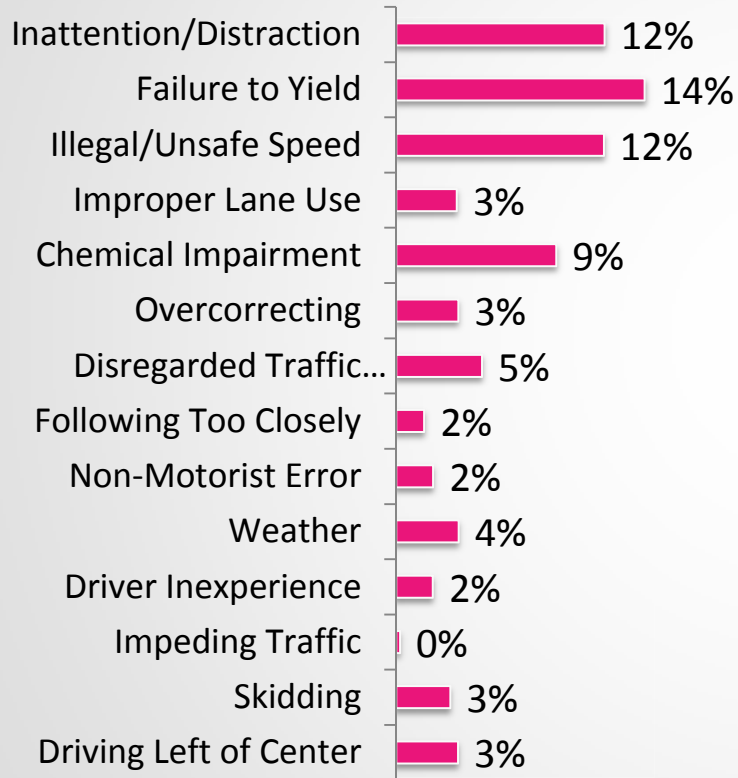
**Total Vehicles: 11,489**

Notes: 1) Percentages were determined as the number of crashes due to each factor per total number of vehicles involved in crashes. 2) For purposes of comparison, contributing factors that didn't lead to serious crashes were omitted from the "All Work Zone Crashes" graph. Omitted from both graphs were skidding, improper passing, and driving left of center, which each contributed to one serious crash but had negligible (<1%) percentages. "Other" contributing factors were also omitted.



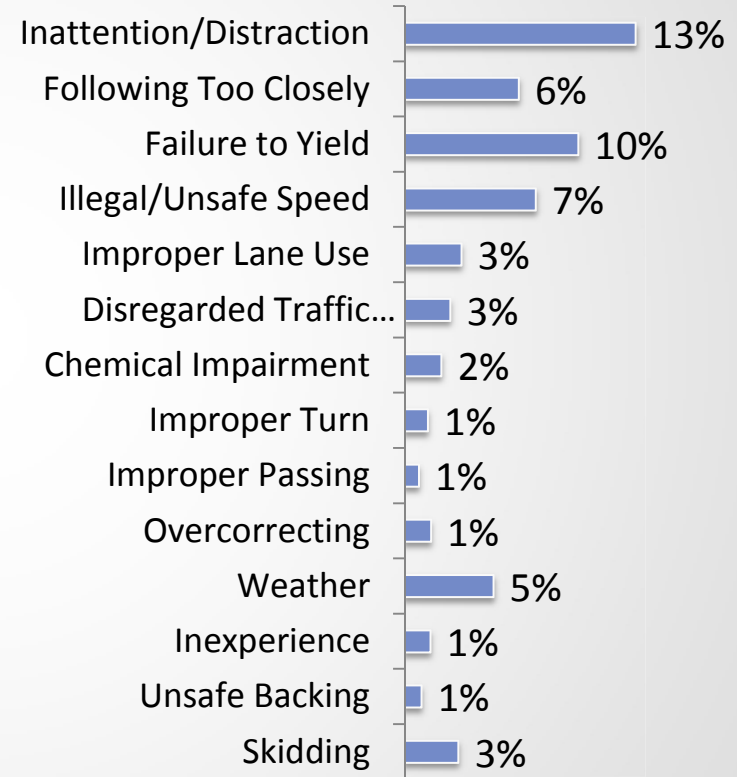
# Contributing Factors

## All Severe Crashes



**Total Vehicles: 6,212**

## All Crashes

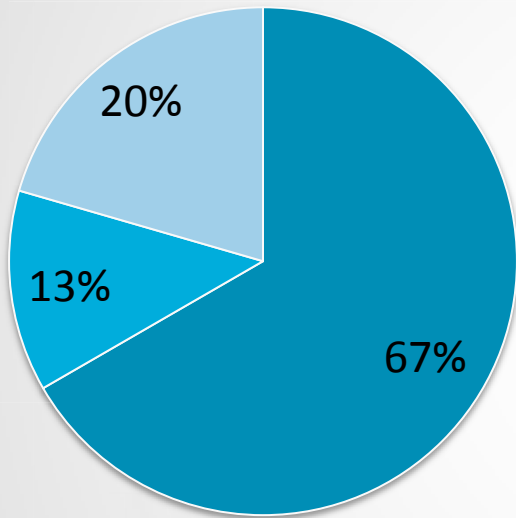


**Total Vehicles: 410,216**

Notes: 1) Percentages were determined as the number of crashes due to each factor per total number of vehicles involved in crashes. 2) Some factors were omitted from the "All Severe Crashes" graph, for purposes of comparison, because none of the severe work zone crashes were of these types of collisions. Improper passing was also omitted, which contributed to one severe work zone crash but had a negligible (<1%) percentage. "Other" contributing factors were also omitted from both graphs.

# Vehicle Type

## Severe Work Zone Crashes



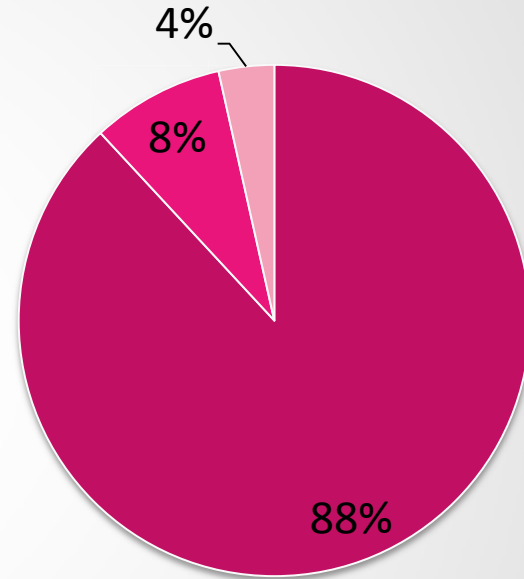
■ Passenger ■ Commercial ■ Other

“Other” Includes:

- **7 Pedestrians**
- 2 Bicycles
- 12 Motorcycles
- 1 Motorhome/RV
- 1 ATV
- 1 Construction

**Total Vehicles: 119**

## All Work Zone Crashes



■ Passenger ■ Commercial ■ Other

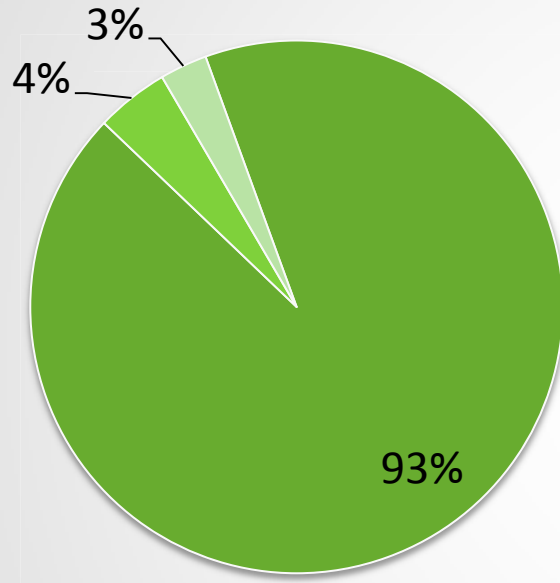
“Other” Includes:

