



# Speed Limits in Work Zones Guidelines

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**SPEED LIMITS IN WORK ZONES GUIDELINES  
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The information contained within is the preferred practice for MnDOT personnel.

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# SPEED LIMITS IN WORK ZONE GUIDELINES

## SUMMARY CHART

There are several methods of signing available for speed control in work zones. These methods are *Advisory Speeds*, *Workers Present Speed Limits* and *24/7 Construction Speed Limits*. Under certain conditions, a *Workers Present Speed Limit* is required by MN Statute. The following is a field application summary for the speed limits in this guideline.

METHOD	DESCRIPTION	EXAMPLES	AUTHORITY
<b>Advisory Speed (Road Conditions)</b>	For <b>driver safety</b> , warning signs with advisory speed plates, identify safe speeds for the driver to safely negotiate a potentially hazardous condition caused by the work activity. <b>Advisory speeds should be the first consideration.</b>	Bumps, low shoulders, drop-offs, bypass indicating the curve, narrow lanes, no shoulders, sight distance restrictions or poor road surface.	Established by the District or Local Road Authority per the MN MUTCD.
<b>Advisory Speed (Worker)</b>	For <b>worker safety at spot locations</b> and under temporary conditions. Warning signs alerts motorists that there are workers ahead.	Maintenance or construction operations at spot locations.	Established by the District or Local Road Authority per the MN MUTCD.
<b>Workers Present Speed Limits</b>	For <b>worker safety</b> , <i>Workers Present Speed Limits</i> are established in short-term projects during continuous worker activity <b>when the workers are present</b> and are adjacent to moving traffic.	Pavement repair, bridge repair, loop detector installation and turn lanes, mill and overlay projects, concrete joint repair and crack sealing with multiple operations.	Established by the District Traffic Engineer (or designee) or Local Road Authority per M.S.169.14 Subd 5d.
<b>24/7 Construction Speed Limits</b>	<i>24/7 Construction Speed Limits</i> are regulatory speed zones intended for a 24 hour continuous posting established in long term projects where it is <b>important for the motorist to reduce speeds in order to safely navigate</b> through hazards over the length of the project.	Bypasses, shoulder drop-offs, narrow lanes, grade separations, and pavement repair.	Established by the Commissioner as recommended by the District Traffic Engineer or Local Road Authority per M.S.169.14 Subd 4.

# **INTRODUCTION**

## **BACKGROUND**

Safety in street and highway work zones is an area of emphasis for MnDOT (Minnesota Department of Transportation). One of the ways to improve safety is the appropriate use of speed limits to control vehicle speeds through street and highway work zones. Proper and uniform application of these speed limits should improve the safety of the highway worker and the traveling public.

## **PURPOSE**

The purpose of this document is to provide a uniform guideline for the proper application of speed limits in street and highway work zones. This booklet outlines the guidelines, proper layouts and procedures for implementing speed limits in work zones. Although it is usually desirable to provide all traffic controls as shown in the layouts, situations arise where this becomes impractical. Engineering judgment may dictate modifications to the typical layouts. When modifications are made, factors such as traffic volume, speed, sight distance, type of work, etc. must be considered.

## **SCOPE**

The provisions of Minnesota Statutes 169.14, "Speed Limits, Zones; Radar" and the MN MUTCD (Minnesota Manual on Uniform Traffic Control Devices), including the Field Manual, apply to all road authorities in the State of Minnesota (M.S. 169.06), and must be properly applied to provide all traffic controls in Minnesota.

## **OVERVIEW**

It has been shown that the placement of appropriate speed limit signs and the presence of active enforcement results in the best compliance to the posted limit. Speed limits in work zones should not be considered a "cure-all" for work zone safety problems, but only a portion of the overall project control plan. Speed advisories should be considered prior to instituting a regulatory speed limit in the work zone. Studies have shown a high level of compliance with the advisory signs and that there is little difference in traffic performance between regulatory speed limits and advisory speed signing.

