

Work Zone Safety and Mobility

Traffic Regulating for the
Supervisor

Traffic Regulator - Supervisor

■ Resource Materials

- Michigan Manual on Uniform Traffic Control Devices, Part 6, Chapters 6C and 6E (MMUTCD).
- Standard Specifications for Construction, Section 922.07, page 876-877.

For The Supervisor

Items for the Supervisor

Agenda

- For the Supervisor
 - Traffic Control Layout
 - Station and Position
 - Single Traffic Regulators
 - Intermediate Traffic Regulators
 - Ingress/Egress Operations

Agenda

- For the Supervisor (cont.)
 - Haul Road Crossings
 - Night Work
 - Pilot Vehicles
 - Emergency Vehicle Procedures
 - Special Traffic Regulating Situations
- Definitions of Terms

For the Supervisor

■ Items for the Supervisor

- Ensure the traffic regulator has been issued necessary instructions and training prior to starting work.
- Ensure the traffic regulator is provided with the necessary required clothing and equipment.
- Update the traffic regulators on any emergencies that may occur within the zone.

For the Supervisor

■ Items for the Supervisor

- Instruct the traffic regulator to stay with the signing sequence and arrow panel.
- Make certain that the required signs, channelizing devices, traffic regulators and equipment are in place before operations begin. (MUTCD: TA-10, TA-14, TA-16, TA-27, TA-46)
- Ensure precautionary measures to safeguard the public and employees are in place.

For the Supervisor

■ Items for the Supervisor

- Ensure that all traffic control is properly maintained during the progress of work.
- Ensure that the traffic regulator station is properly positioned for driver visibility.
- Properly remove or cover all traffic control when it is no longer in use.

For the Supervisor

■ Items for the Supervisor

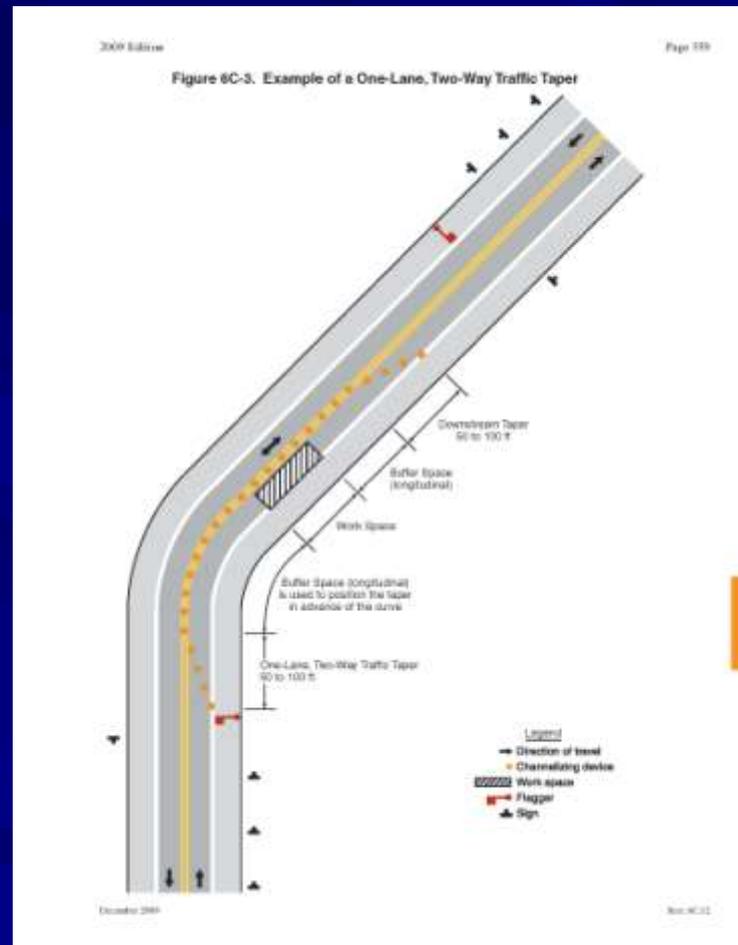
- Drive through the project to determine the effectiveness of the work zone traffic control plan.
- Immediately correct any hazardous situations.
- If the operation is complex, seek the advice of a MDOT inspector or Engineer.
- Discipline or replace a traffic regulator who is not in compliance.