- **51 Pedestrians**
- 33 Bicycles
- 125 Motorcycles
- 10 Mopeds/Scooters
- 11 Farm
- 13 Motorhome/RVs
- 2 ATVs

**Total Vehicles: 11,489**

# Typical Commercial Vehicle Data

## All Crashes



■ Passenger ■ Commercial ■ Other

“Other” Includes:

- **2,582 Pedestrians**
- 2,612 Bicycles
- 3,936 Motorcycles
- 197 Motorhome/RV
- 223 Snowmobile/ATV
- 371 Scooters/Mopeds
- 426 Farm
- 37 Skaters

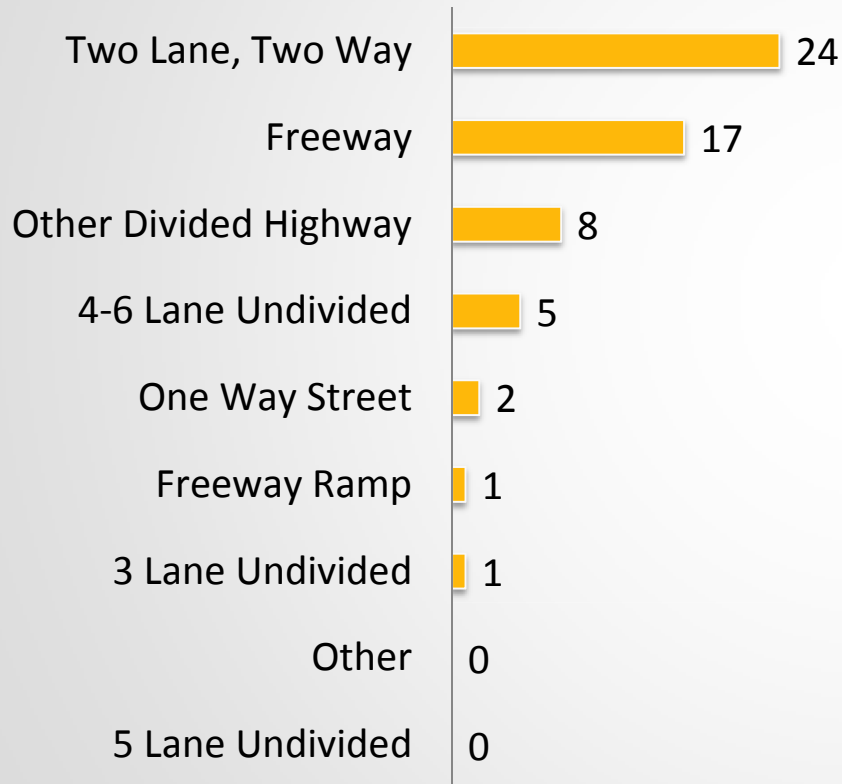
**Total Vehicles: 410,216**

## Percentage of Traffic

- Only have trunk highway data for 2013.
- Typical volumes – may be different when work zones are present.
- Heavy vehicles made up 8.25% of the total vehicle miles traveled.

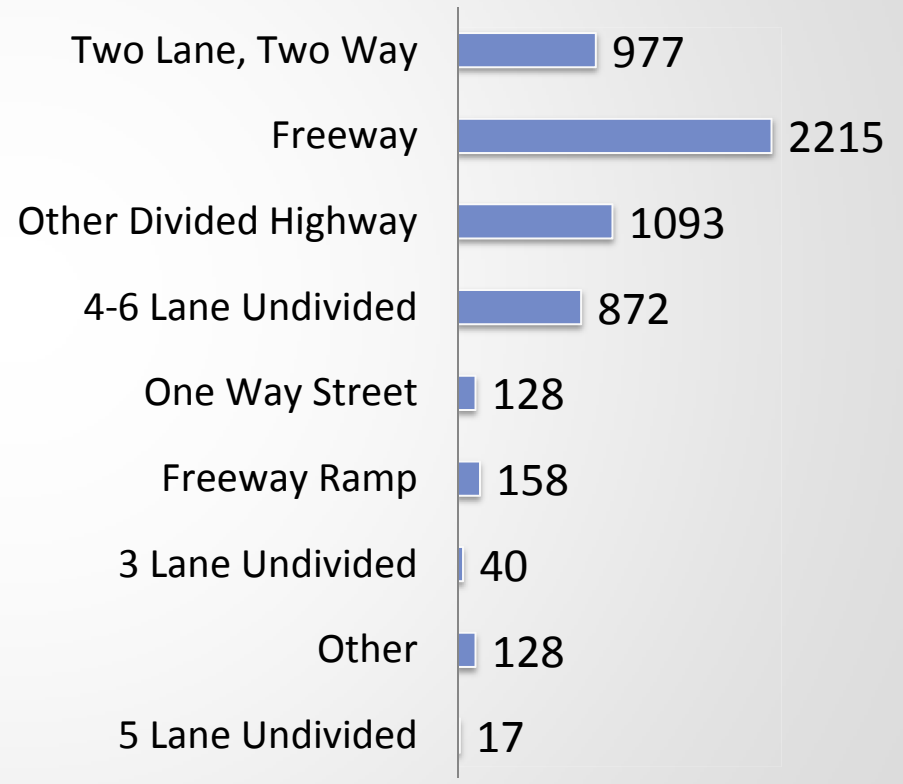
# Road Type

## Severe Work Zone Crashes



**Total Crashes: 58**

## All Work Zone Crashes

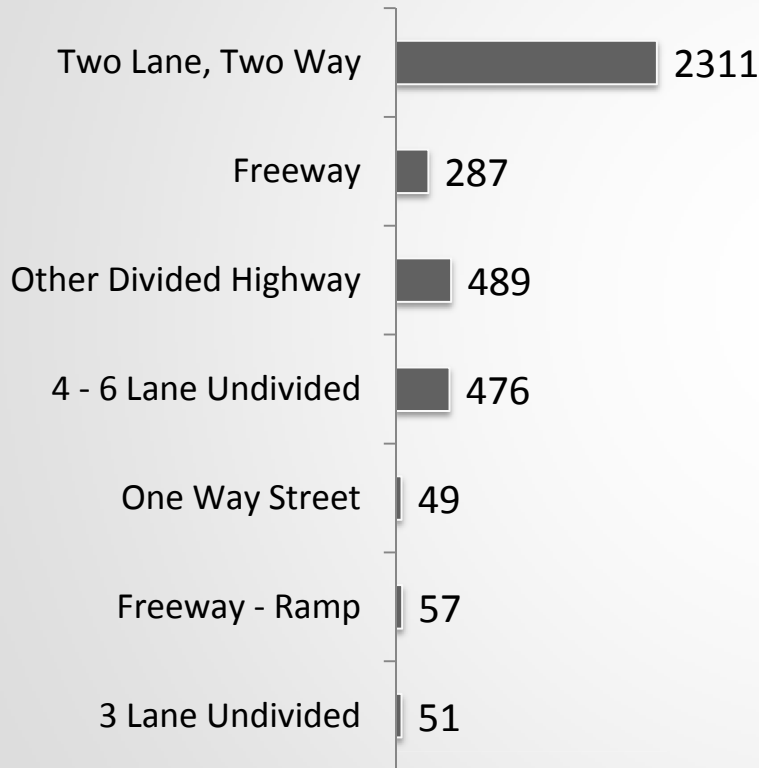


**Total Crashes: 5,659**

Note: Many of the "All Work Zone Crashes" reports coded "other" for road type were found to be 4-6 lane divided roads not commonly considered highways (sections of University Ave, for example).