It must be stressed that the safest work zone is one that minimizes the worker and motorist crash probability and does not present roadway conditions that violate driver expectations. This safe environment is created by strict and uniform adherence to the MN MUTCD, including the Field Manual. Reduced the speed limit in a work zone is only one of the many traffic control techniques that can be used to safely guide the motorist through highway work zones.

## **AUTHORITY**

Modification of traffic controls or working conditions may be required to expedite safe traffic movement and to promote worker safety. The engineer or their representative has the authority to control the progress of work on the project with respect to obtaining safe conditions, including the authority to modify conditions or halt work until applicable or remedial safety measures are taken. This authority is supported by the specifications and additionally by State Statute. Each person whose actions affect temporary traffic control zone safety, from upper-level management personnel to field personnel, should receive training appropriate to the job decisions each is required to make. Only those who are trained in safe traffic control practices, and who have a basic understanding of the principles established by applicable standards and regulations (including those of the MN MUTCD), should supervise the selection, placement and maintenance of traffic control devices in work zones.

## RELATION TO OTHER DOCUMENTS

Other documents that are important to engineering personnel in selecting and providing safe work zones include:

- Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD) including the Field Manual, "Temporary Traffic Control Zone Layouts";
- Minnesota Statutes Section 169.14;
- MnDOT Traffic Engineering Manual Section 8-5;
- MnDOT Contract Administration Manual; and
- MnDOT Standard Signs Summary

## THE LAW

### Minnesota Statutes Section 169.011 Subdivision 95 reads:

**Work zone.** "Work zone" means a segment of street or highway for which:

- (1) 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
- (2) any of the following applies:
  - (i) official traffic-control devices that indicate the segment of street or highway under construction, reconstruction, or maintenance, are erected;
  - (ii) one or more lanes of traffic are closed;
  - (iii) a flagger under section 169.06, subdivision 4a, is present;
  - (iv) a construction zone speed limit under section 169.14, subdivision 4, is established; or
  - (v) a workers present speed limit under section 169.14, subdivision 5d, is in effect.

### Minnesota Statutes Section 169.14 Subdivision 4 reads:

**Establishment of zones by commissioner.** On determining upon the basis of an engineering and traffic investigation that any speed set forth in this section is greater or less than is reasonable or safe under the conditions found to exist on any trunk highway or upon any part thereof, the commissioner may erect appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be effective when such signs are erected. Any speeds in excess of such limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. On determining upon that basis that a part of the trunk highway system outside a municipality should be a zone of maximum speed limit, the commissioner may establish that part as such a zone by erecting appropriate signs showing the beginning and end of the zone, designating a reasonable and safe speed therefor, which may be different than the speed set forth in this section, and that it is a zone of maximum speed limit. The speed so designated by the commissioner within any such zone shall be a maximum speed limit, and speed in excess of such limit shall be unlawful. The commissioner may in the same manner from time to time alter the boundary of such a zone and the speed limit therein or eliminate such zone.

### Minnesota Statutes Section 169.14 Subdivision 5 reads:

**Zoning within local area.** When local authorities believe that the existing speed limit upon any street or highway, or part thereof, within their respective jurisdictions and not a part of the trunk highway system is greater or less than is reasonable or safe under existing conditions, they may request the commissioner to authorize, upon the basis of an engineering and traffic investigation, the erection of appropriate signs designating what speed is reasonable and safe, and the commissioner may authorize the erection of appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be

effective when such signs are erected. Any speeds in excess of these speed limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. Alteration of speed limits on streets and highways shall be made only upon authority of the commissioner except as provided in subdivision 5a.

### **Minnesota Statutes Section 169.14 Subdivision 5d reads:**

#### **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.

### **Minnesota Statutes Section 169.14 Subdivision 6a reads:**

**Work zone speed limit violations.** 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. This fine is in addition to the surcharge under section 357.021, subdivision 6.

