Minnesota LTAP
University of Minnesota

Department of Transportation

Center for Transportation Studies
University of Minnesota

Thank you to the LMC for MN LTAP's participation!

We are the University of MN –

Just having fun with our good neighbor to the east!

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MN LOCAL TECHNICAL ASSISTANCE PROGRAM (MnLTAP)

Local Agencies – We're Here for YOU!

MINNESOTA LTAP
UNIVERSITY OF MINNESOTA

MnLTAP: Training and Education

- Annual Sponsored Events
  - Roadway Maintenance Training & Demo Day *(Cloquet – 5/29/25)*
  - Fall Maintenance Expo *(St. Cloud – 10/1-10/2/25)*
- Variety of Technical Workshops (Scheduled and On-Site)
  - **Asphalt Pavement Rehabilitation**
  - **Culvert Installation & Maintenance**
  - **Gravel Roads Maintenance and Design**
- Online Courses (always on-demand)

❖Visit our Training and Events Calendar for current offerings

MnLTAP: Resources

- Exchange
- Bi-weekly LTAP E-News
- Topical resource references
- Comprehensive website
- Library services
- Videos

MnLTAP Programs

1. Roads Scholar Program
2. OPERA & Mousetrap
3. Truck Weight Education Program
4. Work Zone Safety Training Program

ROADS SCHOLAR PROGRAM

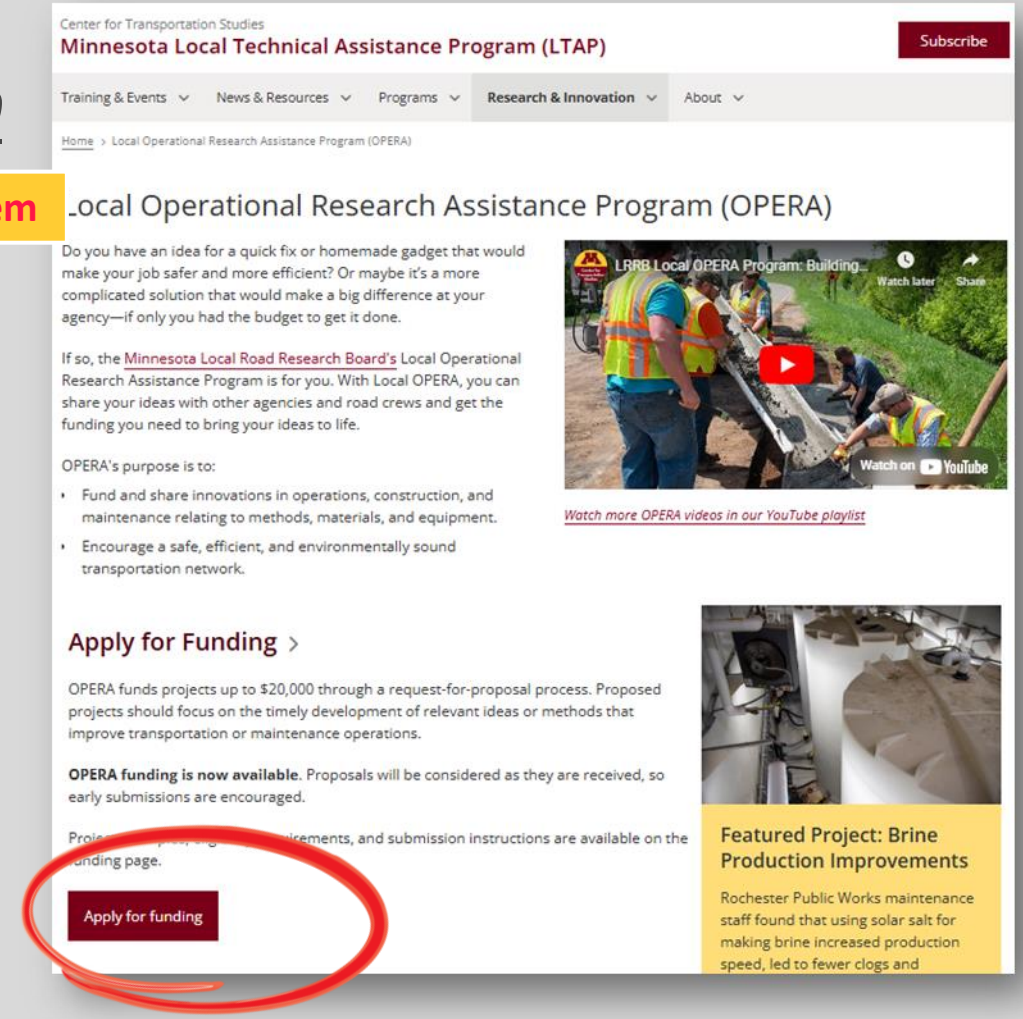
Three Certificates:

1. Maintenance Operations and Technical
2. Leadership, Supervisory, and Operations Management
3. Civil Engineering Technician Level I

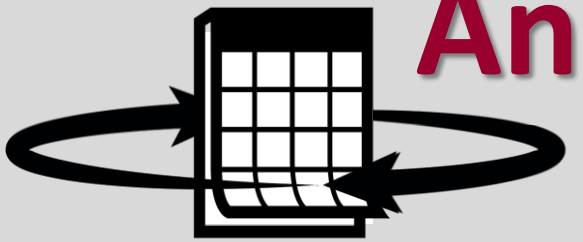
LOCAL OPERATIONAL RESEARCH ASSISTANCE (OPERA) PROGRAM

✓Innovation Sharing & available funds up to ***$20,000***

Barn Owl weather monitor system



MN Build a Better Mousetrap Competition



Annual Competition, Enter Anytime!

Two Awards Available

- Minnesota Pioneer Award
- Minnesota SMART Transformation Award

Who is Eligible to Enter?

All local Minnesota transportation agencies

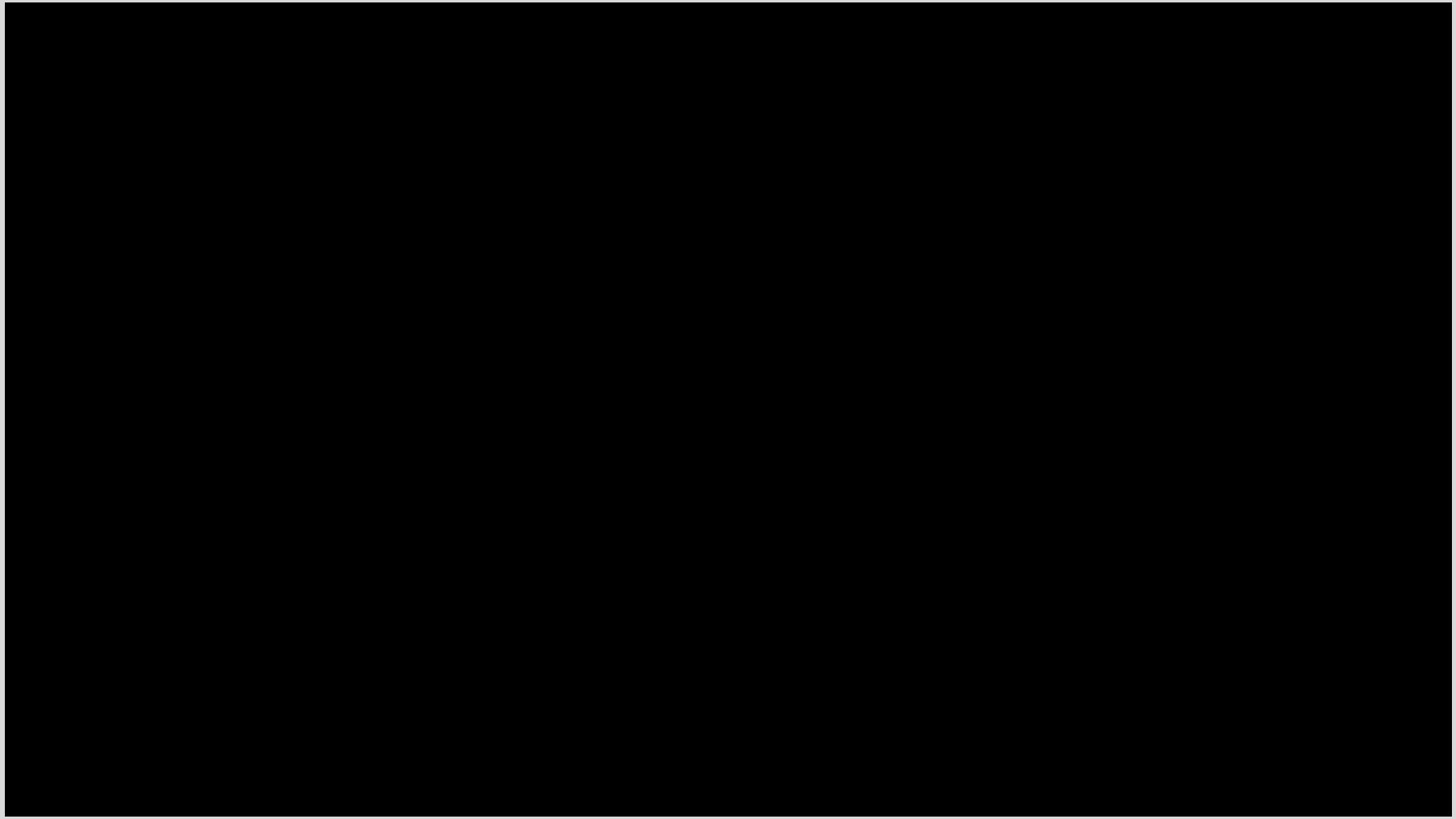
TRUCK WEIGHT EDUCATION PROGRAM (TWEP)

A Minnesota educational program to protect public roadway damage through voluntary commercial vehicle weight compliance.

TRUCK WEIGHT EDUCATION PROGRAM

- Training
- Technical Assistance
  - 1:1
  - Truck Scale Weighting
  - County Road and Permitting Information
- Outreach

TRUCK WEIGHT EDUCATION PROGRAM



WORK ZONE SAFETY PROGRAM INTRODUCTORY OVERVIEW

Safety!