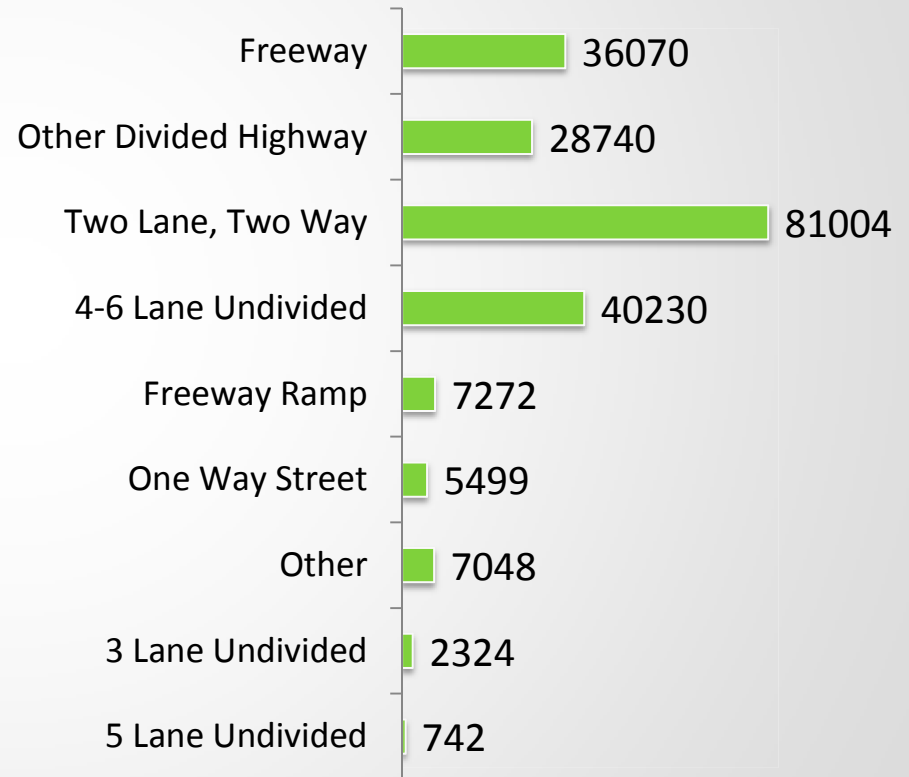
# Road Type

## All Severe Crashes



**Total Crashes: 3,963**

## All Crashes



**Total Crashes: 226,405**

Note: For purposes of comparison, Alley/Driveways, Privately Owned Roads, 5 Lane Divided, and Other were excluded, because no work zone accidents occurred on this type of road.

# Recent Work Zone Legislation

MN Session Law 2014 Chapter 312

- ▶ Defined Work Zone
- ▶ Modified fine for violating a flagger direction
  - \$300 Fine
- ▶ Modified speed limits in work zones
  - Requires reduction under certain conditions
  - Allows road agency to set without an engineering study
  - Modified fine

Effective August 1, 2014



# Definition of a Work Zone

MN Statutes 169.011, Subd. 95 – slightly paraphrased

- ▶ A work zone means a segment of street or highway which...
  - A road authority or its agent is constructing, reconstructing, or maintaining the physical structure of the roadway, which may include, but is not limited to, shoulders, features adjacent to the roadway, and utilities and highway appurtenances, whether underground or overhead, AND any of the following items applies...



# Definition of a Work Zone

MN Statutes 169.011, Subd. 95 – slightly paraphrased

- ▶ Official traffic control devices that indicate the segment of a street or highway under construction, reconstruction, or maintenance, are erected
- ▶ *One or more lanes of traffic are closed*
- ▶ *A flagger is present*
- ▶ *A 24/7 construction speed limit is established*
- ▶ *A workers present speed limit is in effect*





# Speed Limits in Work Zones

- ▶ Why do workers want speed limits?
- ▶ How effective are speed limits in work zones?
- ▶ New legislation details
- ▶ What are the speed limits that can be used in a Work Zone?
- ▶ What guidance is available?
- ▶ What are the procedures?







# Speed Limit Sign (only)

Table 1. Potential Voluntary Speed Reductions for Various Work Zone Conditions.

Work Zone Condition	Potential Voluntary Speed Reduction*
Work Zone Reduced Speed Limit Sign	0 to 3 mph
Barrier Near Inside Travel Lane	0 to 3 mph
Lane Encroachment	1 to 5 mph
Lane Closure	1 to 7 mph
Construction Vehicle Access/Egress Location	5 to 6 mph
Temporary Crossover	4 to 9 mph
Two-Lane, Two-Way Barrier Separated Traffic	7 to 9 mph

\* The speed reductions listed are based on a study conducted in Texas. Operating speeds upstream of the work zones ranged from 60 mph to 77 mph.

Drivers disregard static signs that don't reflect current driving speeds

Source: *Guidelines on Managing Speeds in WZ* – Roadway Safety Consortium, published by FHWA, available on [www.workzonesafety.org](http://www.workzonesafety.org)



# Speed Limit Sign Effectiveness – with other enhancements

Table 2. Potential Speed Reductions for Various Speed Management Techniques.

Speed Management Technique	Potential Speed Reduction*
CB Radio Information Systems	0 to 2 mph
Narrow Lanes With Channelizing Devices	0 to 5 mph
Transverse Pavement Markings	0 to 5 mph
Portable Changeable Message Sign With Radar	0 to 6 mph
Drone Radar	2 to 3 mph
Transverse Rumble Strips	2 to 5 mph
Speed Display Trailers	2 to 10 mph

\* The speed reductions listed are based on a number of studies, and the results vary considerably.



15 mph reduction in some situations  
5–10 mph reduction more common



# Speed limit in work zone when workers present

MN Statutes 169.14, Subd. 5d

- ▶ The speed limit on a road having an established speed limit of 50 mph or greater is adjusted to 45 mph in a work zone (remember definition) when...
  - At least one lane or portion of a lane of traffic is closed in either direction
  - Workers are present
  - Exceptions follow –



# Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

- ▶ The required work zone speed limit of 45 mph does not apply when...
  - Positive barriers are placed between workers and the traveled portion of the highway



# Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

- ▶ The required work zone speed limit of 45 mph does not apply when...
  - The work zone is in place for less than 24 hours





# Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

- ▶ The required work zone speed limit of 45 mph does not apply when...
  - A different speed limit for the work zone is determined by the road authority following an engineering and traffic investigation, and based on accepted engineering practice
  - 24/7 Construction Speed Limit
    - A Commissioners Order required
    - The local road agency would request through MnDOT



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# Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

- ▶ The required work zone speed limit of 45 mph does not apply when...
  - A reduced speed limit for the work zone is established by the road authority for a road under their jurisdiction when workers are present (an engineering and traffic investigation is not required)
    - No more than 20 mph on a street or highway with an established speed limit of 55 mph or greater
    - No more than 15 mph on a street or highway with an established speed limit of 50 mph or less

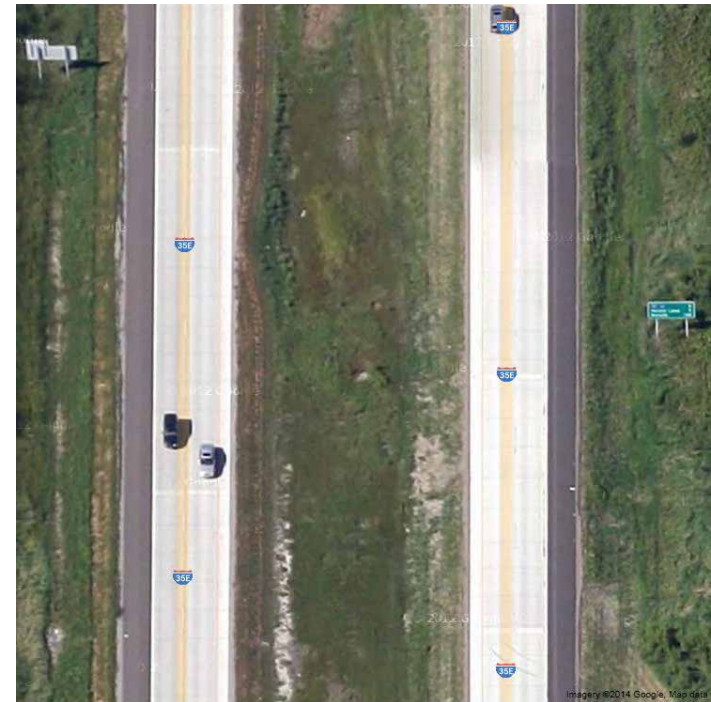
The “Other” Workers Present Speed Limit  
– or agency determined



# Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

- ▶ The required work zone speed limit of 45 mph does not apply when...
  - Added in the revision to the MN MUTCD
  - On the roadway of a divided highway with a median that does not include a TTC zone



# Agency Determined Workers Present Speed Limit

MN Statutes 169.14, Subd. 5d

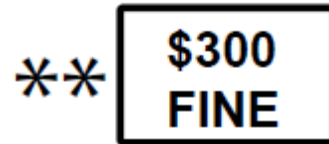
- ▶ Only requires:
  - In Work Zone
  - Workers Present



# Work Zone Speed Limit Violations

MN Statutes 169.14, Subd. 6a

- ▶ A person convicted of operating a motor vehicle in violation of a speed limit in a work zone, or any other provision of this section while in a work zone, shall be required to pay a fine of \$300.
  - The provision of “fines double” no longer applies to violations within work zones
- ▶ All work zones that meet statutory definition
  - Even those without posted speed limits
- ▶ MN MUTCD will allow turning existing posted speed limits into work zone speed limit assembly



# MN MUTCD Revision

- ▶ Part 6H has been fully rewritten in revision 4, changes to:
  - 24/7 Construction Speed Limit
  - Workers Present Speed Limit
  - Includes layouts and other language changes approved by MN MUTCD committee



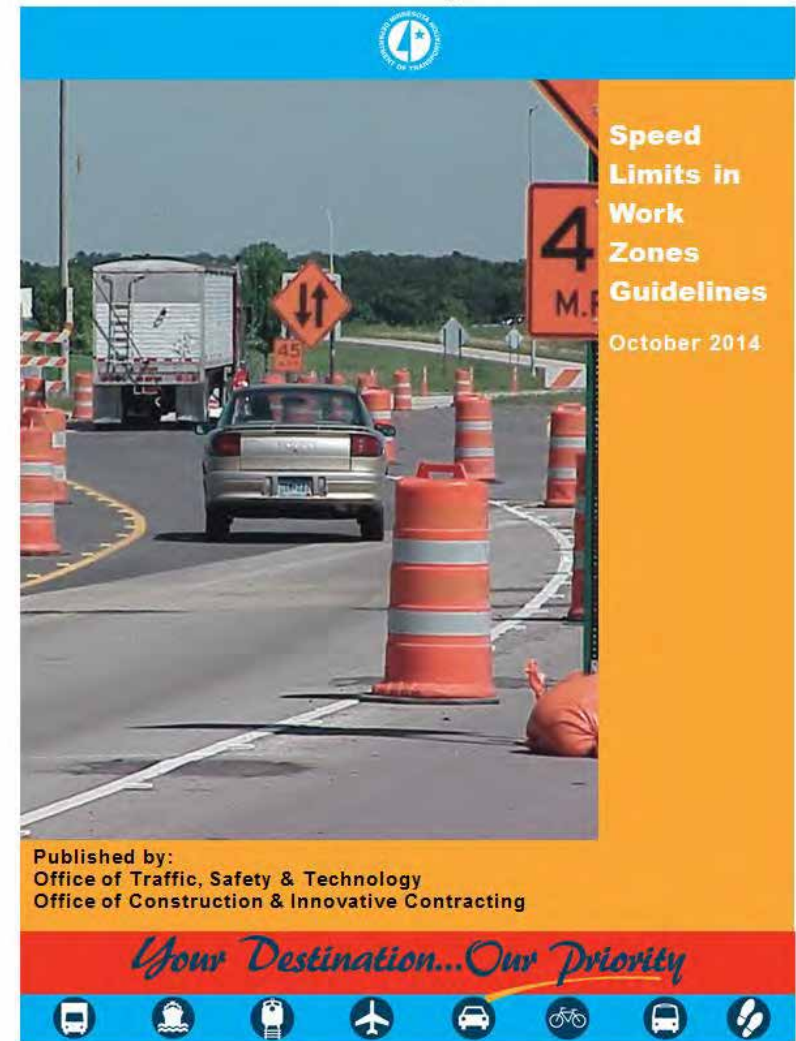
## What does Workers Present mean?

- Not defined in law – so “defined” in MN MUTCD
- Working directly adjacent to the traveled lanes
- Within 1 mile past Workers Present Speed Limit assembly



# SL in WZ Guideline

- Updated based on revision 4 to MN MUTCD caused by legislation passed in 2014



<http://www.dot.state.mn.us/speed/pdf/WZSpeedLimitGuideline.pdf>

Or websearch - mndot speed limit work zone



# Advisory Speeds

## ▶ Application

- For driver safety – let driver know a safe speed to travel to negotiate a potential hazard
  - Bumps, low shoulders, bypass indicating the curve, narrow lanes, lane shift, poor road surface, etc
  - For worker safety at spot locations – let driver know that there are workers ahead



## • Authority

- Warning sign needed
- Established by the District per the [MN MUTCD Part 6H-2](#)

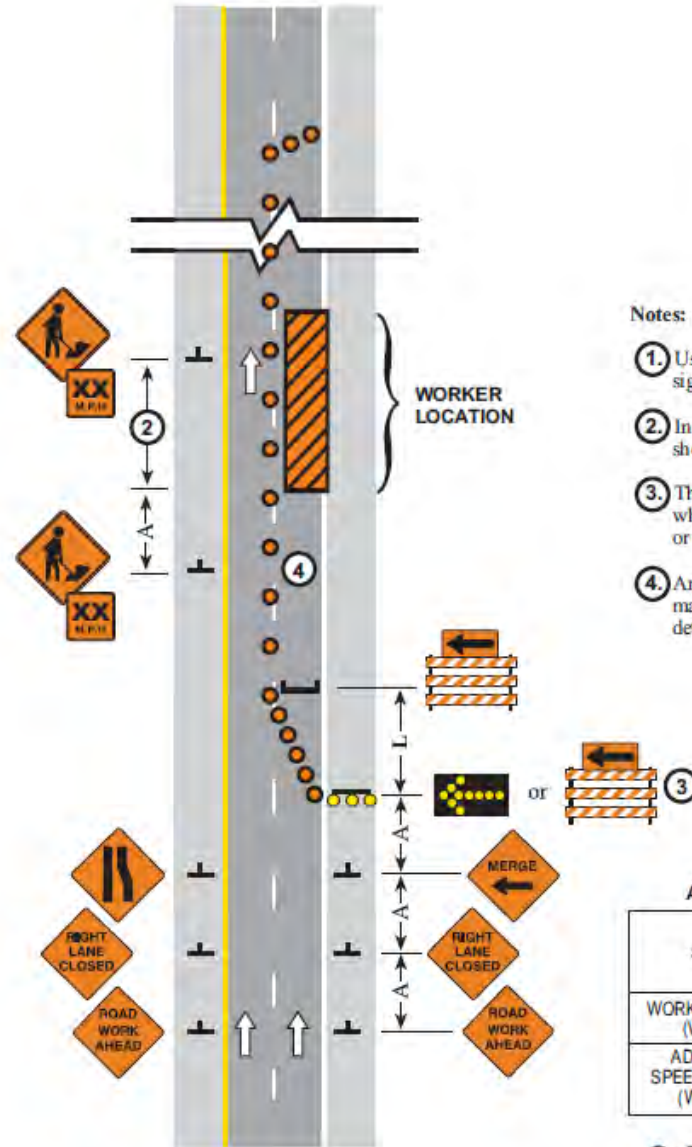
Can be as effective as regulatory speed limit





# Advisory Speed Layout

Posted Speed Limit Prior to Work Starting mph	Advance Warning Sign Spacing - A - feet
0 - 30	250
35 - 40	325
45 - 50	600
55	750
60 - 65	1000
70 - 75	1200



**Notes:**

1. Use the appropriate layout for advance signing and spacing.
2. In long work zones, this sign assembly should be repeated at 1 mile intervals.
3. The flashing arrow panel shall be used when the posted speed limit is 45 mph or greater.
4. An OPTIONAL Dynamic Speed Display may be used. See Layout 4 for spacing details and sign specifications.