## **DOCUMENTATION**

For enforcement and legal claims, it is necessary to accurately document the application of all regulatory speed limits in work zones. This documentation should accurately describe sign locations, direction of travel the signs face, dates/times the signs were installed and removed, and the numerical value of the limit. The sign locations should be referenced to physical features of the roadway, such as the distance from an intersection or reference (milepost) marker. It is suggested that each road authority adopt a proper method of documentation so these records may be used to establish the existence of the speed limit.

# ADVISORY SPEEDS

## DESCRIPTION

Warning signs with speed advisories should be used whenever an unexpected change in geometrics is caused by the work activity. This section addresses the use of advisory speed plates in stationary work zones. In summary, the advisory speed plate is intended to supplement warning signs. Warning signs, with speed advisory plates, identify the speed by the driver to safely negotiate a hazard or potentially hazardous condition. Drivers will reduce their speed if they clearly perceive a hazard. **ADVISORY SPEEDS SHOULD BE THE FIRST CONSIDERATION WHEN ESTABLISHING SPEED LIMITS IN ANY WORK ZONE.**

Warning signs with speed advisories should be determined in advance. Prior work zones with similar activities should be used as a base in determining the necessary speed plates. The work zone site should be test driven by the supervisor to confirm that the advisory speed is set at a reasonable value for the activity being performed. Advisory speed plates (W13-1P) are further detailed in Part 6 of the MN MUTCD. A very common application of *Advisory Speeds* is on crossovers for two-way bypasses. These speed limits also work well on bump signing often used on bituminous mill and overlay projects.

Although *Advisory Speeds* are usually used to alert motorists to hazards to themselves, there is one special *Advisory Speed* in which this is not the case. The *Advisory Speed (Worker)* is used to alert motorists to workers ahead and is used in conjunction with the "Worker Ahead" W21-1 warning sign, which is outlined in Layout 1. Unlike other worker speed limits, the *Advisory Speed (Worker)* is meant to be used only at spot locations. Additional signs may be used in very long work zones.

## AUTHORITY

A speed limit authorization from the Commissioner of Transportation is not required to establish an *Advisory Speeds*. The District Traffic Engineer and/or responsible local road authority is authorized to determine the use of advisory speed plates. When this authority has been delegated down to front line supervisors, it is important that the same person should always establish the speed limit. Experienced judgment is sometimes the only indicator of the reasonable speed to be posted. Traffic Engineering personnel should be contacted whenever there is any doubt as to what the posted value should be.

## SIGN SIZE AND MOUNTING

The speed advisory plate (W13-1) shall be black legend on orange background when used in construction and/or maintenance work zones. Advisory speed plates shall be minimum 18" x 18". When used with 36" or larger warning signs, advisory speed plates shall be minimum 24" x 24". When used, the plate shall be mounted below the warning sign on the same assembly. The bottom of the speed advisory plate shall be at least one foot above the pavement elevation. The standard sizes described above are the minimum sizes allowed for application on high-speed streets or highways as defined in the MN MUTCD. However, applications on higher volume and higher speed highways, such as freeways and expressways, should use larger signs to provide adequate target value and legibility.

## LOCATION (See Layout 1)

If a work zone *Advisory Speed* is located within a regulatory speed zone, it is not necessary to lower the regulatory speed to conform to the *Advisory Speed*. However, care should be taken not to erect an *Advisory Speed* so near the regulatory speed limit sign that the motorist may become confused by two different speed values. If it is physically impossible to prevent this, then the regulatory speed sign should be covered or removed for the duration of the work zone *Advisory Speed*. An advisory speed zone within a regulatory speed zone should not be posted for a value higher than the in place posted regulatory speed zone.

# WORKERS PRESENT SPEED LIMITS

## DESCRIPTION

*Workers Present Speed Limits* are regulatory speed limits established in work zones to improve worker safety. These limits are intended for use where the work area and workers are adjacent to traveled lane(s) open to vehicular traffic. A road agency may set a reduced *Workers Present Speed Limit* without an engineering and traffic investigation. A *Workers Present Speed Limit* of 45 mph is required by law under certain conditions (see **AUTHORITY** below for specifics).