For the Supervisor

■ Items for the Supervisor

- Relieve or rotate the traffic regulator at predetermined intervals.
- When two or more traffic regulators are required, designate one of the regulators as the lead traffic regulator.
- Document your actions.
- Report serious violations to the police.

Traffic Control Layout



Traffic Control Layout

- Taper lengths shall be 50 feet minimum to 100 feet maximum. 100 feet maximum is the recommended length, with shorter lengths allowed if there are space restrictions.
- Maximum recommended distance(s) between channelizing devices in the taper area(s) should not exceed 15 feet.

Traffic Regulator Station

- Park vehicles as far off the roadway as possible inside the work zone or a minimum of 50 feet beyond the lighted arrow panel into the taper area.
- Do not park vehicles or equipment at the traffic regulator station.
- Do not park vehicles or equipment on sidewalks, or other pedestrian pathways.
- Park at locations set out in the work area access plan.

Traffic Regulator Station

- Stay with the arrow board and sign sequence.
- When you are directing the traffic regulator to move, the arrow panel and sign sequence are required to move.

Traffic Regulator Position – Good example



Station and Position

Station and Position

■ Traffic Regulator Position

- Can be clearly seen by approaching traffic as recommended by the stopping sight distance Table 6E-1 in the current MMUTCD.
- Increase the distance for downgrades or other conditions that affect stopping distance.

Table 6E-1. Stopping Sight Distance as a Function of Speed

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed

Station and Position

■ Traffic Regulator Station

- Obtaining sufficient sight distance may require extending the beginning or end of a lane closure depending on existing features such as hills and curves.
- Located 50 to 100 feet in advance of the full lane closure; after the advance warning sign or signs.

Station and Position

- Provides a sufficient escape path and is free of obstructions.
- Lighted arrow panel should be positioned at the beginning of the taper for the full lane closure.



Single Traffic Regulators

Spot Locations – Single Traffic Regulator

A single traffic regulator can only be used if all of the following are met:

1. The work area is short (i.e. guardrail ending, minor shoulder repair).
2. The work area is on a straight section of road with good visibility from both approaches.
3. Traffic volumes less than 400 vehicles per day.
4. Traffic speeds are low (less than 45 mph).
5. There has to be no cross street traffic.

Single Traffic Regulator

- Single traffic regulator positioned on the shoulder directly opposite from the work area and have a pre-determined escape path.
- Use channelizing devices for increased visibility and motorist awareness. Place one at each intended stopping point.

Single Traffic Regulator

- An oversized STOP/SLOW paddle recommended. (24")
- A single traffic regulator may need to move a short distance toward the end of the work zone while stopping approaching vehicles.
- If traffic fails to understand the single traffic regulator (i.e.: stopping point, and proceed or slow commands), a standard traffic regulator operation shall be used.

Intermediate Traffic Regulators

Intermediate Traffic Regulators

- Intermediate Traffic Regulators are stationed at intersecting roads and/or significant traffic generators (shopping centers, mobile home parks, etc.) with the responsibility of controlling the movement of traffic entering from these points within the work zone or incident area.

Intermediate Traffic Regulators

- Are required to use a **STOP/STOP** paddle.
- Required to be in radio or visual contact with the other traffic regulators to coordinate the safe entry of intermediate traffic within the work zone.
- Not allowed to stop the mainline flow of traffic.

Intermediate Traffic Regulators

- Release traffic in either direction after mainline flow of traffic passes the intermediate station.
- After releasing traffic, clearly describe the last vehicle added to the traffic flow in each direction to other traffic regulators.

Intermediate Traffic Regulators

- Should be positioned at a location near the intersection where traffic in all directions can be observed and approaching traffic can stop safely at the intended stopping point.

Ingress/Egress Operations

Ingress/Egress Operations

- When no other contractor access is available and short stoppages for ingress/egress of contractor operations are required to be performed through active traffic, the following must be satisfied to permit use:
 - Non-freeway only.
 - Maximum duration of 2 minutes.
 - Posted speed less than 45 mph.
 - Must be approved by the Engineer prior to use.