**Minimum Sign Sizes For Advisory Speed Limit Signing**

Sign	Posted Speed Limit Prior to Work Starting	
	0 - 40 mph	45 - 75 mph
WORKER AHEAD (W21-1)	36" x 36"	48" x 48"
ADVISORY SPEED PLAQUE (W13-1P)	18" x 18"	24" x 24"

● - Retroreflective channelizing device.



# Workers Present Speed Limit

- ▶ Regulatory speed limit
  - Engineering study not needed
  - Required 45 mph under certain conditions
  - Or agency determined
    - At MnDOT – District Traffic Engineer or designee
  - **Workers have to be present**
- ▶ What can the speed limit be?
  - Required 45 mph under certain conditions
  - No more than 20 mph reduction – existing 55 mph or greater
  - No more than 15 mph reduction – existing 50 mph or less



# Workers Present Speed Limit

## ▶ Application

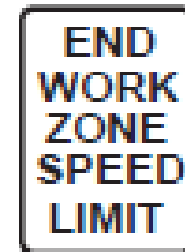
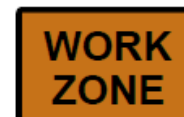
- For worker safety, established in short-term projects during continuous worker activity when workers are present and are adjacent to moving traffic.

## ▶ Examples:

- Pavement repair, loop detector installation, M&O, concrete joint repair & crack sealing.



W3-5



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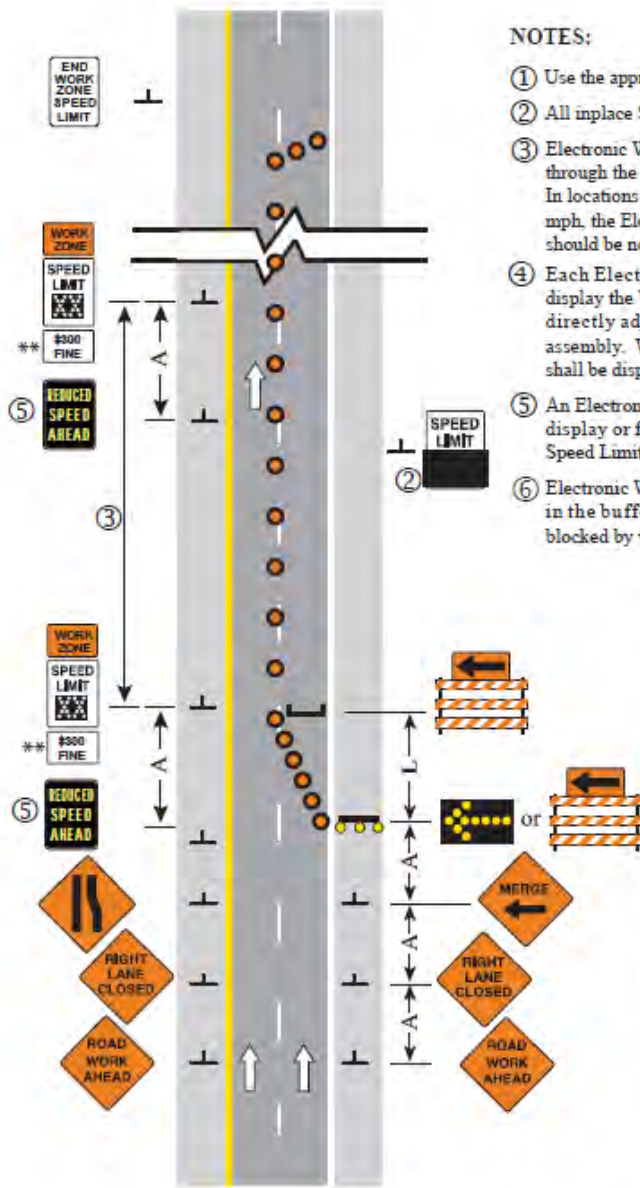




# Electronic Workers Present Speed Limit - Multilane

## NOTES:

- ① Use the appropriate layout for temporary traffic control.
- ② All inplace Speed Limit signs shall be removed or covered.
- ③ Electronic Workers Present Speed Limit assemblies shall be placed through the length of the activity area no greater than 1 mile apart. In locations with a Workers Present Speed Limit of less than 40 mph, the Electronic Workers Present Speed Limit assemblies should be no greater than 1/2 mile apart.
- ④ Each Electronic Workers Present Speed Limit assembly shall display the Workers Present Speed Limit when workers are present directly adjacent to traveled lanes in the segment beyond the assembly. When workers are not present, the inplace Speed Limit shall be displayed.
- ⑤ An Electronic Reduced Speed Ahead sign (may be electronic display or flip board) should be used when the Workers Present Speed Limit is more than 10 mph below the inplace speed limit.
- ⑥ Electronic Workers Present Speed Limit assemblies may be placed in the buffer or work space as long as the assemblies are not blocked by vehicles or devices.



Sign	Minimum Sign Sizes	
	Posted Speed Limit Prior to Work Starting	
	≤40 mph	>40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (Electronic Display or Flip Board)	24" X 30"	36" X 48"

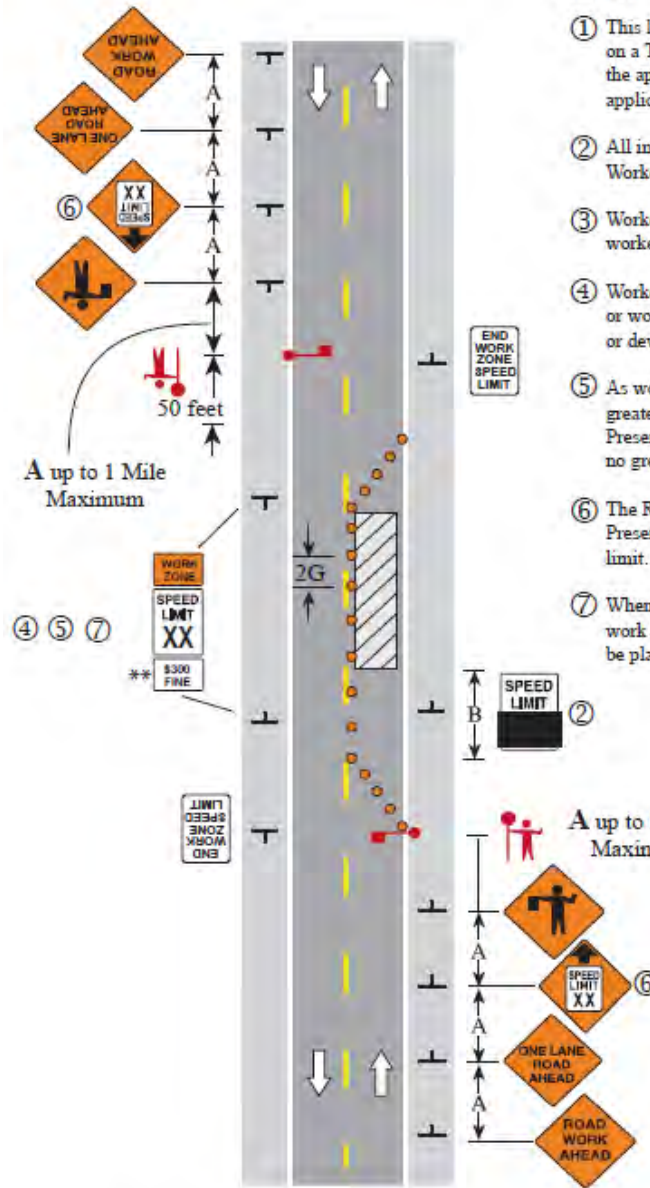
\*\* - Optional

● - Retroreflective channelizing device.