The reduced speed limit signs shall only be posted in the traffic control zone during continuous worker activity while performing construction or maintenance operations. Overuse of the *Workers Present Speed Limit* will reduce the effectiveness; therefore, these must be prudently applied where the motorist can perceive the need to reduce speeds. During periods of no activity or when the traffic controls are removed from the roadway, the speed limit signs shall be covered or removed. This means installing signs at the beginning of a work shift and removing signs at the end of the shift. The speed limit is only in effect when the signs are installed and visible to traffic.

Signs with an electronic display (meeting visibility criteria) may be used to display the numerical value of the *Workers Present Speed Limit*. This *Electronic Workers Present Speed Limit* allows the advantage of modifying the speed limit at specific locations in long work zones where workers are present instead of mobilizing each time to install and remove signs depending on workers' presence. Existing speed limit signs will still need to be covered or removed.

The use of the *Workers Present Speed Limit* should be determined in advance. Prior work zones with similar activities should be used as a base in determining the necessary speed limits. As a general rule, posting the *Workers Present Speed Limit* 10 miles per hour below the in place limit is a good beginning point. The work zone site should be test driven by the supervisor to confirm that the speed limit is set at a reasonable value for the activity being performed.

Some hazards near the work area may still require warning signs but it is intended that the regulatory speed limit reduce drivers' speed such that the majority of hazards can be safely negotiated. Severe hazards at spot locations may still require an additional speed advisory to slow the motorist even more.

## AUTHORITY

The "***Speed limit in work zone when workers present***" contained in Minnesota Statutes Section 169.14, Subd. 5d allows (as well as requires in certain conditions) the governing road authority to authorize the use of reduced maximum speed limits in highway work zones without conducting an engineering and traffic investigation. To reduce confusion between the different types of speed limits that can be used in work zones, MnDOT OTST has modified the name in this document to *Workers Present Speed Limit*. For practical application on the trunk highway system, the MnDOT district representative to approve a *Workers Present Speed Limit* shall be the District Traffic Engineer (or his/her designee).

A required *Workers Present Speed Limit* of 45 mph shall be used on a road with an established speed limit of at least 50 mph when at least one lane or portion of a lane of traffic is closed in either direction and workers are present directly adjacent to the traveled lanes – with the following exceptions:

- On the side of a divided highway (with a median) that does not include a temporary traffic control zone;
- where positive barriers are placed between workers and the traveled portion of the highway;
- where temporary traffic control zone devices are deployed for less than 24 hours;
- where a 24/7 Construction Speed Limit is in place; or
- where a different *Workers Present Speed Limit* is established by the road authority (following the criteria listed below).

Aside from the required 45 mph *Workers Present Speed Limit*, the local road authority may establish a *Workers Present Speed Limit* in a work zone (as defined in MN Statutes Section 169.011, Subd. 95 – see

section **THE LAW** in this document) when workers are present adjacent to traveled lanes open to vehicular traffic. This *Workers Present Speed Limit* shall not reduce the speed limit on the affected roadway by more than (1) 20 mph on a roadway having an established speed limit of 55 mph or greater, and (2) 15 mph on a roadway having an established speed limit of 50 mph or less.

The *Workers Present Speed Limit* shall be effective upon erection of appropriate signs. The law further states that the signs must be removed or covered or when they are not required. It is a good practice to document the time, place and value when the speed limit is established to assist in prosecuting speed offenders and supporting defense in the event of liable actions. [See the sample Documentation Form in the Appendix.](#)

## **SIGN SIZE AND MOUNTING**

A *Workers Present Speed Limit* assembly shall consist of a black and white SPEED LIMIT sign (R2-1) with a black and orange WORK ZONE plaque (G20-5aP) installed above the SPEED LIMIT sign. A black and white \$300 FINE plaque (R2-6bP) may be installed below the *Workers Present Speed Limit* assembly. See the charts on Layout 2 (typical application of *Workers Present Speed Limit* on multi-lane road) & Layout 2b (typical application of *Workers Present Speed Limit* on 2-lane, 2-way road).