- *MN LTAP works with agencies looking to educate their workers on the safe application of Traffic Control measures*

- *Creating a safe environment for workers, traffic, & the public!*

Funding and Educational Partnership

MINNESOTA LTAP
UNIVERSITY OF MINNESOTA

CENTER FOR TRANSPORTATION STUDIES
UNIVERSITY OF MINNESOTA

DEPARTMENT OF TRANSPORTATION


No job is so important in maintenance or construction, and no service so urgent, that we cannot take time to perform our work safely.
MINNESOTA

2025 National Work Zone Awareness Week

April 21 – 25

2025 National Work Zone Awareness Week
April 21 – 25

- **<u>Work Zone Safety Training Day</u>**

  Monday April 21, 2025

  ➢ *Companies encouraged to pause during the workday for safety demonstrations, discussions about safety policies and other prevention steps*

In 2021 there were 105,000 accidents in work zones in the USA

42,151 Injuries

954 Deaths

On average **55** workers are killed each year


L
JUL 30 2008
10:32:25 PM

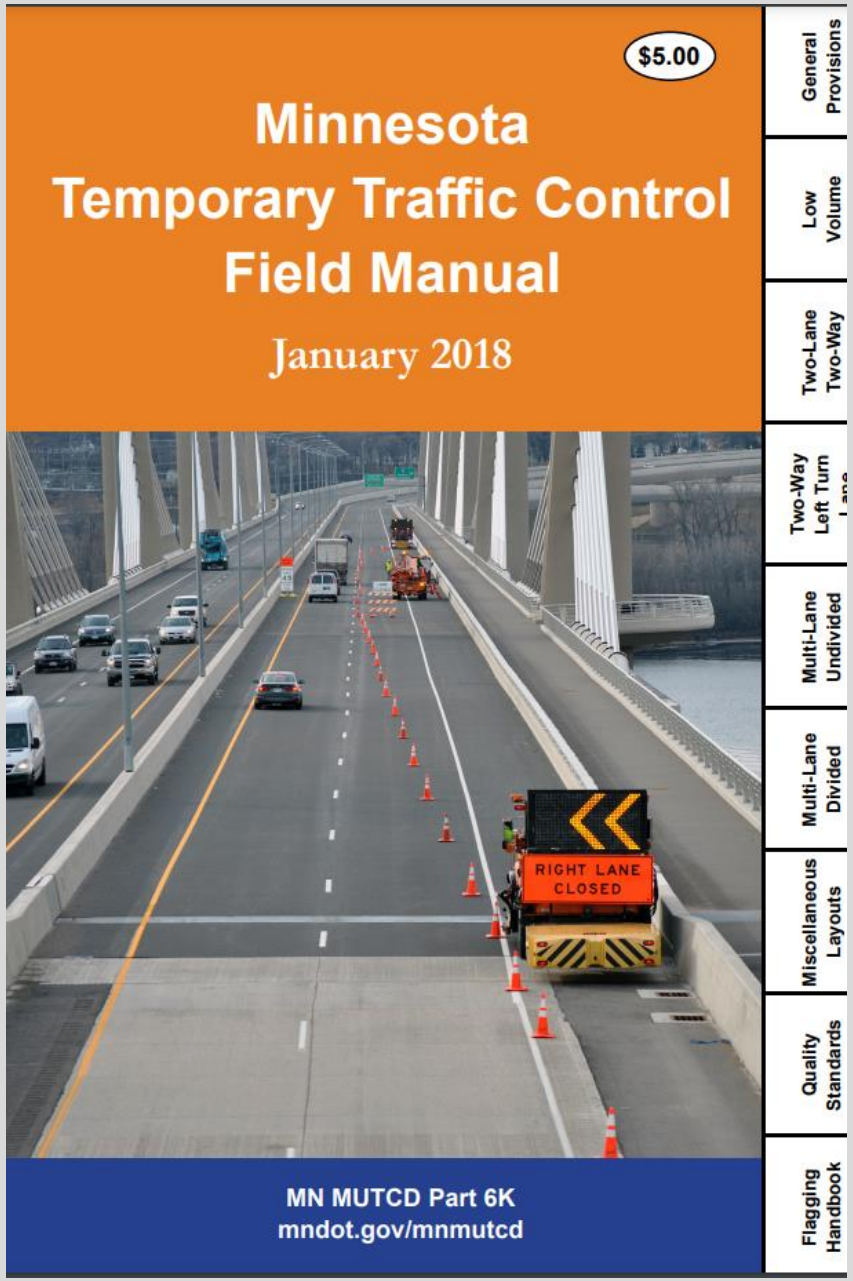

ABC13 Courtesy Andrew Wolf 2019
IDEALEASE

According to the MN Dept of Public Safety & Dept of Transportation

In 2021 Minnesota work zone crashes were totaled at 2,498 with 10 fatalities

In 2022 Minnesota work zone crashes were totaled at 2,010 with 13 fatalities

Between 2013 & 2021 work zone fatalities have increased **61%**



Minnesota Temporary Traffic Control Field Manual January 2018

The MN TTC Field Manual is updated every 5 years - Next updated manual is scheduled for 2025 release

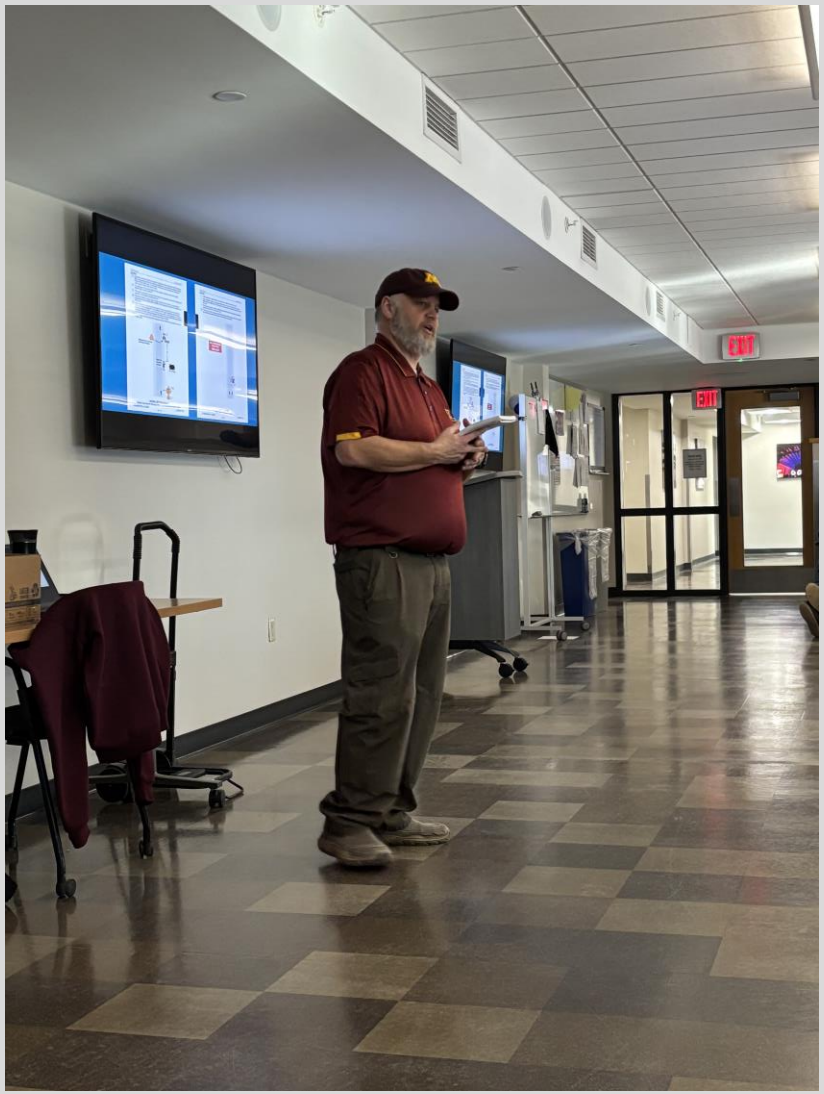
Minnesota Temporary Traffic Control Field Manual 2018

- ✓ The 2018 Field Manual contains:
  - ✓ typical traffic control layouts that all state, county and city roadway operations staff should use
- ✓ The above link directs you to MNDOT's website with all the sections available in PDF form

The MN Temporary Traffic Control (TTC) training class breaks down the field manual

- ✓HOW to use it
  - ✓Terminology
  - ✓Types of Roadways
  - ✓Types of Equipment
  - ✓Scenarios for appropriate WZ set up

The Field Manual instructs workers how to SAEFLY set up the work-zone



Compliance Levels

Shall:

Indicates a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device

Should:

Indicates a statement of recommended practice, but not mandatory, in typical situations, with deviations allowed if engineering judgement or engineering study indicates the deviation to be appropriate

May:

Indicates a statement of practice that is a permissive condition and carries no requirement or recommendation

Key Terminology

Average Daily Traffic (ADT)

The average 24-hour volume of traffic

Decision Sight Distance (D)

The total distance traveled during the length of time required for a driver to:

1. Detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered,
2. Recognize the hazard or its potential threat,
3. Select an appropriate speed and path, and
4. Initiate and complete the required maneuver safely and efficiently

Key Terminology

6K-d, 6K-e

Duration

Is the length of time <u>any</u> work operation occupies:

1) *a specific location or*
2) *causes a traffic obstruction without changing the location.*

Key Terminology

6K-d, 6K-e

Duration Definitions:

- Mobile - when an operation is continuously moving or stopped in one location for periods of 15 minutes or less.
- Short Duration - when an operation stays in one location during daylight conditions from 15 minutes to 1 hour.
- Short Term - when an operation stays in one location during daylight conditions from 15 minutes to twelve hours.
- Intermediate Term/Night - when an operation stays in one location during daylight conditions from 15 minutes to no more than three days or stays in one location during hours of darkness.
- Long Term - when an operation stays in one location for more than three days

TTC General Guidelines and Responsibilities

- ✓Be trained and qualified for the work you are doing
- ✓Keep devices clean and in position
- ✓Remove/Cover unnecessary devices
- ✓Keep traffic control records
- ✓Perform and document routine day and night inspections

Selecting the Appropriate Layout

Determine type of road

- Low Volume Rural/Residential
- Two-Lane, Two-Way (intermediate and all ADT's)
- Two-Way Continuous Left Turn Lanes
- Multi-Lane Undivided
- Multi-Lane Divided

Selecting the Appropriate Layout

- Low-volume: Less than 400 ADT
- Intermediate-volume: Up to 1,500 ADT
- All ADTs

Selecting the Appropriate Layout

Determine type of work space

Where is the work happening?

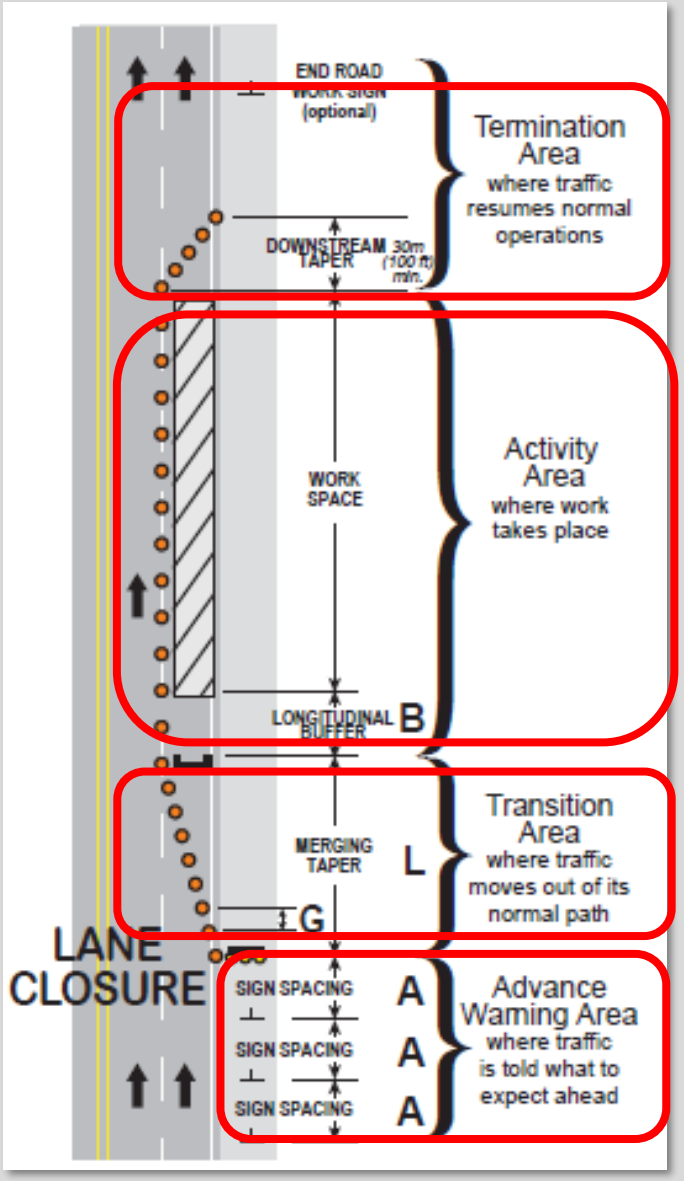
- In a travel lane
- On the shoulder
- In the Ditch
- In the center of the roadway

Selecting the Appropriate Layout

Determine the Duration

- Mobile: up to 15 minutes
- Short Duration: up to 1 hour
- Short Term: 12 hours or less
- Intermediate Term: up to 3 days
- Long Term: more than 3 days

Components of a Traffic Control Zone



Installing the TTC Zone

- A lane width of 10 feet **should** be provided, anything less, **shall** be approved by the road authority

Installing the TTC Zone

- After all devices are installed:

  ✓drive through the work zone to ensure all devices are properly placed and in visible locations.