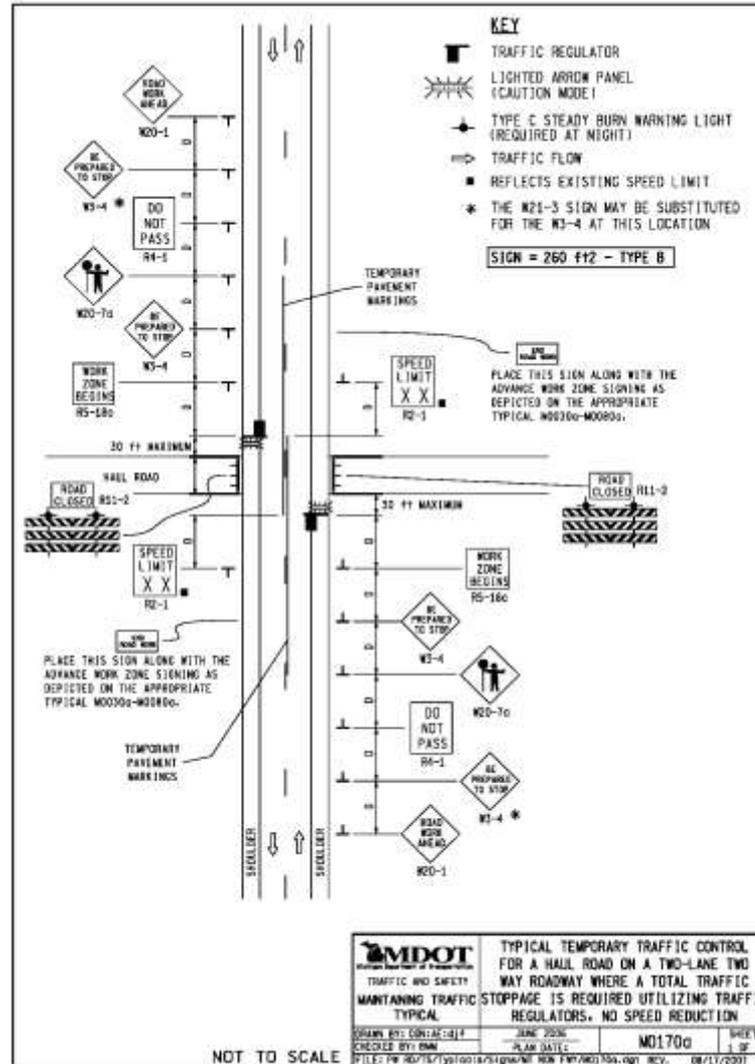
Ingress/Egress Traffic Regulator Operations

- **No more than 3 stoppages per hour** unless approved by the Engineer.
- Additional stoppages per hour without prior approval will require a full traffic regulating signing sequence.
- For ingress/egress of construction equipment and materials only.

Ingress/Egress Operations

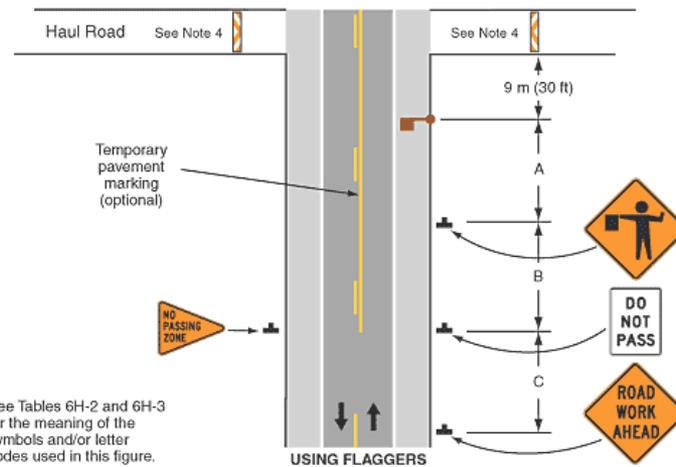
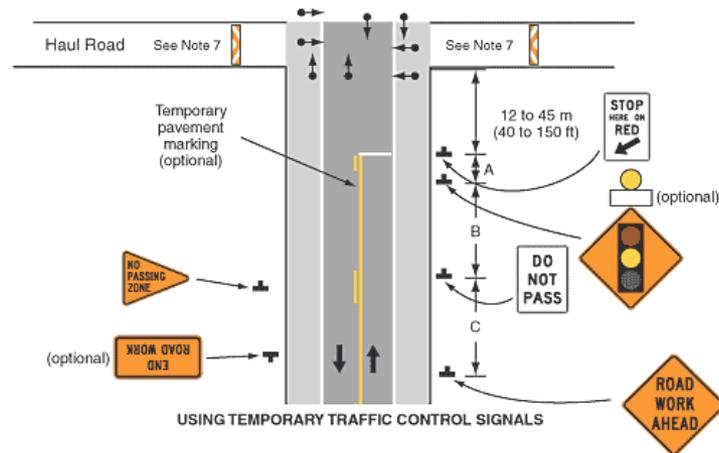
- Provide one Traffic Regulator for every 2 lanes required to stop.
- If controlling 2 lanes of traffic, wait for first vehicle to stop in the first lane and then proceed into the controlled lane to stop the second lane.
- Provide one Flagger AHEAD sign for approaching traffic.