When the *Workers Present Speed Limit* calls for a reduced speed that results in a difference of 15 MPH from the preceding zone, then a speed reduction (W3-5) sign should be used. The sign is not required for reductions of 5 - 10 MPH but may be used. When this sign is posted with the temporary mounted advance warning sign series, it must be mounted at least one foot above the pavement. If the advance warning series is mounted on post driven structures or attached to other fixtures, all signs should be mounted at the same height. In rural areas this requires the bottom of sign to be 5 feet above the pavement and 7 feet in urban areas. If the *Workers Present Speed Limit* is not in effect then the speed reduction sign should be covered or removed.

The *Workers Present Speed Limit* assemblies may be mounted on temporary stands such that they can be easily removed or may be mounted on posts driven into the ground and covered when not needed. When post mounted, the bottom of any sign assembly should be least 5 feet above the pavement in rural areas and at least 7 feet above the pavement in urban areas.

For the *Electronic Workers Present Speed Limits*, the black and white SPEED LIMIT sign (R2-1) should have the speed limit indicated with a black and white electronic display. When workers are not present, the in-place speed limit shall be indicated by the electronic display. When workers are present, the reduced speed limit shall be displayed. When the *Workers Present Speed Limit* calls for a reduced speed that results in a difference of 15 MPH from the preceding zone, then an electronic reduced speed ahead sign (may be electronic display or flip board) should be placed prior to each *Electronic Workers Present Speed Limit* assembly. The electronic reduced speed ahead sign should display yellow lettering on a black background or black lettering on a yellow or orange background. See Layout 2a for additional information.

An black and white END WORK ZONE SPEED LIMIT sign (R2-12) shall be placed at the end of the work zone to indicate the end of the higher fine area.

## **LOCATION (See Layout 2, Layout 2a & Layout 2b)**

The signs should be placed in the shoulder or ditch area on the side of the road open to through traffic. Signs may be erected or attached to vehicles/trailers in the closed lane as long as equipment and devices do not obstruct visibility of the signs. Typically, a *Workers Present Speed Limit* assembly is placed by the area where workers are working. If the work activity proceeds downstream, the assembly shall not exceed a distance of 1 mile from the active work area where workers are present for 40 mph or higher speed limits (for *Workers Present Speed Limits* less than 40 mph, the assembly should be no greater than ½ mile in advance of the work area). Subsequent confirming sign locations for long work crews are also specified on Layout 2 & Layout 2b.

# 24/7 CONSTRUCTION SPEED LIMITS

## DESCRIPTION

*24/7 Construction Speed Limits* are regulatory speed zones established in long term construction and/or maintenance projects when the physical features or the roadway or the work zone require lower vehicle speeds. The *24/7 Construction Speed Limit* is intended for a 24-hour continuous posting so, unlike the *Workers Present Speed Limit*, they are not taken down at the end of the work shift. The speed limit goes into effect when the signs are posted.

*24/7 Construction Speed Limits* should be used when the roadway construction environment will continuously dictate a reduced speed and it is imperative for the motorist to reduce speed in order to safely navigate sub-standard geometrics or hazards that may be encountered over the length of the project. Since the signs will be posted 24 hours a day, the primary reasons to establish the limit should also be present 24 hours a day. Conditions that would warrant *24/7 Construction Speed Limits* are bypasses, lane drops, drop-offs, narrow lanes, no shoulders, and sight distance restrictions or poor road surface. Some of these hazards may still require warning signs but it is intended that the regulatory speed limit will reduce drivers' speed such that the majority of hazards can be safely negotiated. Severe hazards at spot locations may still require an additional speed advisory to slow the motorist even more.