# Workers Present Speed Limit

## 2-lane, 2-way



### NOTES:

- ① This layout shows an application of Workers Present Speed Limits on a Two-Lane Two-Way Road with Flaggers as an example. Use the appropriate layout for temporary traffic control for other applications on Two-Lane Two-Way Roads.
- ② All in-place Speed Limit signs shall be removed or covered when the Workers Present Speed Limit is implemented.
- ③ Workers Present Speed Limit assemblies shall be removed when workers are not present directly adjacent to traveled lanes.
- ④ Workers Present Speed Limit assemblies may be placed in the buffer or work space as long as the assemblies are not blocked by vehicles or devices.
- ⑤ As workers proceed through the work area, the assembly shall be no greater than 1 mile in advance of the work crew. For Workers Present Speed Limits of less than 40 mph, the assembly should be no greater than 1/2 mile in advance of the work crew.
- ⑥ The Reduced Speed Ahead sign should be used when the Workers Present Speed Limit is more than 10 mph below the in-place speed limit.
- ⑦ When workers are present adjacent to traveled lanes throughout the work area, confirming Workers Present Speed Limit assemblies may be placed according to the Spacing Table below:

Workers Present Speed Limit (mph)	Assembly Spacing (mile)
< 40	1/2
≥ 40	1

Sign	Posted Speed Limit Prior to Work Starting	
	≤ 40 mph	> 40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"



# Workers Present Speed Limit

Documentation critical:

- Enforcement
- Tort liability

## WORKERS PRESENT SPEED LIMIT DOCUMENTATION FORM

Road Name	Control Section
Road Authority	
Existing Speed Limit	Posted Workers Present Speed Limit

Whereas it is necessary to perform maintenance/construction roadwork in a safe and efficient manner, therefore, the following changes in maximum speed limits shall be made to the described roadway sections. Changes authorized herein are in accordance with Minnesota Highway Traffic Regulation Act, Minnesota Statutes Chapter 169.14, Subd. 5d.

### Location

FROM \_\_\_\_\_ TO \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

### Location

FROM \_\_\_\_\_ TO \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

### Location

FROM \_\_\_\_\_ TO \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

### Location

FROM \_\_\_\_\_ TO \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

Signature \_\_\_\_\_ Time/Date Installed \_\_\_\_\_

Use fixed physical features such as intersections and bridges or the distance from these features to describe from/to locations. Reference Points (mileposts) may be used if accurately identified. DO NOT USE signs, poles, barricades, or temporary devices.



# Contractor responsibility

- ▶ Reduced speed only when workers present in adjacent lane within 1 mile of the reduced speed limit sign.
- ▶ Signs must be taken down when workers leave.
- ▶ Document





# 24/7 Construction Speed Limit

- ▶ Authority
  - Regulatory speed limit allowed by [MN Statute 169.14 Subd 4](#), same statute as permanent regulatory speed limits
  - Established by Commissioner as recommended by District Traffic Engineer (requires “engineering and traffic investigation”)
- ▶ Engineering and traffic investigation
  - Traffic Control Plan, idea of staging, location of geometric issues, narrative with reasons why.
- ▶ Speed limit should be monitored and verified that it is appropriate for activities
  - Investigation is done prior to the actual set-up



# 24/7 Construction Speed Limit

## ▶ Application

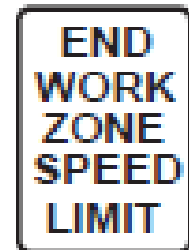
- Regulatory speed limit intended for **24 hour** posting where motorists must reduce speeds **to safely navigate** the work zone. Primarily for driver safety.
- Typical 10 mph reduction – research shows that compliance to 10 mph reduction much more likely than greater speed limit reductions

## ▶ Examples

- Bypasses, shoulder drop-offs, narrow lanes, grade separations, and pavement repair.



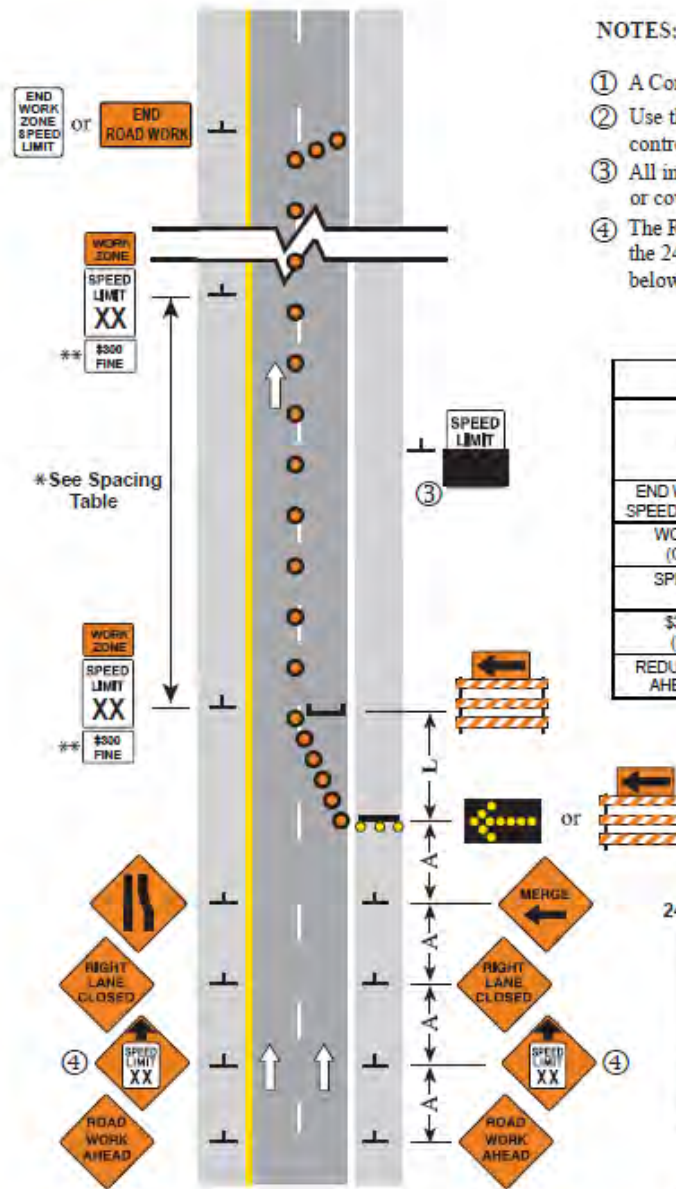
W3-5



\*\*



# 24/7 Construction Speed Limit



## NOTES:

- ① A Commissioners Authorization is required.
- ② Use the appropriate layout for temporary traffic control.
- ③ All in-place Speed Limit signs shall be removed or covered.
- ④ The Reduced Speed Ahead sign should be used when the 24/7 Construction Speed Limit is more than 10 mph below the in-place speed limit.