Haul Road Crossings



Haul Road Crossings

Figure 6H-14. Haul Road Crossing (TA-14)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 14

Haul Road Crossings

- If the truck is crossing the highway or making a left turn onto the highway:
 - Traffic is stopped in both directions by two Traffic Regulators.
 - A **STOP/STOP** paddle is required for use by both Traffic Regulators.
 - To release traffic, Traffic Regulators turn **STOP/STOP** paddle a quarter turn away from the haul road traffic and use the appropriate hand signals.

Haul Road Crossing

- If the truck is making a right turn onto the highway:
 - Traffic is stopped in one direction by one Traffic Regulator.
 - **STOP/STOP** paddle is used by the Traffic Regulator.
 - To release traffic, the Traffic Regulator turns the **STOP/STOP** paddle a quarter turn away from the haul road and use the appropriate hand signals.

Haul Road Crossing

- In both instances, “BE PREPARED TO STOP” sign replaces “ONE LANE ROAD AHEAD” sign for each direction being controlled.



Haul Road Crossings

- The Traffic Regulators are required to be:
 - Positioned on the shoulder out of the path of oncoming traffic at each side of the crossing.
 - Be clearly visible to each other.
 - Have a pre-determined escape path free of obstructions.

Night Work

Operations during Hours of Darkness

- Traffic Regulator stations and work area are required to be illuminated with appropriate lighting. Lighting should not create glare for the Traffic Regulators or motorists.
- Required levels of lighting are a minimum of ten (10) foot candles per MIOSHA Construction Safety Standard, Part 1, General Rules, Rule 133 (1).

Operations During Hours of Darkness

- Safety apparel meeting ANSI 107-2004 standard performance for Class 3 risk exposure is recommended.



Operations during Hours of Darkness

- **STOP/SLOW** paddle required to have retro-reflective sheeting, which shall meet the sign sheeting requirements in the agency or contract documents.
- A flashlight with a red glow cone may be used to get the attention of motorists. The proper method is to slowly wave the light back and forth slowly across the front of the legs with the free hand.

Pilot Vehicles



Pilot Vehicles

- Used in conjunction with Traffic Regulators to help control traffic passing through the work zone.
- The goal with using pilot vehicles is to provide information to the motorists on where and what speed to drive through the work zone.

Pilot Vehicles

- Must be coordinated with Traffic Regulator operations or other controls being used at the end of the one lane section.
- Pilot vehicle required to have an operating amber beacon or strobe light and the name of the contractor or contracting agency prominently displayed.

Pilot Vehicles

- Per Part 6 of MMUTCD, the “PILOT CAR FOLLOW ME” sign shall be mounted in a conspicuous position on the rear of the pilot vehicle.



Pilot Vehicles

■ Procedures for Pilot Vehicles

- The Traffic Regulator holds traffic in a stopped position.
- The driver of the pilot vehicle positions the vehicle on the shoulder opposite the Traffic Regulator or if the shoulder is limited, at the beginning of the stopped queue of vehicles.
- The Traffic Regulator checks with other Traffic Regulators to make sure traffic has been cleared.