## AUTHORITY

All *24/7 Construction Speed Limits* must be authorized by the Commissioner of Transportation per MN Statute 169.14 Subd 4. On trunk highways, a request should be made to the MnDOT District Traffic Office. A complete layout of the traffic control plan sheets for the project and any other relevant data should also be submitted. The traffic staff will conduct a traffic investigation to determine the safe speed. The results of the investigation, along with the recommended speed, will be submitted to MnDOT's Office of Traffic, Safety & Technology. An authorization to erect the signs will be issued by MnDOT's Office of Traffic, Safety & Technology.

On local roads, the road authority should follow the same procedures as requesting a normal speed limit authorization. A resolution, traffic control plan sheets and any other relevant data should be submitted to the MnDOT District Traffic Engineer. The traffic staff will perform a traffic investigation and submit the results to MnDOT's Office of Traffic, Safety & Technology. An authorization will be issued to the road authority from there.

The local road speed limit authorization will be issued with the following contingencies: 1. The District Traffic Engineer shall be notified when the signs are erected. 2. The road authority should monitor and verify that the correct speed is posted for the work activities involved. 3. If changes are necessary, the District Traffic Engineer should be notified immediately. 4. The District Traffic Engineer shall be notified when the signs are removed.

## SIGN SIZE AND MOUNTING

A *24/7 Construction Speed Limit* assembly shall consist of a black and white SPEED LIMIT sign (R2-1) with a black and orange WORK ZONE plaque (G20-5aP) installed above the SPEED LIMIT sign. A black and white \$300 FINE plaque (R2-6bP) may be installed below the *24/7 Construction Speed Limit* assembly. See the chart on Layout 3.

*24/7 Construction Speed Limit* signs shall be regulatory "SPEED LIMIT" signs (R2-1) and be ground mounted. The spacing of the succeeding speed limit signs shall be according to the **Typical Spacing For 24/7 Construction Speed Limit Signs** chart. The bottom of any sign assembly should be least 5 feet above the pavement in rural areas and at least 7 feet above the pavement in urban areas.

When the *24/7 Construction Speed Limit* calls for a reduced speed that results in a difference of 15 MPH or greater from the preceding zone, a speed reduction (W3-5) sign should be used. The sign may be used for a difference of 10 MPH when deemed necessary by engineering judgment. When this sign is posted with the advance warning sign series, it must be mounted at least 1 foot above the pavement. When ground mounted, or attached to some other permanent fixture on the roadway, it must be mounted a minimum of 5 feet (rural) or 7 feet (urban) above the roadway elevation.

A black and white END WORK ZONE SPEED LIMIT sign (R2-12) shall be placed at the end of the work zone to indicate the end of the higher fine area. A black and orange END ROAD WORK sign (G20-2a) may be used instead of the END WORK ZONE SPEED LIMIT sign.

### **LOCATION (See Layout 3)**

The signs should be placed in the shoulder or ditch area on the side of the road open to thru traffic. As mentioned above, The spacing of the succeeding speed limit signs shall be according to the **Typical Spacing For 24/7 Construction Speed Limit Signs** chart shown on Layout 3.

## **HIGHER FINES FOR INPLACE SPEED LIMITS IN WORK ZONES**

### **DESCRIPTION**

Since MN statute sets a fine of \$300 for a violation of a regulatory speed limit in a work zone, the road authority may determine that the traveling public be made aware of the increased fine, even if the inplace speed limit is not modified. In addition, installing the WORK ZONE and, if desired, the \$300 FINE plaque may encourage drivers to slow down in an area where speed limits are often violated – particularly important if workers are present or if the driver should reduce speeds to better navigate the work zone.

### **SIGN SIZE AND MOUNTING/LOCATION**

A black and orange WORK ZONE plaque (G20-5aP) may be installed above an inplace SPEED LIMIT sign to reinforce the presence of the work zone. This assembly may be supplemented by the installation of a black and white \$300 FINE plaque (R2-6bP) below the SPEED LIMIT sign to indicate the increased fine within the work zone.