Sign	Minimum Sign Sizes	
	Posted Speed Limit Prior to Work Starting	
	≤40 mph	>40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-6aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"

## \* Typical Spacing For 24/7 Construction Speed Limit Signs

24/7 Construction Speed Limit mph	Sign Spacing mile
≤ 25	1/4
30 - 35	1/2
40 - 45	3/4
≥ 50	1

\*\* - Optional

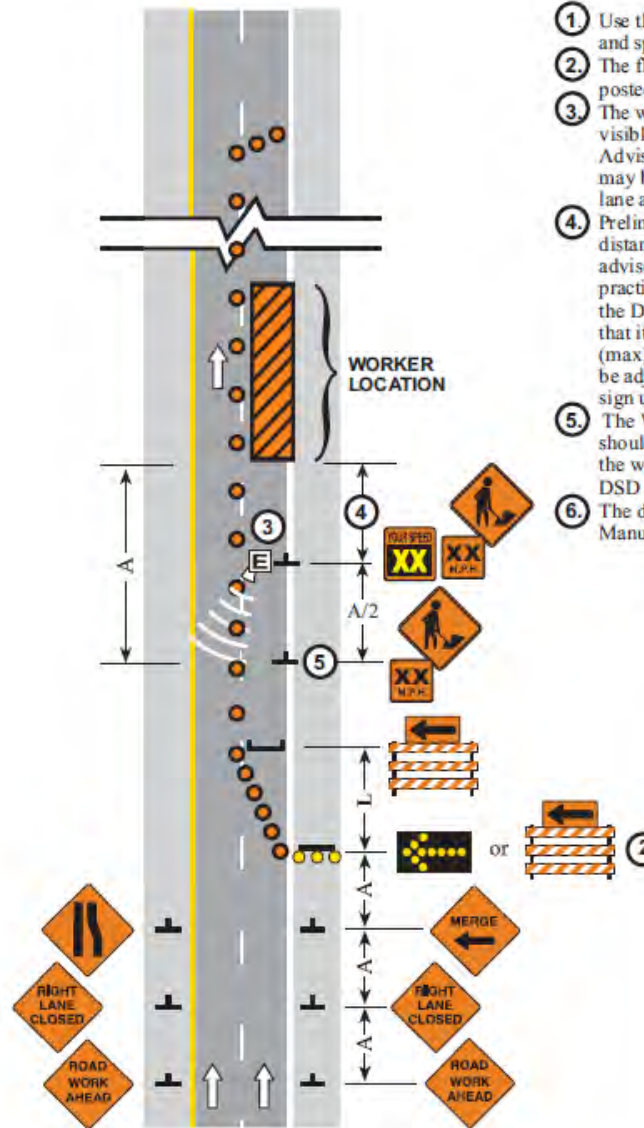
● - Retroreflective channelizing device.

# Speed Limits on Detours

- ▶ Regulatory speed limit allowed by [MN Statute 169.14 Subd 4](#), same statute as permanent regulatory speed limits
- ▶ Follow procedures similar to setting permanent speed limit
- ▶ However – not a work zone



# Dynamic Speed Display Signs



## Notes:

- ① Use the appropriate layout for advance signing and spacing.
- ② The flashing arrow panel shall be used when the posted speed limit is 45 mph or greater.
- ③ The work crew (or poor road condition) should be visible to the driver from the point of viewing the Advisory Speed Plaque and DSD sign display. It may be located on either side of the open traffic lane as space allows for the equipment.
- ④ Preliminary studies show 'A' is the optimum distance for speed reduction, therefore, it's advised to maintain that distance as much as practical. As workers move within the work zone, the DSD location should be re-positioned such that it remains within 300 feet (min) and 600 feet (max) of the worker location. The distances may be adjusted following further studies of the DSD sign usage in work zones.
- ⑤ The Warning Sign with Speed Advisory Plaque should be placed a minimum distance 'A' ahead of the workers and approximately 'A/2' ahead of the DSD device location.
- ⑥ The distances 'A' and 'L' are found in the Field Manual (MnMUTCD Part 6K) Distance Charts.

● - Retroreflective channelizing device.

## MINIMUM SPECIFICATIONS on DSD SIGN EQUIPMENT

Display size of the DSD sign is dependent on the size of the speed plaque used.

Plaque size	DSD display MIN.
18" X 18"	10" character
24" X 24"	10"
30" X 30"	14" character
36" X 36"	14"

The static sign (YOUR SPEED) should be black letters on a **fluorescent orange** background when used with a work zone advisory speed plaque. The font should be a minimum of 4" high when used with a 10" display character, and 6" when used with a 14" or greater character display sign.



# Dynamic Speed Display Sign



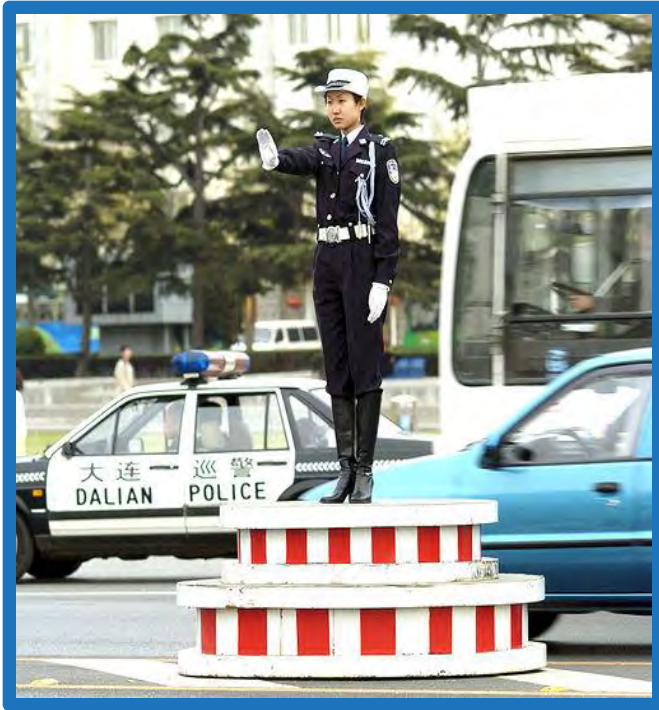
Trooper Brian Gibbs – Patrol 2900  
Brent Holland – MnDOT D4 Maintenance <sub>56</sub>