TO WISCONSIN
MINNESOTA
ROAD WORK AHEAD
COFFEE MILL INN & SUITES

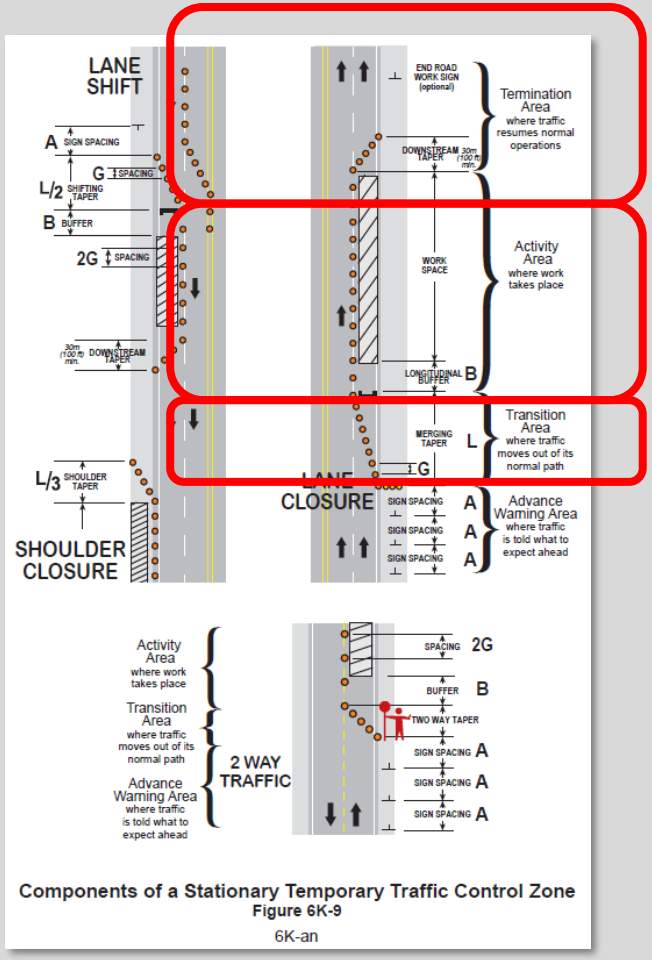
Roadside Safety

6K-n to 6K-o

- Provide clear zones where practical

- Work equipment, personal & work vehicles, materials, and debris should be stored to reduce probability of impact by run-off-road vehicles

Removing the TTC Zone



Components of a Stationary Temporary Traffic Control Zone
Figure 6K-9
6K-an

Remove devices in *opposite* order, **especially devices in the termination, activity and transition areas**

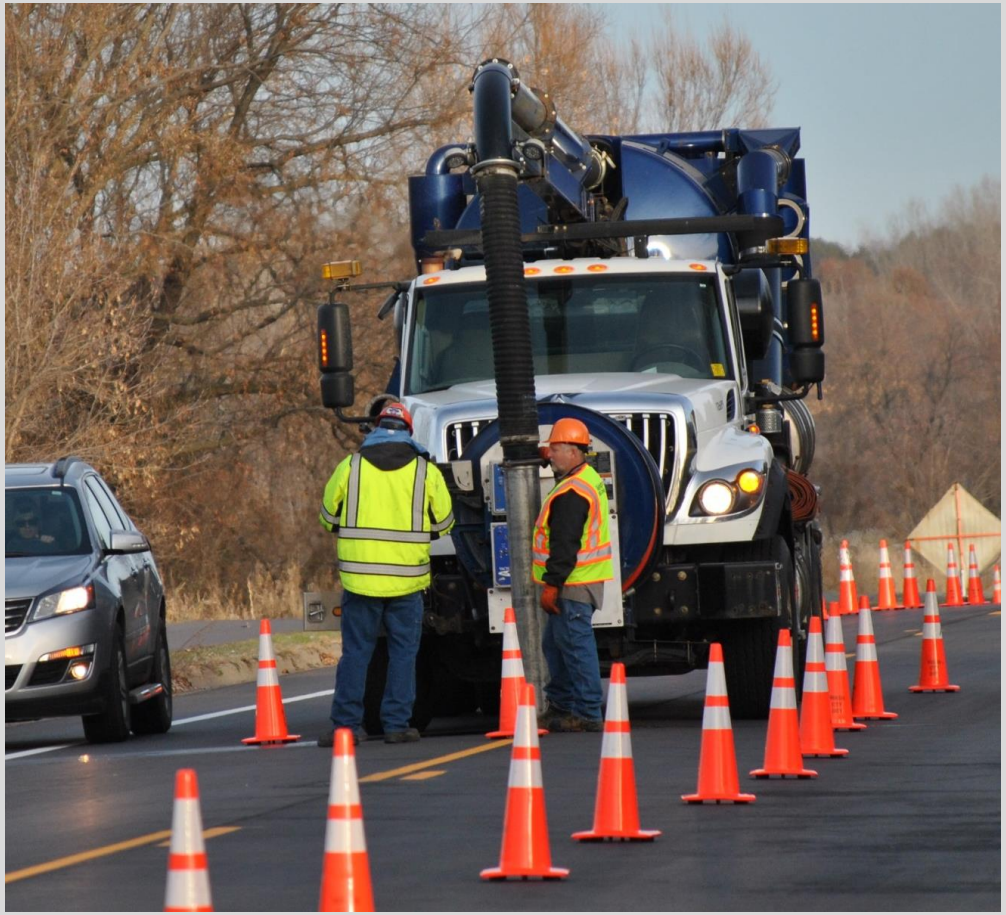
Equipment and Temporary Traffic Control Devices

- High visibility clothing
- Vehicle warning lights
- Channelizing devices
- Signing
- Arrow Board
- Portable Changeable Message Sign

Acceptable High Visibility Clothing

6K-r

- ANSI/ISEA 107-2015 Type R
- ANSI/ISEA 107-2020 Type R
- Clothing shall have an **attached original label** indicating performance class
- Check the tag to see how many wash cycles the garment is good for. Most garments are rated for **25** washes.
- In areas where a hardhat isn't required, a **High Visibility hat should be worn**



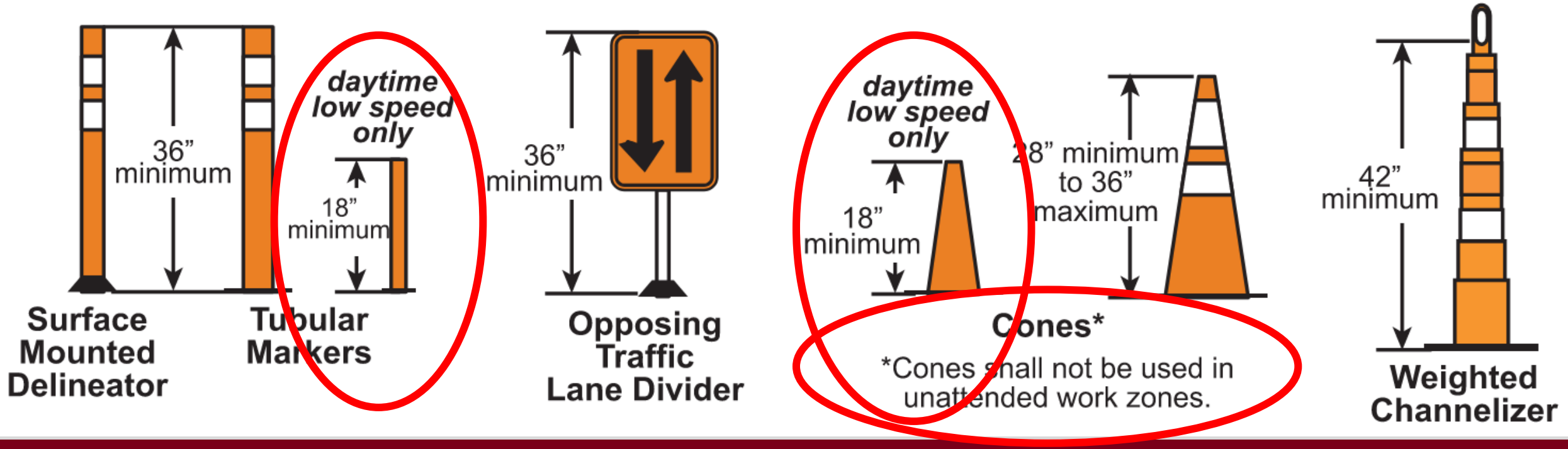
Vehicle Warning Lights

- Vehicle warning lights shall be visible 360° at a minimum height of 3 ½ feet and a radius of 60 feet or greater

Channelizing Devices

TYPE A CHANNELIZERS

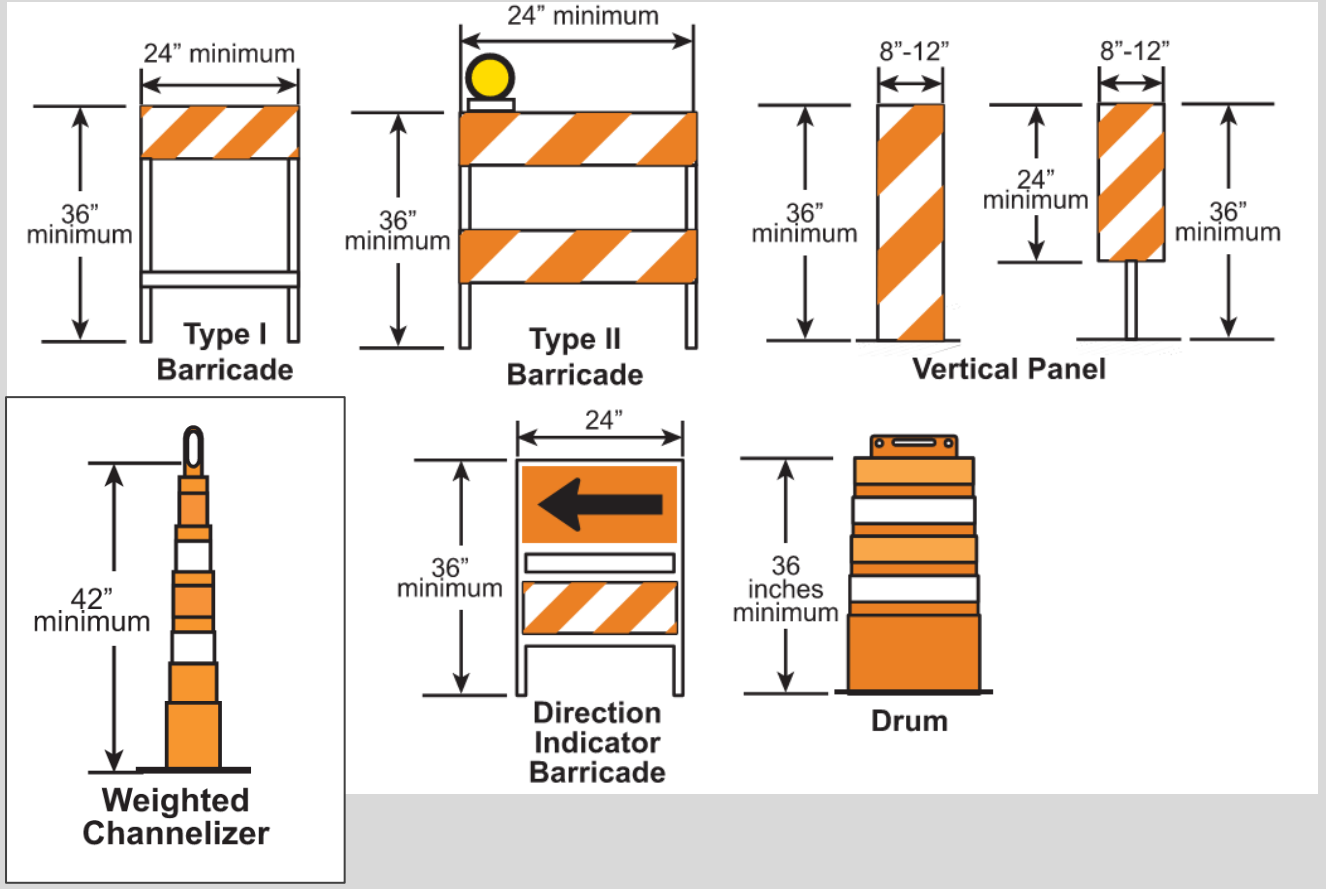
- Type A channelizing devices are typically used in attended Temporary Traffic Control zones.