Pilot Vehicles

- Once the traffic regulator confirms from other regulators that traffic has been cleared, traffic regulator releases the pilot vehicle, turns the **STOP/SLOW** paddle to **SLOW** and directs remaining traffic in the queue to follow.
- Clearly communicate with other regulators when the last vehicle has been released.

Pilot Vehicles

- Key Point for the Pilot Vehicle Operator
 - Must be aware of the size and composition of the vehicle queue that will follow the pilot vehicle.
 - Semi-trucks, or vehicles with trailers will likely have different acceleration/deceleration speeds and widths than the pilot vehicle.

Pilot Vehicles

- Driving a consistent speed. This is the key component in helping to keep the queue of vehicles safely spaced together and avoiding undesirable speed increases from motorists trying to catch up to the vehicle queue or falling behind and not understanding the expectations of where and how fast to drive through the work zone.

Emergency Vehicle Procedures

Emergency Vehicle Procedures

- Always be alert for emergency vehicles and crews.
- Immediately contact other Traffic Regulators and work crews and coordinate stoppage of all traffic entering and traveling through the work zone.

Emergency Vehicle Procedures

- Allow emergency vehicle to proceed through the work zone.
- Continue to keep traffic out of the work zone until the emergency vehicle(s) have cleared the work zone.

Emergency Vehicle Procedures

- All other traffic regulators shall immediately stop all traffic movements to allow the emergency vehicle to pass through the work zone.

Special Traffic Regulating Situations

Signalized Intersections

- Signalized Intersections
 - Altering signal operations are separately arranged or included in the contract documents.

Signalized Intersections

- **For operations that impact an intersection for greater than 20 minutes:**
- Prior to starting work,
 - Place traffic control devices per appropriate maintaining traffic typical.
 - Provide Traffic Regulators at all intersection legs.
 - Turn the signal off and bag the entire signal.

Signalized Intersections

- **For operations that impact an intersection for greater than 20 minutes:**
- Prior to completing work,
 - Remove bags from signal
 - Turn signal back on
 - Once the signal is on and working point to the signal to let the driver know that they are to now follow the signal.

Signalized Intersections

- **For Operations that impact an intersection for 20 minutes or less (short duration)**
 - Prior to starting work, the agency designated representative shall
 - Place traffic control devices per appropriate maintaining traffic typical.
 - Place traffic regulators at all directions of traffic being controlled.

Signalized Intersections

20 minutes or less (cont'd)

- Under Michigan Vehicle Code 257.611a
 - An owner or employee of an entity performing construction, maintenance, surveying, or utility work within a work zone may direct traffic within that work zone if both of the following apply:
 - (a) The department of transportation, the local authority, or the county road commission, within its respective jurisdiction, authorizes that owner or employee to direct traffic due to safety or work requirements. The authorization shall be issued in the manner considered appropriate by the department of transportation, the local authority, or the county road commission, and may be general or specific. The authorization may establish the conditions under which the owner or employee may direct traffic, and may allow the owner or employee to direct traffic in disregard of an existing traffic control device.
 - (b) The owner or employee is properly trained, equipped, and attired in conformance with the manual of uniform traffic control devices authorized under section 608.
 - (2) The operator of a motor vehicle who fails to comply with the directions of an owner or employee directing traffic under this section, including a direction made in disregard of an existing traffic control device, is responsible for a civil infraction.

Signalized Intersections

20 minutes or less (cont'd)

- **For Operations that impact an intersection for 20 minutes or less (short duration)**
 - Conduct Traffic Regulator operations while the signal is in stop and go operation. **Do not attempt to stop traffic under a green indication until the intersection is under control.**

Signalized Intersections

20 minutes or less (cont'd)

- For Operations that impact an intersection for 20 minutes or less (short duration)
- Prior to giving control back to the signal,
 - Make sure the first vehicle is stopped at a red light
 - Point to the signal to let the driver know that they are to now follow the signal again.

Non-Signalized Intersections

- A traffic regulator is required for each side road approach of traffic being controlled.
- **Stop** and **Yield** signs are not required to be covered.

Definitions of Terms

Traffic Regulator Definitions

■ Activity Area

- The section of highway or street where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space.

■ Advance Warning Area

- The section of highway or street where motorists are informed about the upcoming work zone or incident area.