# Additional thoughts

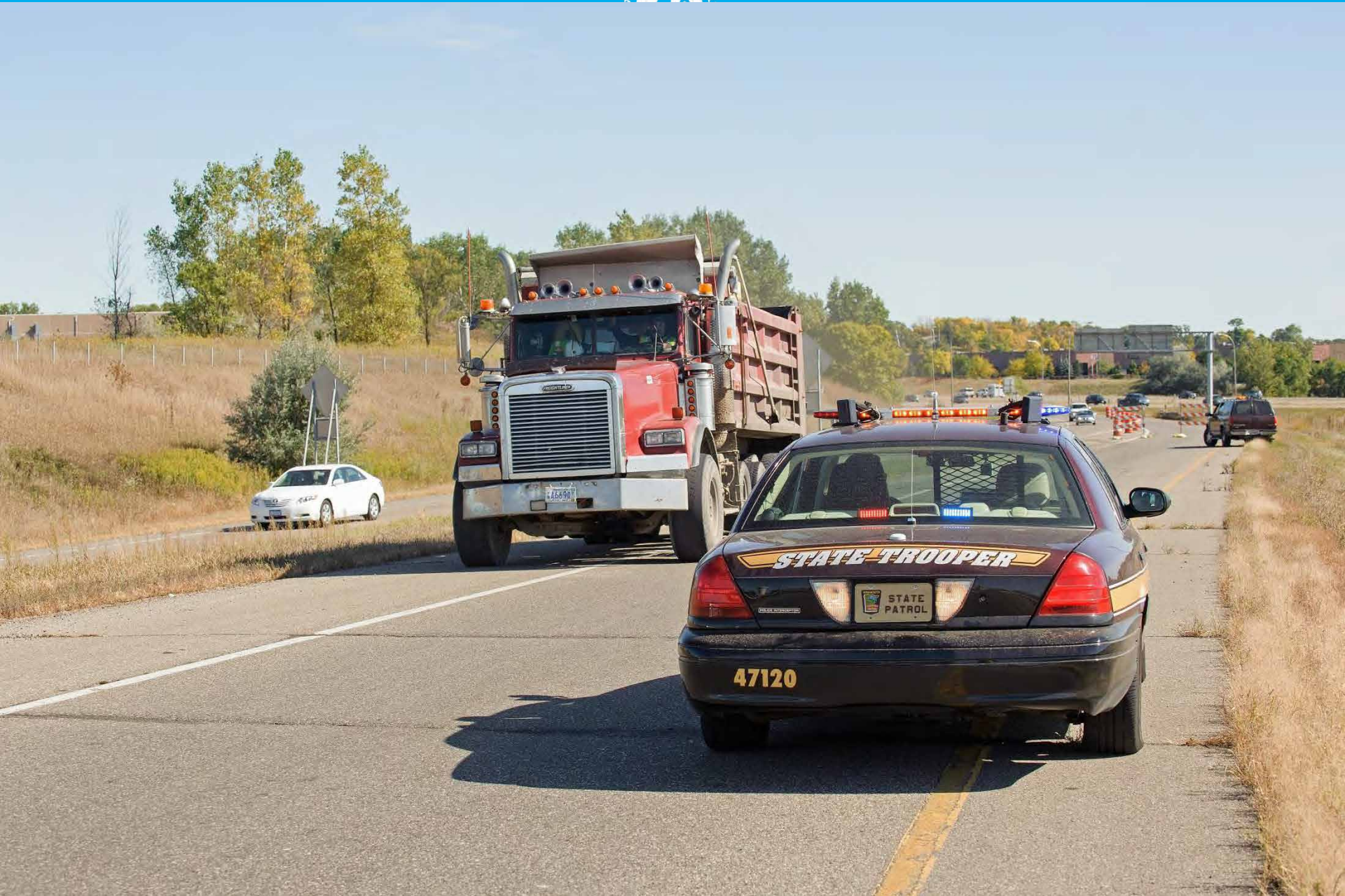
- ▶ Don't reduce speeds for the sake of reducing speeds – if enforcement is not there, you'll increase the speed differential – leading to a less safe flow
- ▶ Proper TTC set up following the Traffic Control Plan, the MN MUTCD & Field Manual – primary way to keep work zone as safe as possible
- ▶ 24/7 Construction Speed Limit with Workers Present Speed Limit
  - CPR job – lane reduction on rural freeway
- ▶ Regulatory speed limits in work zones
  - \$300 fine in all work zones



# Extraordinary Enforcement







# Extraordinary Enforcement

- ▶ Use State Patrol for safety of workers/public
- ▶ State Patrol is effective when used in proximity to the work
- ▶ Restricted to MnDOT Construction Projects
- ▶ Requests (including estimated costs) go to the State Construction Engineer
- ▶ Hourly fees are reassessed periodically



# Extraordinary Enforcement

## ▶ How to help enforcement

- Clear direction
- Where to work from
- (See Capt. Lemon's slides)
- Speed Limits
  - Presence
  - Enforcement
- Truck Safety Inspection
- Enforce Detours
- Zipper Merge



# Informal partnering

- ▶ MnDOT Maintenance and State Patrol
- ▶ Could work with local agencies





TAKE  
TURNS



TAKE TURNS  
AT MERGE

I DO THE  
**ZIPPER**  
*Merge*.org







# How to help enforcement

- ▶ See Captain Lemon's list
- ▶ Cameras
- ▶ Wrong Way Response
- ▶ Consider Enhanced Reference Markers



Between Exit 256B: MN 194; 5th Avenue West and Exit 258 (near Duluth). The roadway is reduced to one lane. There is a width limit in effect. Bridge inspection work is in progress. Width limit 13'0". Until Friday, at about 3:00PM CST.

*Comment:* On I-35 at the junction of Lake Avenue, alternating lane closures due to bridge inspections. Daytime restrictions only.





# How to help enforcement



▶ Contact info to dispatch



# How to help incident response

- ▶ Plan for incident response in the Transportation Management Plan
- ▶ Tow trucks clearing crashes



# ENGINEERING AND LAW ENFORCEMENT

Working Together in Work Zones



# INTRODUCTIONS

- Captain Charles Lemon
  - Duluth District 2700



# STRATEGIES AND SUGGESTIONS FOR WORK ZONE DESIGNS.

- Work with MnDOT, local law enforcement, EMS and tow companies (pre, during and post) work zone!
- Establish shoulders for enforcement
- Establish crash pull off areas within the zone
- Ensure safe areas for extra ordinary enforcement
  - Moving Zones
  - Road Closures
- Discuss special events
  - Grandmas Marathon
  - Tall Ships



# ENFORCEMENTS ROLE

- Traffic Safety!
- Safety for the workers in the zone!
- Safety of other Emergency Workers!
- Your Safety!

Change Behavior through enforcement!



# KEY TO SAFETY

Get clear of the zone as soon as possible!



# CRASHES ON THE FREEWAY





# SEMI WITH BOULDERS VIDEO



# PRESENCE VS. EXTRAORDINARY ENFORCEMENT

- Presence
  - Is used to ensure safe transportation for the public and workers within Work Zones (Reactive).
- Extra Ordinary Enforcement
  - Active enforcement of laws within the Work Zones (Proactive)



# MOVE OVER LAW

- Who does this law apply?
- Defined As: If traveling on a roadway with two or more lanes, keep a lane away when passing a stopped...
- **Ambulance**
- **Law Enforcement Vehicle**
- **Fire Truck**
- **Maintenance or Construction Vehicles**
- **Or stalled vehicles**



# DISTRACTED DRIVING

Distracted or inattentive driving is when a driver engages in any activity that might distract them from the primary task of driving — and increases their risk of crashing. –MnDPS

Distracted by:

- Cell phone use
- Passengers
- Grooming
- Eating
- Reaching
- Remember these same drivers are in Work Zones!



2012-08-18 01:32:19 PM



# WORK ZONE CRASH AT INTERSECTION!



# 160.2715 RIGHT-OF-WAY USE; MISDEMEANORS.

- (a) Except for the actions of the road authorities, their agents, employees, contractors, and utilities in carrying out their duties imposed by law or contract, and except as herein provided, it shall be unlawful to:
  - (14) drive over, through, or around any barricade, fence, or obstruction erected for the purpose of preventing traffic from passing over a portion of a highway closed to public travel or to remove, deface, or damage any such barricade, fence, or obstruction.
- (b) Any violation of this section is a misdemeanor



# JEEP CRASHING INTO ZONE VIDEO





T H 52 / I - 494 E  
554



# WEAR YOUR SEATBELT! IT'S THE LAW



Minnesota's Primary Seat Belt Law  
went into effect on June 9, 2009



# Traffic Violation Fines

- Seat Belt - \$25 + \$85 Admin Fee = \$110
- Move Over Law - \$50 + \$85 admin fee = \$137
- Texting - \$50 + \$85 admin fee = 135
  - 2<sup>nd</sup> offense \$225 + \$85 = \$310
- Speeding - \$300

**Remember: All speed fines DOUBLE in work zones no longer exists! The fine for speed in an active work zone is \$300.**



# DYNAMIC LATE MERGE SYSTEM “ZIPPER METHOD”

- The purpose of this system is to provide guidance to motorist on proper lane usage



# TOWARD ZERO DEATHS

- MISSION: To create a culture for which traffic fatalities and serious injuries are no longer acceptable.
- State Wide Goal: Fewer than 300 traffic-related fatalities—and fewer than 850 serious injuries—by 2020
- STATS: 2015, 411 people killed





# Questions?

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