Channelizing Devices

TYPE B CHANNELIZERS

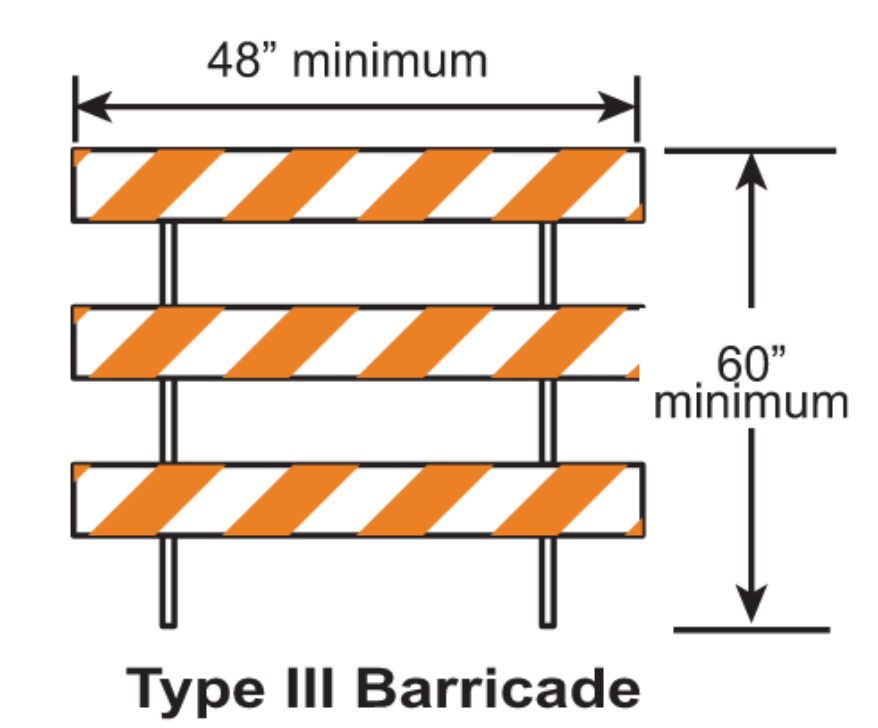
- Type B channelizing devices shall be used if the TTC zone will be installed for more than 12 hours or if left unattended
- ***Weighted channelizers*** may be used in lieu of a Type B Channelizer with the permission of the road authority. **When used, the spacing shall be reduced by 50 percent.**



Channelizing Devices

TYPE C CHANNELIZERS

- Orange diagonals shall slope down toward the traffic side.
- Signs mounted on Type III barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.
- Type A Flashing Warning Lights may be used - place on the side with traffic.



Type III Barricade

Work Zone Signing

- Signs mounted on temporary supports should not be placed in the open traveled lane

6K-u

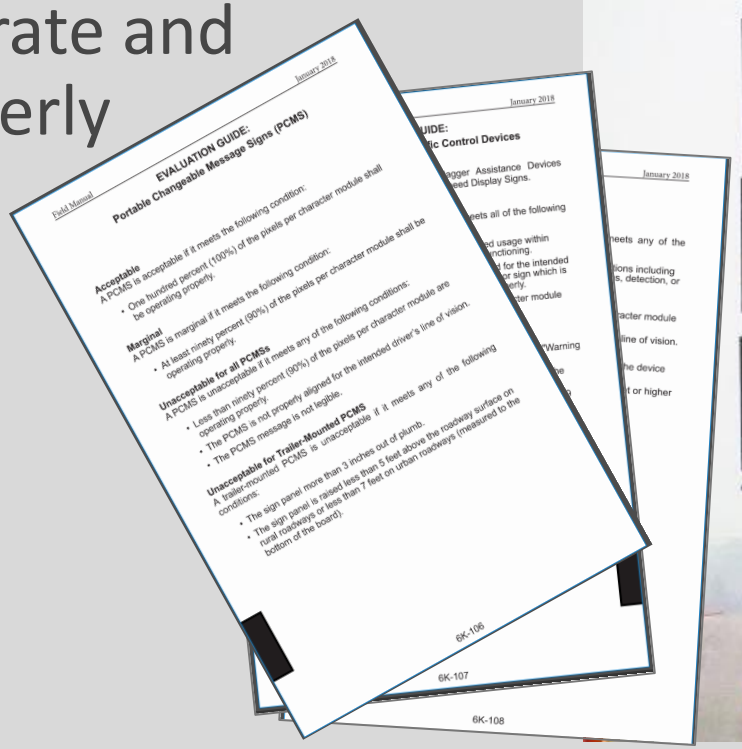
*Low speed = 40MPH and less

*High speed = 45MPH and greater

Portable Changeable Message Signs (PCMS)

Read all of the Requirements:

- Becoming more common place
- Very effective
- Need to be accurate and functioning properly




BEWARE!
ZOMBIES
AHEAD


THE ROADS
ARE WICKED
SLIPPERY!!!


ROGUE
PANDA ON
RAMPAGE
BOB'S


THE END
IS NEAR!
!!!!!!!!!

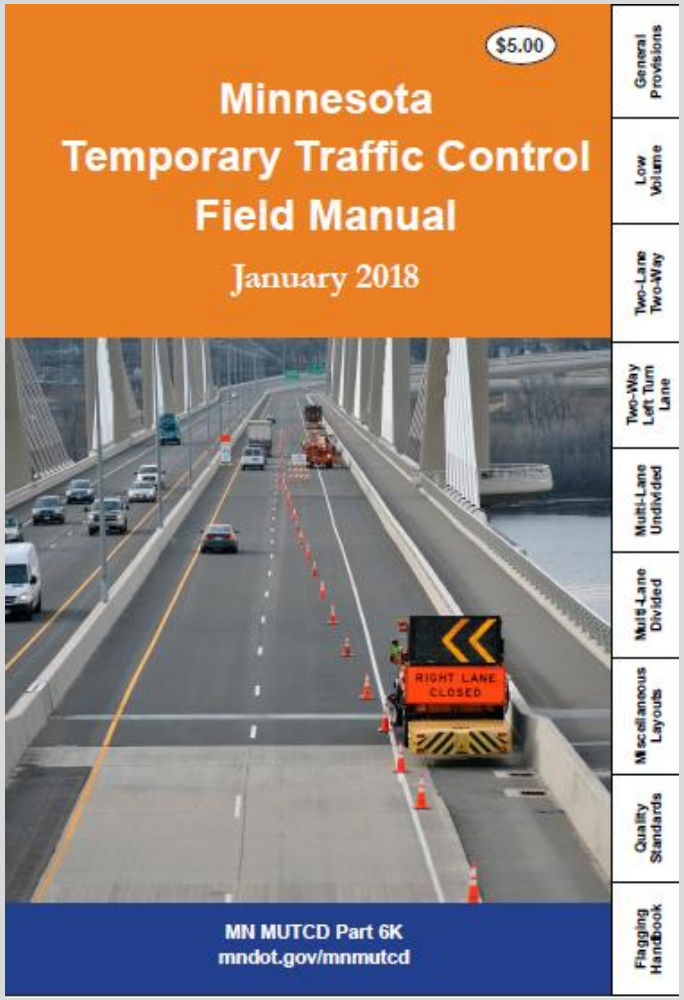

YOU'LL NEVER
GET TO WORK
ON TIME
HAHA!!


Music and Moonlight
Love and Romance
THERE MAY BE
TROUBLE AHEAD

How To Use The Field Manual

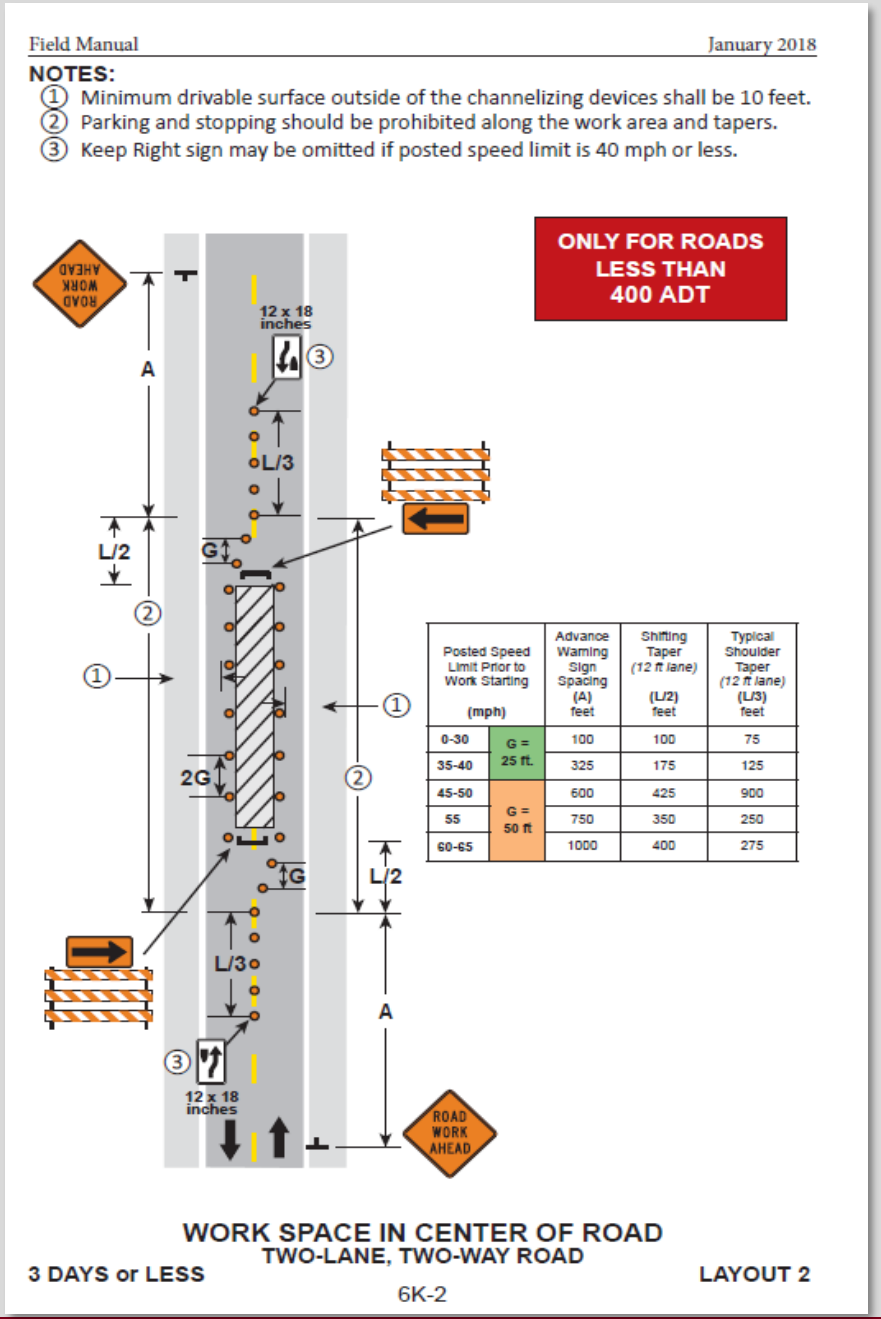
1. Become familiar with the General Provisions we discussed
2. Select the roadway type you will be working on
3. Use the layout selection matrix to find the layout(s) suggested
4. Find the suggested layout, read all of the notes to determine if this is the best for your situation
5. Use the Temporary Traffic Control Distance Charts and select appropriate spacing
6. Ensure you have the correct type and number of devices