Traffic Regulator Definitions

■ ANSI

- American National Standards Institute
(www.ansi.org)

■ Channelizing Device

- A plastic drum, cone, tubular marker, or vertical panel that is used to guide and warn motorists of conditions created by work activities in or near the roadway.

Traffic Regulator Definitions

■ D Distance*

- Distance between temporary advance signing and the beginning of remaining temporary signing sequence based on the posted speed prior to the work area.

■ Escape Path

- A pre-determined route free of obstructions that enables a traffic regulator to maneuver away from errant vehicles or equipment.

*D=10*Posted speed limit prior to construction

Traffic Regulator Definitions

■ Haul Road Crossing

- A specific location within a work zone that is used to move equipment into and/or out of the work area.

■ Highway or Street

- The entire width between the boundary lines (right-of-way) of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel.

Traffic Regulator Definitions

■ Hours of Darkness

- The time from sunset to sunrise upon a straight, level unlighted highway under normal atmospheric conditions and at any other time when there is not sufficient light to render clearly discernable persons and vehicles on the highway at stopping sight distance.

Traffic Regulator Definitions

■ Intermediate Traffic Regulator

- The Traffic Regulator who is responsible for controlling traffic at intersecting roads or significant traffic generators.

■ ISEA

- International Safety Equipment Association (<http://www.safetyequipment.org/>)

Traffic Regulator Definitions

■ Lead Traffic Regulator

- The Traffic Regulator who is responsible for the control of all Traffic Regulators who control traffic traveling through a work zone.
- The location for this Traffic Regulator is where the lane that is open to traffic is required to be stopped.

Traffic Regulator Definitions

- Lighted Arrow Panel
 - A traffic control device that helps to advise motorists approaching a work zone and highlights the location of the Traffic Regulator at the earliest opportunity.
- Longitudinal Buffer Space (B Distance)*
 - Distance between the start of the full lane closure and the work area.

*See MMUTCD for tables.

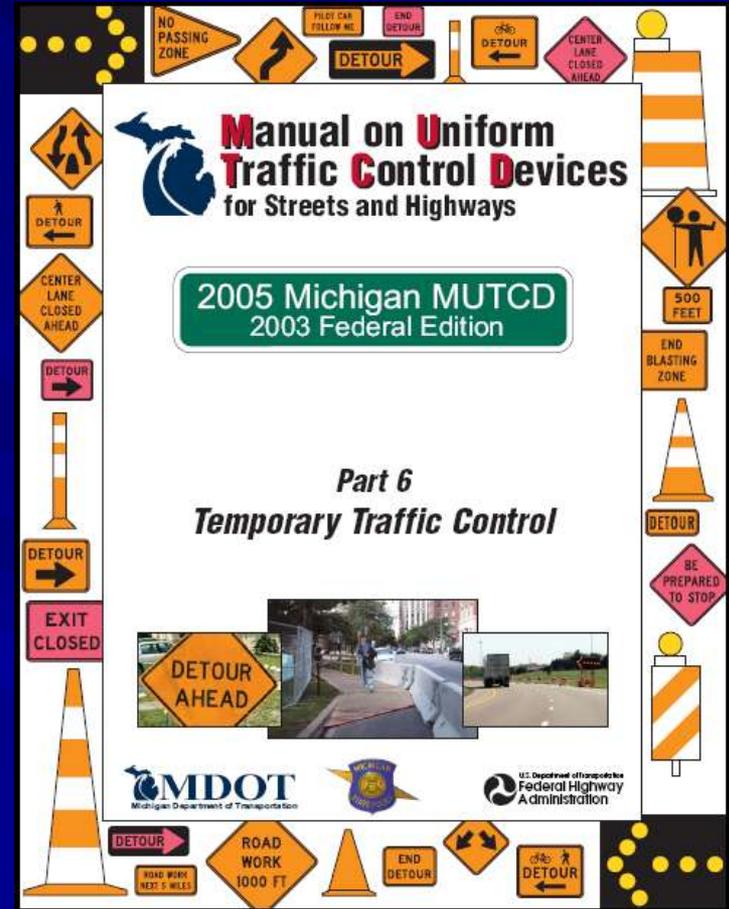
Traffic Regulator Definitions

■ MASH-08

- American Association of State Highway and Transportation Officials (AASHTO) Manual for assessing Safety Hardware (MASH).
- This document is an update of the National Cooperative Highway Research Program (NCHRP) Report 350 crash testing and evaluation criteria.