Field Manual Sections



The layouts are divided primarily by the type of roadway

General Provisions	Low Volume	Two-Lane Two-Way	Two-Way Left Turn Lane	Multi-Lane Undivided	Multi-Lane Divided	Miscellaneous Layouts	Quality Standards	Flagging Handbook



Low Volume Layouts

Read all of the Notes

- Red Box – Less than 400 ADT
- 10 foot minimum driving surface
- Prohibit parking
- Keep Right Optional 40 mph or less

Distance chart on the layout

Low Volume Roads

LOW VOLUME ROADS: RURAL AND URBAN				
Low Volume Less than 400 ADT	MOBILE 15 Minutes or Less	SHORT DURATION 1 Hour or Less	SHORT TERM 12 Hours or Less	INTERMEDIATE TERM 3 Days or Less
Work Vehicle Parked On Shoulder	6		8	
Work on Shoulder	9		8	
Work off Shoulder	6			
Work off Roadway	10			
Shoulder or Parking Lane Closure	6			
Partial Shoulder Closure for Trailer Mounted Devices	7			
Lane Closure	11			
Uncontrolled	4			
One Flagger Control	4*			
2 Flagger Control	16*			
Moving Work Spaces	17 *			
Near Intersection	20*, 21*			
Near Railroad Xing	22*			
Pilot Car Operation	18*			
Flagging Crossroads and Blind Curves	19*			
Automated Flagger Assistance Device (AFAD)	24*			
Portable Signal Control	25			
STOP Sign Control	14			
Flagging Station Enhancements	23			
Turn Lane Closures	33, 34			
Lane Shift	29			
Work on Centerline	1 (30 mph or less only)			
Work in Center of Road	2			
Work in Intersection	3 (30 mph or less only)			
Temporary Road Closure (15 minute intervals)	31			
Temporary Road Closure	32			
Road Closure - Special Events	5			
Sidewalk Closure	88, 89			
Gravel Road Maintenance	30			

In this section there are Two ways to determine which layout to use:

The standard method…

- Type of road
- Determine the volume
- Type of work space
- Duration

Layout Selection Matrix by Maintenance Activity

The following are examples of situations where layouts may be used. Layouts may be used for other operations.

URBAN

	MAINTENANCE ACTIVITY	WORK DURATION: MOBILE 15 Minutes or Less	SHORT DURATION 1 Hour or Less	SHORT TERM 12 Hours or Less
On Road	Asphalt Pavement Patching	11	4	4
	Concrete Pavement Patching			4
	Pothole Patching	11	4	
	Crack Filling		4	4, 16
	Crack Sealing - Route and Seal			4, 16
	Surface Treatment			4, 16
	Sweeping - Residential	11		
	Utility Repair - Centerline	1	1	1, 2
	Utility Repair - Center of Intersection	3	3	3
	Road Closure (e.g. water main break)	31	31	31, 32
	Road Closure (for Special Event)	5	5	5
	Utility Maintenance (partial road closure)			4
Roadside	Mowing	10		
	Tree/Brush Removal	10, 11	4	4
	Debris Removal - Routine (e.g. litter pickup)	8, 9	8, 9	
	Debris Removal - Large Item (e.g. couch, roadkill)	11		
	Utility Repair - Shoulder	8, 9	8, 9	8
	Sign Repair	8, 9, 11	8, 9	
	Snow Cleanup	8, 9, 11	8, 9	

Or select a layout by:

Maintenance Activity

Layout Selection Matrix by Maintenance Activity

The following are examples of situations where layouts may be used. Layouts may be used for other operations.

RURAL

	MAINTENANCE ACTIVITY	WORK DURATION: MOBILE 15 Minutes or Less	SHORT DURATION 1 Hour or Less	SHORT TERM 12 Hours or Less
On Road	Asphalt Pavement Patching	11	4*	4*
	Concrete Pavement Patching			4*
	Temporary Pothole Patching	11	4*	
	Crack Filling		4*	16*
	Crack Sealing - Route and Seal			16*
	Surface Treatment			16*
	Grading a Gravel Road	30		
	Road Closure (e.g. water main break)	31	31	31, 32
	Culvert Maintenance (partial road closure)			4*
	Shouldering Shoulder Disking/Blading	10, 11		
Roadside	Mowing	10		
	Tree/Brush Removal	10, 11	4*	4*
	Debris Removal - Routine (e.g. litter pickup)	11	8	
	Debris Removal - Large Item (e.g. couch, roadkill)	11		
	Utility Repair - Shoulder	8	8	8
	Sign Repair	11	8	
	Snow Cleanup	11		
	Driveway Culvert Maintenance	8	8	8
	Ditch Maintenance (Partial Road Closure)			8

Layout Selection Matrix by Maintenance Activity

The following are examples of situations where layouts may be used. Layouts may be used for other operations.

URBAN

	MAINTENANCE ACTIVITY	WORK DURATION: MOBILE 15 Minutes or Less	SHORT DURATION 1 Hour or Less	SHORT TERM 12 Hours or Less
On Road	Asphalt Pavement Patching	11	4*	4*
	Concrete Pavement Patching			4*
	Pothole Patching	11	4*	
	Crack Filling		4*	4*, 16*
	Crack Sealing - Route and Seal			4*, 16*
	Surface Treatment			4*, 16*
	Sweeping - Residential	11		
	Utility Repair - Centerline	1	1	1, 2
	Utility Repair - Center of Intersection	3	3	3
	Road Closure (e.g. water main break)	31	31	31, 32
	Road Closure (for Special Event)	5	5	5
	Utility Maintenance (partial road closure)			4*
Roadside	Mowing	10		
	Tree/Brush Removal	10, 11	4*	4*
	Debris Removal - Routine (e.g. litter pickup)	8, 9	8, 9	
	Debris Removal - Large Item (e.g. couch, roadkill)	11		
	Utility Repair - Shoulder	8, 9	8, 9	8
	Sign Repair	8, 9, 11	8, 9	
	Snow Cleanup	8, 9, 11	8, 9	

* This layout may be used for nighttime operations only if the flagging stations are occupied and illuminated with auxiliary lighting such as floodlights or balloon lighting except in emergency situations.

Low Volume Roads

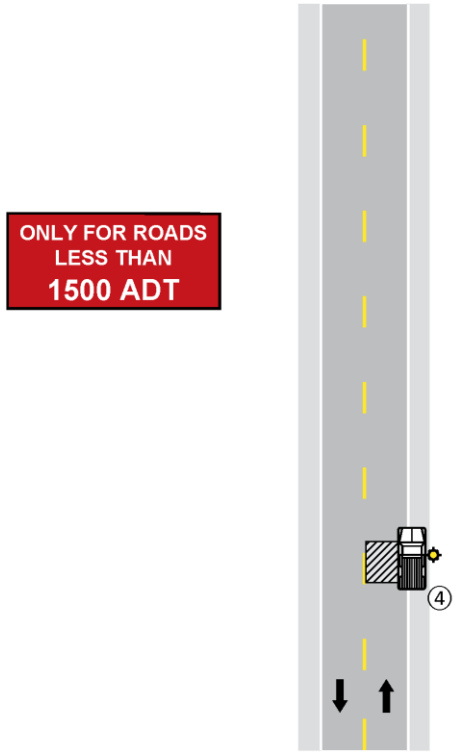
- Urban or Rural
- On Road or Roadside
- Type of Maintenance Activity
- Duration

Example: Patching scattered potholes on residential streets

NOTES:

1. If the approach sight distance is restricted, a spotter should be used.
2. If the visibility is poor or the operation does not move at least the Decision Sight Distance (**D**) every 15 minutes, the appropriate stationary layout should be used.
3. This layout may be used for nighttime operations only in locations where the posted speed limit is 40 mph or less.

④ The slow moving or stopped Work Vehicle should keep the traffic lane as wide as possible by using the shoulder space whenever possible.



LANE CLOSURE
TWO-LANE, TWO-WAY ROAD

15 MINUTES or LESS **LAYOUT 11**

§ Subd. 5d. **Speed limit in work zone when workers present.** (a) Notwithstanding subdivision 2 and subject to subdivision 3, the speed limit on a road having an established speed limit of 50 miles per hour or greater is adjusted to 45 miles per hour in a work zone when (1) at least one lane or portion of a lane of traffic is closed in either direction, and (2) workers are present. A speed in excess of the adjusted speed limit is unlawful.

(b) Paragraph (a) does not apply to a segment of road in which:

(1) positive barriers are placed between workers and the traveled portion of the highway;

(2) the work zone is in place for less than 24 hours;

(3) 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; or

(4) a different speed limit for the work zone is established by the road authority under paragraph (c).

(c) The commissioner, on trunk highways and temporary trunk highways, and local authorities, on streets and highways under their jurisdiction, may authorize the use of reduced maximum speed limits in work zones when workers are present, without an engineering and traffic investigation required. The work zone speed limit must not reduce the speed limit on the affected street or highway by more than:

(1) 20 miles per hour on a street or highway having an established speed limit of 55 miles per hour or greater; and

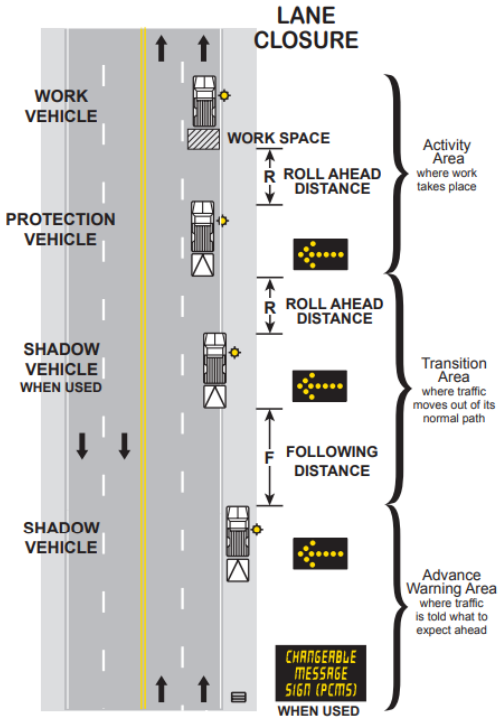
(2) 15 miles per hour on a street or highway having an established speed limit of 50 miles per hour or less.

(d) A work zone speed limit under paragraph (c) is effective on erection of appropriate regulatory speed limit signs. The signs must be removed or covered when they are not required. A speed in excess of the posted work zone speed limit is unlawful.

(e) For any speed limit under this subdivision, a road authority shall erect signs identifying the speed limit and indicating the beginning and end of the speed limit zone.