Traffic Regulator Definitions

- Michigan Manual on Uniform Traffic Control Devices (MMUTCD)
 - The prescribed standards of design, construction, and application of traffic control devices for use upon highways within this State.



Traffic Regulator Definitions

- Michigan Vehicle Code (MVC); Act 300 or 1949
 - An Act to provide for the registration, titling, sale, transfer and regulation of certain vehicles operated upon the public highways of this state or any other place open to the general public or generally accessible to motor vehicles and distressed vehicles.

Traffic Regulator Definitions

■ NCHRP 350

- National Cooperative Highway Research Program, Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features.

Traffic Regulator Definitions

■ NCHRP 350 (cont'd)

- This report is recommended to highway design engineers, bridge engineers, safety engineers, maintenance engineers, researchers, hardware developers, and others concerned with safety features used in the highway environment.
- It contains recommended procedures for evaluating the safety performance of various highway safety features.

Traffic Regulator Definitions

■ Obstruction

- Anything that blocks the movement of a Traffic Regulator along an escape path.

■ Personal Protective Equipment (PPE)

- High visibility safety apparel that clearly identifies the wearer and provides added protection to certain parts of the body.
- PPE includes vests as well as proper head, eye and foot protection.

Traffic Regulator Definitions

■ Pilot Vehicle

- A designated vehicle used in coordination with Traffic Regulators to help control traffic through a construction zone.

Traffic Regulator Definitions

■ Red Flag

- A hand signaling device permitted for emergency situations only.

■ Termination Area

- The section of highway or street from the downstream end of the work area to the last traffic control device where motorists are returned to their normal path.

Traffic Regulator Definitions

■ STOP/STOP Paddle

- The primary hand signaling device used by a Traffic Regulator to control the flow of traffic only at a haul road crossing when regulating two directions of travel, or by an intermediate traffic regulator stationed at intersecting roads.

■ STOP/SLOW Paddle

- The primary hand signaling device used by a Traffic Regulator to control the flow of traffic.

Traffic Regulator Definitions

■ Traffic Regulator

- An individual who is properly trained, equipped, and attired to protect the project personnel by providing safe, courteous, and authoritative directions to motorists seeking passage through a work zone.

Traffic Regulator Definitions

■ Traffic Regulator Station

- An area located off the traveled portion of the roadway that is clear of obstructions and provides sufficient clear distance for approaching traffic to see the Traffic Regulator and stop at an intended stopping point.

Traffic Regulator Definitions

■ Transition Area

- The section of highway or street where motorists are directed out of their normal path.

■ Stopping Sight Distance

- The distance suggested in Table 6E-1 of Part 6 of the MMUTCD so sufficient visibility is provided for a motorist to stop at an intended stopping point.

Traffic Regulator Definitions

■ Taper

- A series of channelizing devices that are used to move traffic out of or into the normal path at the transition area.

Traffic Regulator Definitions

■ Work Duration

– The length of time a work operation occupies a spot location.

■ The five categories of Work Duration include:

– **Long-term stationary** is three days or more.

– **Intermediate-term stationary** is more than one daylight period up to three days, or work during hours of darkness lasting more than one hour.

Traffic Regulator Definitions

- The five categories of Work Duration include (cont'd):
 - **Short-term stationary** is daylight work for more than one hour within a single daylight period.
 - **Short duration** is up to one hour.
 - **Mobile** moves intermittently or continuously.

Traffic Regulator Definitions

■ Work Zone Definitions

– A portion of a street or highway that meets any of the following:

- Between a “WORK ZONE BEGINS” and an “END ROAD WORK” sign.
- Between a “BEGIN WORK CONVOY” and an “END WORK CONVOY” sign.
- Within 150 feet of a vehicle with an operating strobe or beacon.

Michigan Traffic Regulators Manual

- A Copy of this manual may be viewed online at:
- http://www.michigan.gov/documents/mdot/MDOT-TrafficRegulatorsManual_327600_7.pdf

- To order copies of this manual contact:

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