Distance Charts and Tables

- Device Spacing for Stationary Temporary Traffic Control Zone
- Temporary Traffic Control Distance Charts
- Components of a Mobile Temporary Traffic Control Zone
- Roll Ahead Distance Charts



Components of a Mobile Temporary Traffic Control Zone

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Sign Spacing (A) feet	Decision Sight Distance (D) feet	Taper Length (12 ft lane) (L) feet	Shifting Taper (12 ft lane) (L/2) feet	Typical Shoulder Taper (L/3) feet	Buffer Space (B) feet
0-30	G = 25 ft.	100	550	200	100	75	200
35-40		325	700	325	175	125	305
45-50	G = 50 ft.	600	900	600	300	200	425
55		750	1200	700	350	250	500
60-65		1000	1400	800	400	275	650
70-75		1200	1600	900	450	300	820

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Following Distance (F) feet	Roll Ahead Distance Charts: Recommended Spacing for Vehicles Weighing 9900 to 22,000 lbs GVW (R) feet		Roll Ahead Distance Charts: Recommended Spacing for Vehicles Weighing Greater than 22,000 lbs GVW (R) feet	
			Stationary Operation	Moving Operation 15 MPH max	Stationary Operation	Moving Operation 15 MPH max
0-30	G = 25 ft.	100 - 550	100	100	75	100
35-40		325 - 700	100	100	75	100
45-50	G = 50 ft.	600 - 900	125	175	100	150
55		750 - 1200	125	175	100	150
60-65		1000 - 1400	175	225	150	175
70-75		1200 - 1600	175	225	150	175

Shadow and Protection Vehicle wheels should be pointed straight ahead.

Temporary Traffic Control Distance Charts

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Sign Spacing (A) feet	Decision Sight Distance (D) feet	Taper Length (12 ft lane) (L) feet	Shifting Taper (12 ft lane) (L/2) feet	Typical Shoulder Taper (L/3) feet	Buffer Space (B) feet
0-30	G = 25 ft.	100	550	200	100	75	200
35-40		325	700	325	175	125	305
45-50	G = 50 ft.	600	900	600	300	200	425
55		750	1200	700	350	250	500
60-65		1000	1400	800	400	275	650
70-75		1200	1600	900	450	300	820

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Following Distance (F) feet	Roll Ahead Distance Charts: Recommended Spacing for Vehicles Weighing 9900 to 22,000 lbs GVW (R) feet		Roll Ahead Distance Charts: Recommended Spacing for Vehicles Weighing Greater than 22,000 lbs GVW (R) feet	
			Stationary Operation	Moving Operation 15 MPH max	Stationary Operation	Moving Operation 15 MPH max
0-30	G = 25 ft.	100 - 550	100	100	75	100
35-40		325 - 700	100	100	75	100
45-50	G = 50 ft.	600 - 900	125	175	100	150
55		750 - 1200	125	175	100	150
60-65		1000 - 1400	175	225	150	175
70-75		1200 - 1600	175	225	150	175

Shadow and Protection Vehicle wheels should be pointed straight ahead.

Temporary Traffic Control Distance Charts

TOWARD ZERO DEATHS

Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)
mndot.gov/mnmutcd

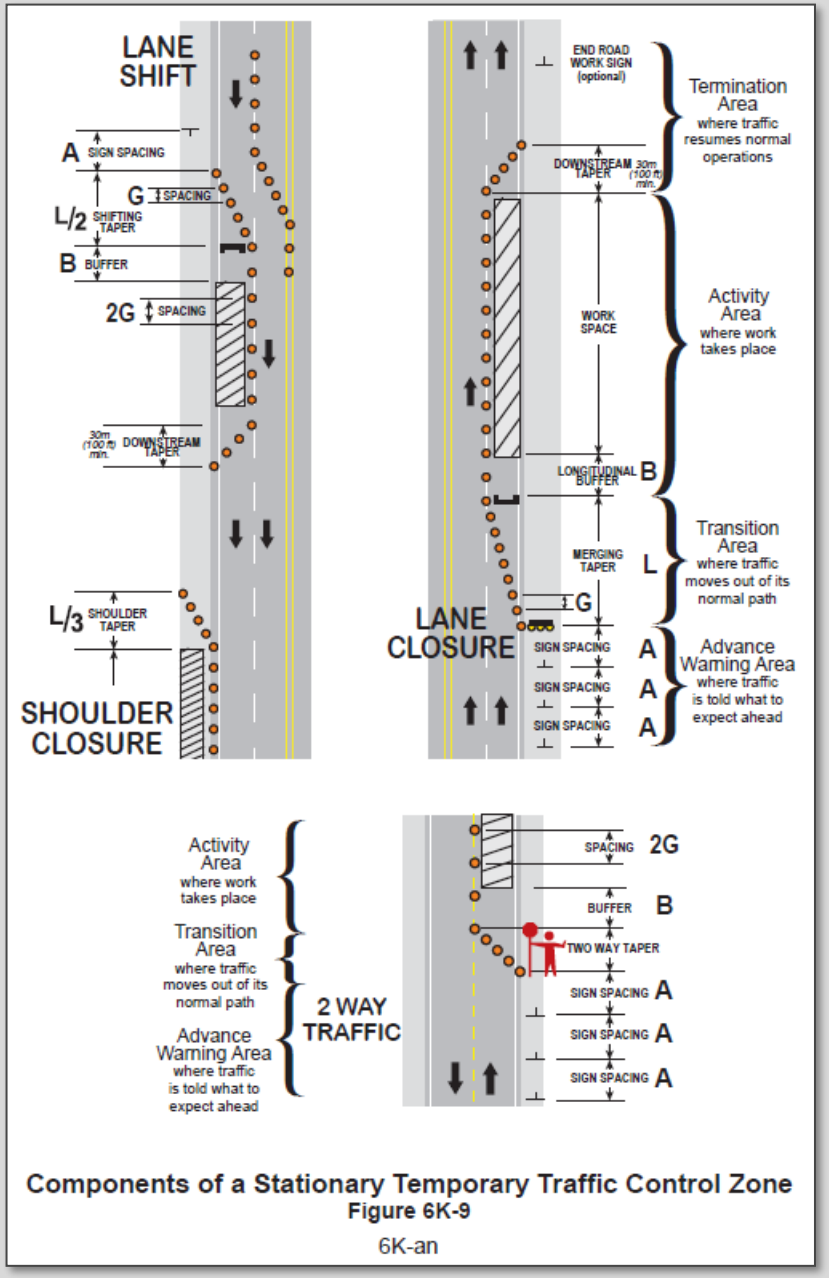
Striping dimensions

- **10’ skip → 40’ gap = 50’**

Decision Sight Distance

- Used to determine the minimum distance required for the driver to respond to the presence of a work zone.
- Used to determine the minimum distance required for the driver to see a flagger (as the flagger is located in a vulnerable location)
- Used to determine if an operation qualifies as a Mobile operation

Decision Sight Distance –"D"



Components of a Stationary Temporary Traffic Control Zone
Figure 6K-9

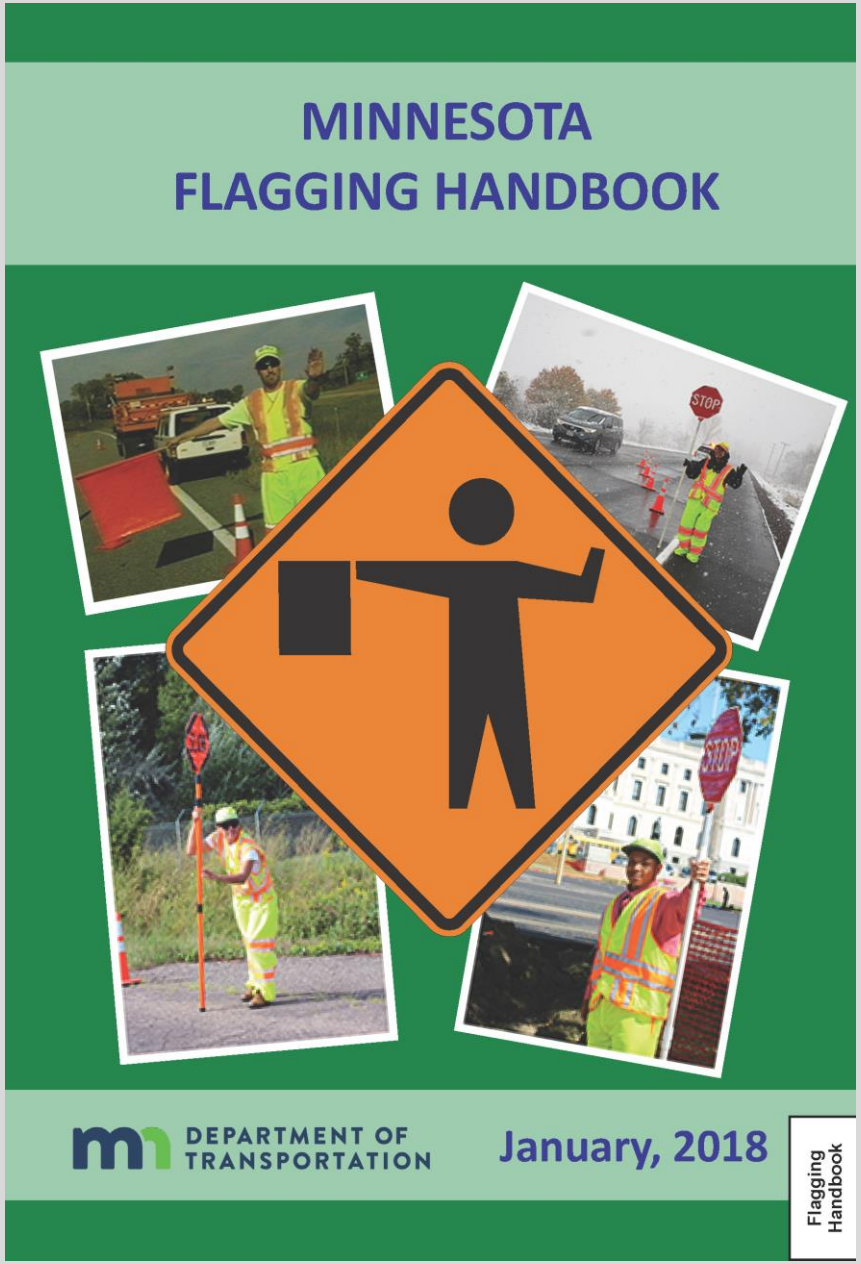
6K-an

Temporary Traffic Control Distance Charts

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Sign Spacing (A) feet	Decision Sight Distance (D) feet	Taper Length (12 ft lane) (L) feet	Shifting Taper (12 ft lane) (L/2) feet	Typical Shoulder Taper (L/3) feet	Buffer Space (B) feet
0-30	G = 25 ft.	100	550	200	100	75	200
35-40		325	700	325	175	125	305
45-50	G = 50 ft.	600	900	600	300	200	425
55		750	1200	700	350	250	500
60-65		1000	1400	800	400	275	650
70-75		1200	1600	900	450	300	820

Posted Speed Limit Prior to Work Starting (mph)		Advance Warning Following Distance (F) feet	Roll Ahead Distance Charts			
			Recommended Spacing for Vehicles Weighing 9,900 to 22,000 lbs GVW (R) feet		Recommended Spacing for Vehicles Weighing Greater than 22,000 lbs GVW (R) feet	
			Stationary Operation	Moving Operation 15 MPH max	Stationary Operation	Moving Operation 15 MPH max
0-30	G = 25 ft.	100 - 550	100	100	75	100
35-40		325 - 700	100	100	75	100
45-50	G = 50 ft.	600 - 900	125	175	100	150
55		750 - 1200	125	175	100	150
60-65		1000 - 1400	175	225	150	175
70-75		1200 - 1600	175	225	150	175

Shadow and Protection Vehicle tires should be pointed straight ahead.


MINNESOTA
FLAGGING HANDBOOK
DEPARTMENT OF TRANSPORTATION
January, 2018
Flagging Handbook


STOP

Flagger Communication

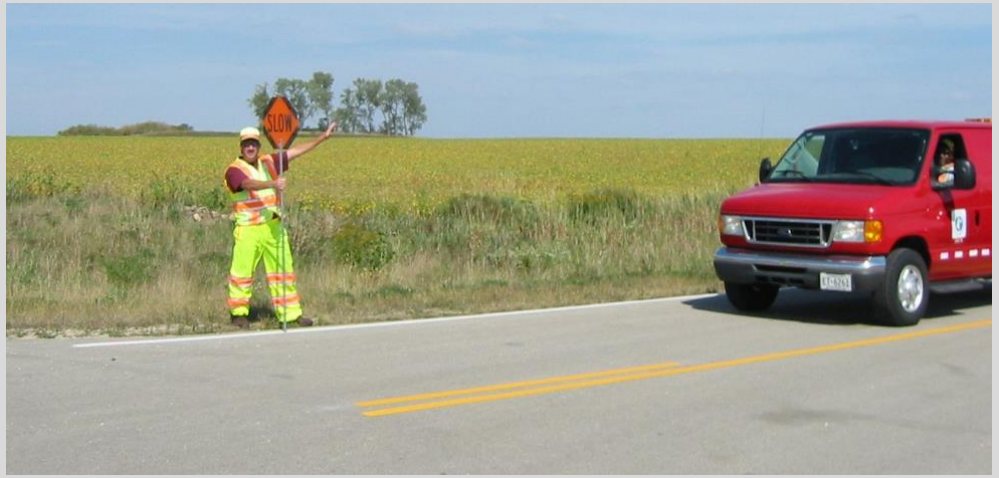
6K-113

- Communication must be established **prior** to the start of flagging operations
- One flagger **SHALL** be the lead

Radio communication works best

FLAGGING PROCEDURES

- Stand on the shoulder
- Face traffic
- Make eye contact with approaching driver
- Never stand in traffic lane unless drivers are unaware of flaggers presence
- Do not cross centerline



PROPER CONDUCT

- Do not abandon your post
- Do not put yourself in danger
- Do not engage in extended conversations, be polite, but be brief
- Be courteous - do not argue with a motorist
- Remove, turn, or cover all signs indicating the presence of a flagger when a flagger is not actually flagging

Minnesota Law

Minnesota Statutes 169.06

Subd. 4a.**Obedience to work zone flagger; violation, penalty.**

(a) A flagger in a work zone may stop vehicles, hold vehicles in place, and direct vehicles to proceed when it is safe.

Minnesota Law

Minnesota Statutes 169.06

Subd. 4a.**Obedience to work zone flagger; violation, penalty.**

(f) A peace officer may issue a citation to the operator of a motor vehicle if the peace officer has probable cause to believe that the person has operated the vehicle in violation of paragraph (a). A citation may be issued even though the violation did not occur in the officer's presence. In addition to other evidentiary elements or factors, a peace officer has probable cause under this subdivision if:

(1) a qualified work zone flagger has provided a report of a violation of paragraph (a) that includes a description and the license plate number of the vehicle used to commit the offense, and the time of the incident;

(2) the person is operating the vehicle described in the report; and

(3) it is within the four-hour period following the time of the incident, as specified in the report.


Northern Heights Dr
STOP


STOP


STOP


STOP
Flagger
Ahead

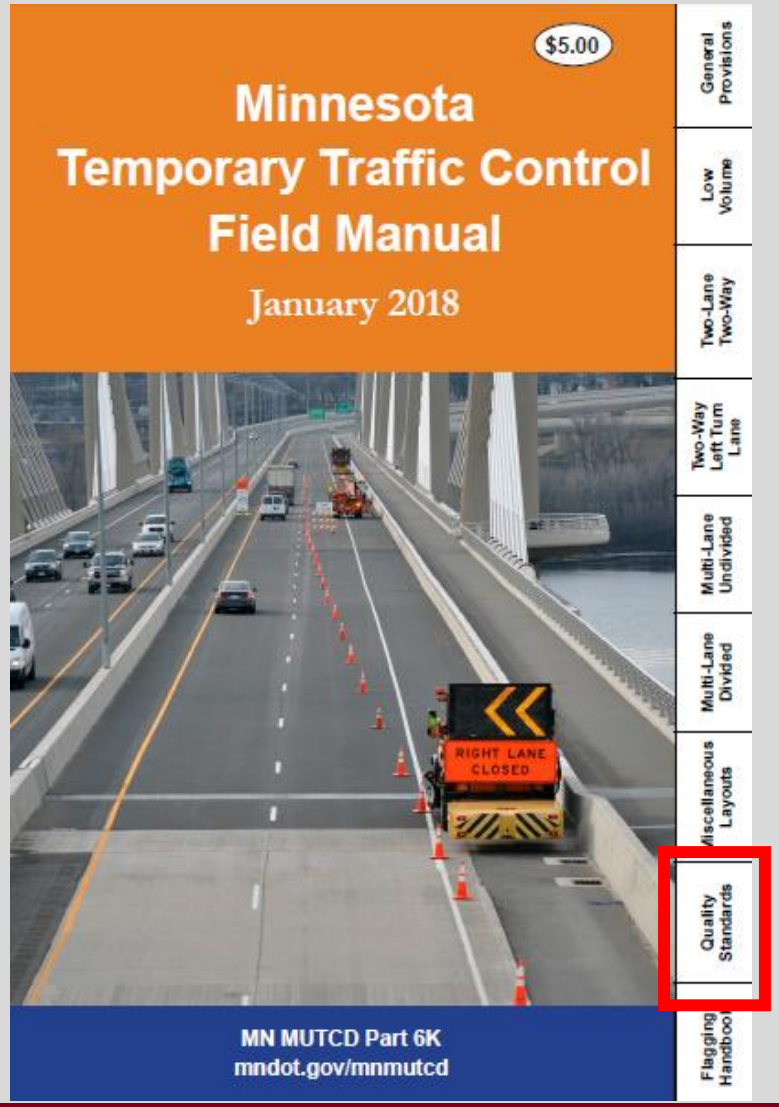

SLOW
SLOW
BOMAG


STOP


STOP


STOP


FLAGMAN
AHEAD
STOP
DEERE



Quality Standards

Minnesota Temporary Traffic Control Field Manual

January 2018

MN MUTCD Part 6K

http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html

Quality Standards

1. **Acceptable Devices** meet the MN MUTCD requirements:
   a) Design, size, color, weight, etc., are properly placed as specified, and clearly perform their intended function
2. Marginal Devices are considered marginally acceptable or reaching the lower end of acceptability
3. Unacceptable Devices shall not be delivered to the job site

Quality Classifications and Requirements

- All TTC devices (except category 4 trailer mounted devices) used in work zones shall be crash worthy

Panel Evaluation

Acceptable

Marginal

Unacceptable

EVALUATION GUIDE:
Type I, II, or III Barricade Panels or Vertical Panels

Acceptable
To be acceptable, the panel shall meet all of the following conditions:

- Panels are not deformed to an extent so as to decrease the panels target value.
- There may be several abrasions on the surface but very little loss of retroreflective sheeting.
- The orange is vivid and the stripes provide contrast.
- The Type III barricade has been fabricated according to the approved crashworthy requirements.

Marginal
The panel is considered marginal if it meets any of the following conditions:

- Panels are not deformed to an extent so as to decrease the panels target value.
- There are numerous surface abrasions through the panel surface.
- Some color fading is evident; however, it has no large areas of residue or missing retroreflective material.
- The Type III barricade has been fabricated according to the approved crashworthy requirements.

Unacceptable
A panel is considered unacceptable if it meets any of the following conditions:

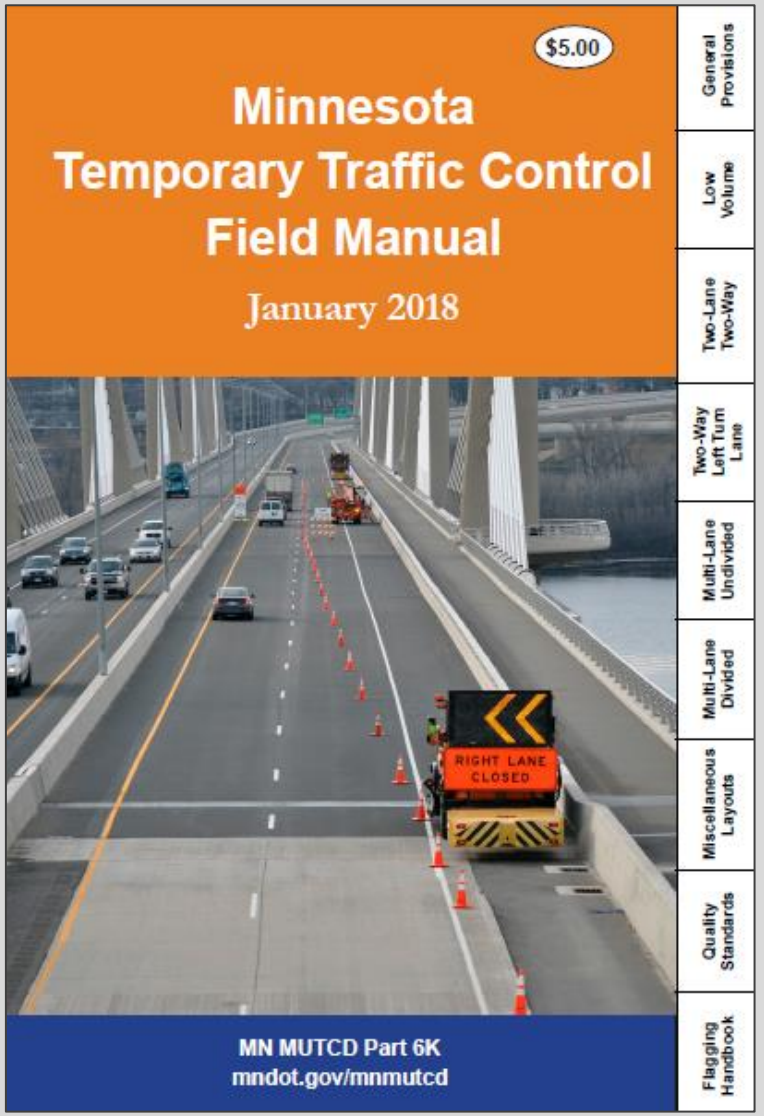
- The surface is marred over a high percentage of the panel area.
- There is a noticeable loss of retroreflectivity and obvious color fading.
- Panels with asphalt splatter, cement slurry, and/or other residue or any combination of missing and covered retroreflective material.
- Barricades have bent or twisted legs, or deformation of the support assembly to the extent that the barricade panel is not reasonably parallel to the roadway surface.

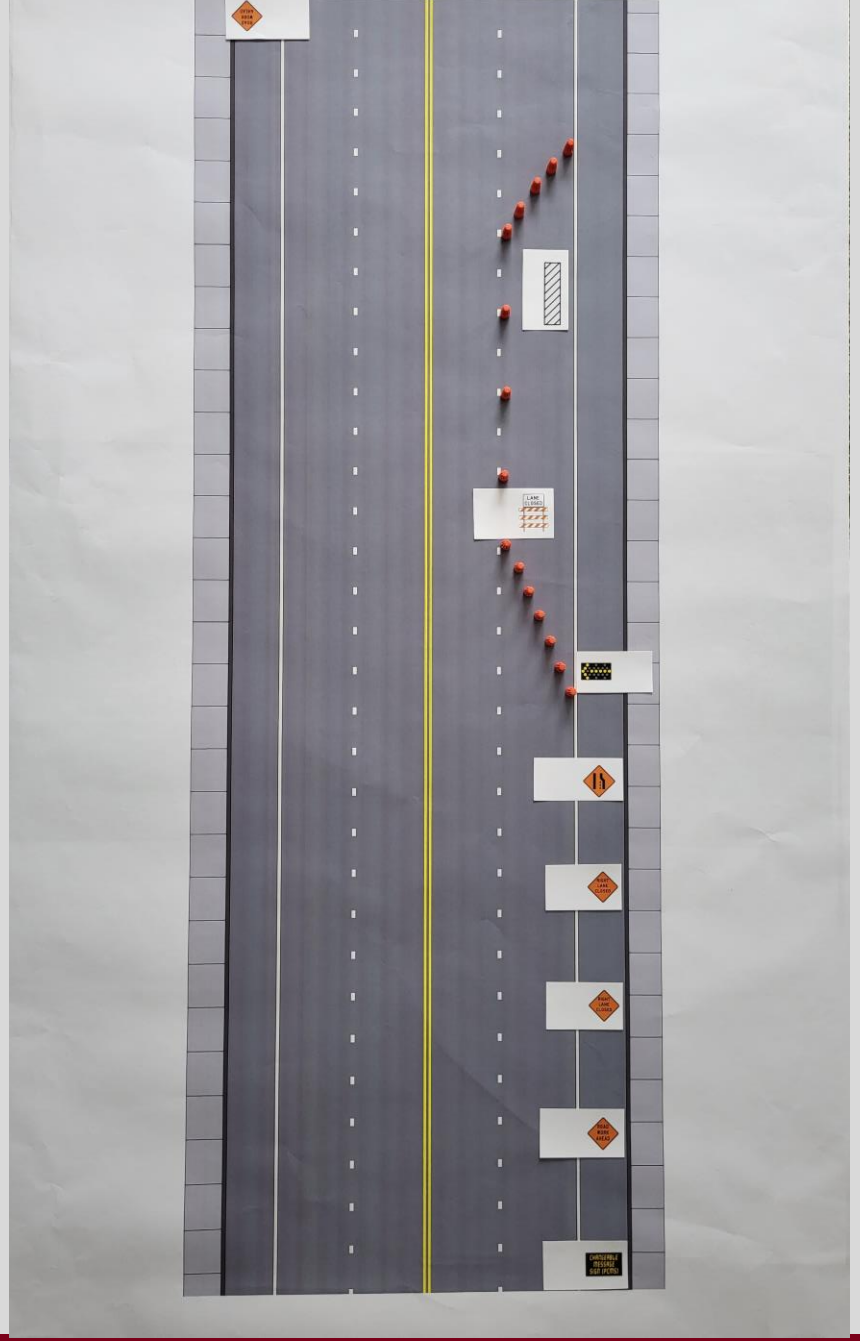
6K-101

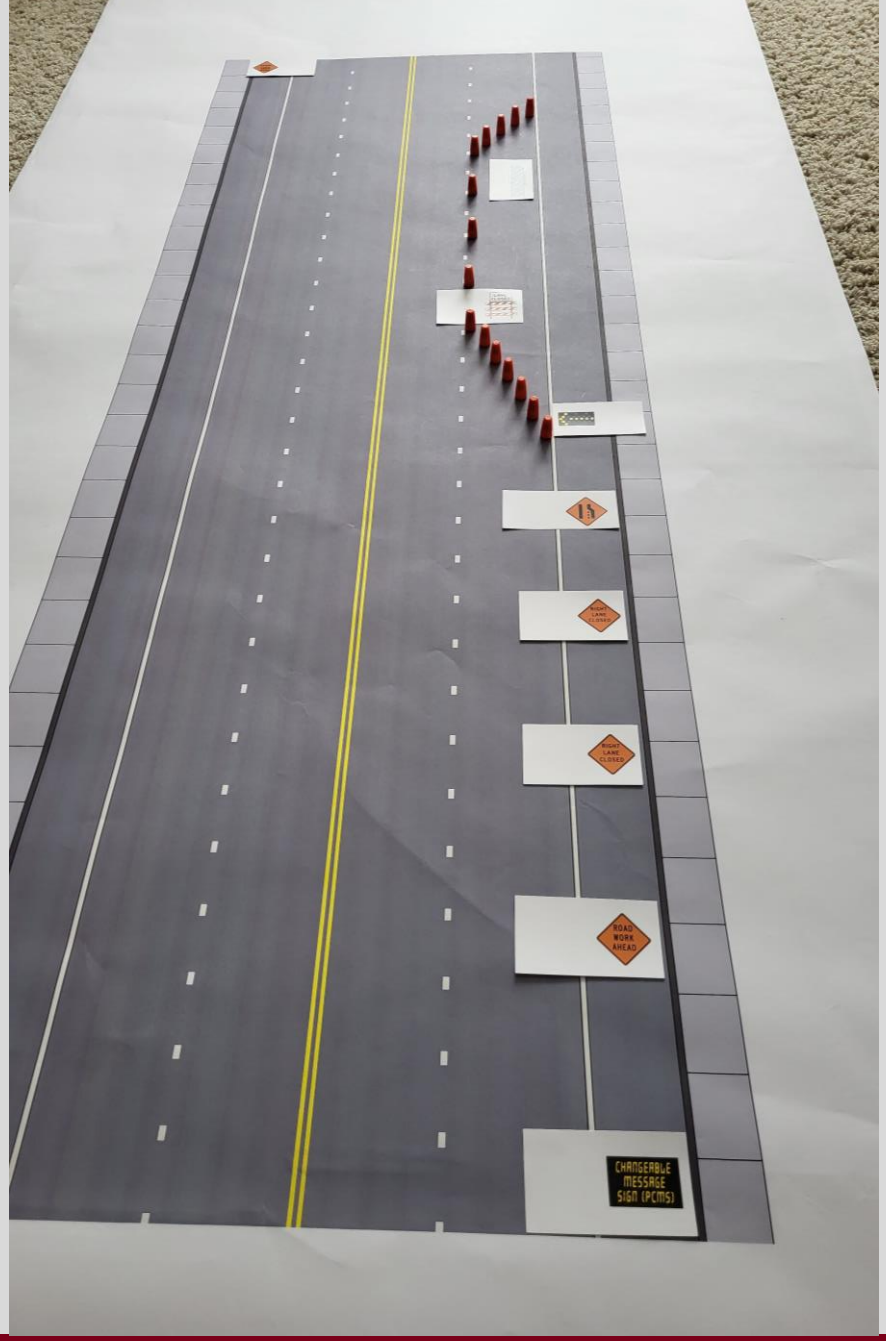
Webinar Series for the 2018 Field Manual

- This webinar series introduces highway workers to the concepts and standards of providing appropriate TTC for work zones.
  - Part 1 – Introduction and General Provisions
  - Part 2 – Two-Lane Two-Way Roadways
  - Part 3 – Multi-Lane Roadways
  - Part 4 – Miscellaneous Layouts
  - Part 5 – Flagging Handbook Overview

https://mnltap.umn.edu/training/catalog/workzoneseries

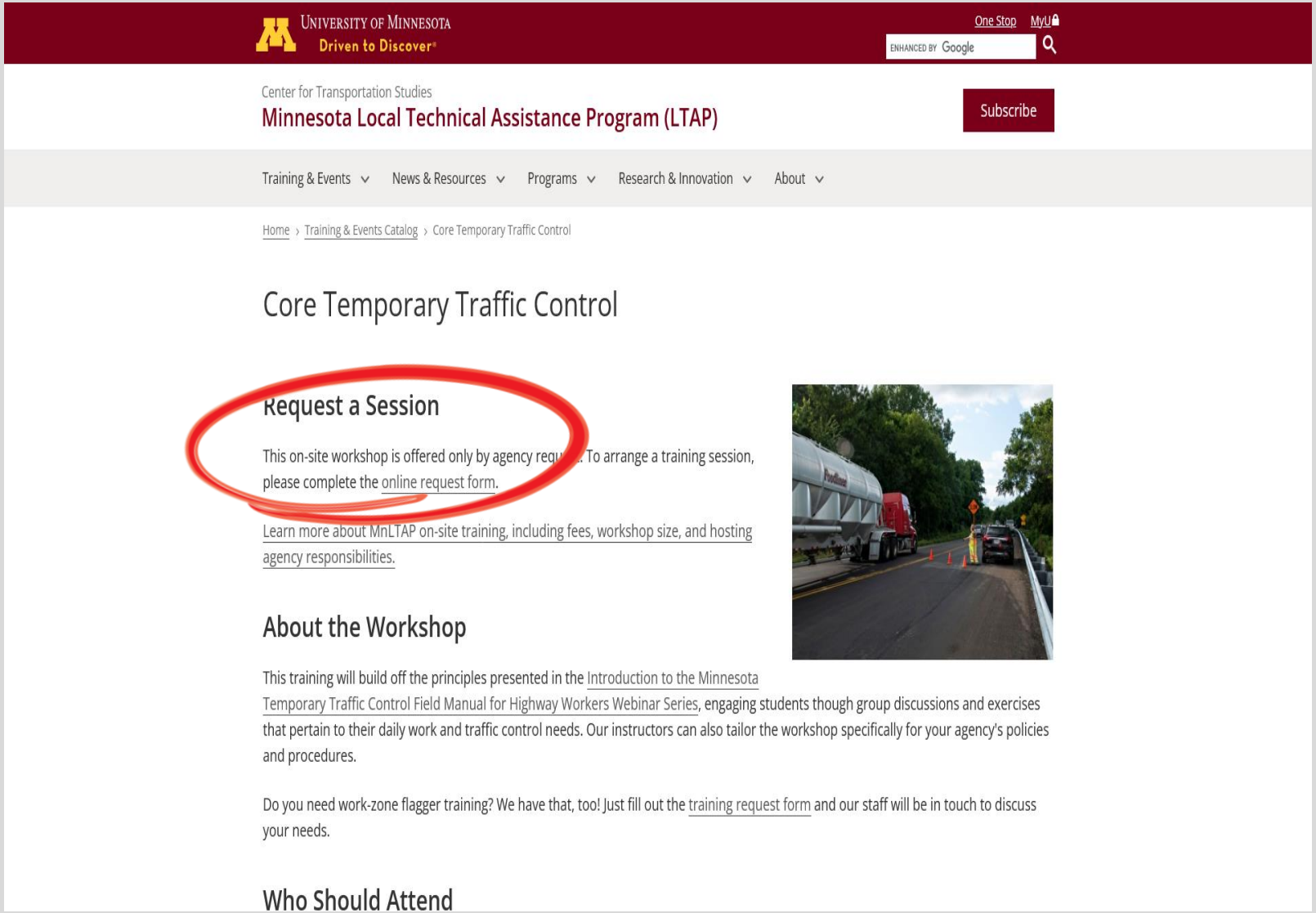





ROAD WORK AHEAD
CHANGEABLE MESSAGE SIGN (PCMS)

Schedule Your Agency Work Zone Safety Training Anytime

Core Temporary Traffic Control



MINNESOTA LOCAL ROAD RESEARCH BOARD

MINNESOTA LOCAL ROAD RESEARCH BOARD

Expansive resource library of products, recent publications:

- Speed Limit Guidance for Municipal Roadways
- Pavement Marking Decision Tree – Project Level
- Asphalt Crack Treatment FAQs and Technical Resources
- Mini Roundabout FAQ
- Best Practices For Dust Control
- Best Practices For Boulevard Tree Selection
- Alerting The Public About Local Road Closures

Visit Lrrb.org for complete resources

MINNESOTA LOCAL ROAD RESEARCH BOARD

Here are some of the **impacts** of LRRB research initiatives:

- Co-sponsorship of MnROAD
- More than 500 completed research projects
- Funded spring-load restriction guidelines, saves an est. $14 million per year
- Funds OPERA
- Technology transfer

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Questions?