If this assembly is used, a black and white END WORK ZONE SPEED LIMIT sign (R2-12) should be placed at the end of the work zone to indicate the end of the higher fine area. A black and orange END ROAD WORK sign (G20-2a) may be used instead of the END WORK ZONE SPEED LIMIT sign. See the charts on Layouts 2 or 3 to see the appropriate sizes of signs to use.

# **SPEED LIMITS ON DETOURS**

## **DESCRIPTION**

Construction projects may involve detouring traffic onto a local road or onto roads designated as Temporary Trunk Highways. The increased traffic and varying designs of the affected detour roads may require the establishment of different speed limits. These detours are typically not under construction therefore *Workers Present Speed Limits* are not appropriate. It is also not appropriate to have higher fines on speeding citations in these areas since there are no workers or construction involved. Authorization of a normal regulatory speed limit, for a temporary time frame, should be used in these instances.

## **AUTHORITY / JUSTIFICATION**

Authorization from the Commissioner of Transportation is required for a temporary speed limit. A complete layout of the proposed detour route and an estimated increase in the ADT should be submitted to the District Traffic Office. The District Traffic Office shall perform a traffic investigation on the detour and submit a recommendation to the central office of traffic engineering. Justification of the proposed speed limit should follow the same guidelines for establishing regulatory speed limits as defined in Chapter 13 of the Traffic Engineering Manual. Increased ADT can cause progressive deterioration in lower design roads and is important that a commitment is made to maintain the road in a safe condition for the recommended speed limit. Speed limit authorizations will be sent to the applicable road authorities with a beginning date and an ending date of the temporary speed limit. The speed limits will be in effect when the signs are posted.

## **SIGN SIZE AND LOCATION**

All signs shall be regulatory black legend on white reflectorized speed limit signs (R2-1) and the bottom of the sign shall be mounted at least 5 feet (rural) or 7 feet (urban) above the pavement elevation. The standard size sign is 24" x 30". Signs should be located frequently enough to reasonably notify drivers of the speed limit as they enter and travel along the detour. The use of additional orange flags or batten boards is not recommended since this may confuse enforcement and the motorists about the type of speed zone in effect. Speed limit signs shall be removed before the termination date listed on the authorization.

# DYNAMIC SPEED DISPLAY SIGNS IN WORK ZONES

## DESCRIPTION

Dynamic Speed Display (DSD) signs are changeable message signs that are activated by radar or some type of speed sensing device and then display, to approaching drivers, the speed at which they are traveling. They may be installed in conjunction with a regularly posted Speed Limit sign, 24/7 Construction Speed Limit assembly, Workers Present Speed Limit assembly, or an Advisory Speed plaque. These signs are commonly referred to as "speed display signs", "driver feedback signs" or "your speed is" signs. These installations may be temporary, portable signs or may be permanent installations attached to new or existing roadside hardware. The signs should only be used at key locations, such as speed transitions, or on a temporary basis for maintenance and construction work zones to avoid overuse.

Studies have shown that the signs do cause increased reductions in travel speed, by drivers, compared to passive static speed limit signs. These larger reductions in speed are beneficial especially when workers will be close to an open lane with high speed traffic. The use of the DSD signs are not limited to any certain speed limit value; however, they may have better utility in areas with higher speeds. While the signs do improve compliance to a lower speed, they do have limitations and the typical practice of lowering speed limits by 10 or 15 MPH in a work zone should be followed.

As with any traffic control device, it must adhere to the MN MUTCD standards for crashworthiness.

## AUTHORITY

Overuse of the DSD signs can reduce their effectiveness therefore rotating the sign to different work zones is recommended. On trunk highways, the MnDOT Offices of Maintenance, Construction and Traffic should coordinate for the best deployment of the signs. The signs should prove most effective during the initial stages of any long term project especially if extraordinary enforcement is utilized.



## OPERATION

If it is used with an *Advisory Speed* or *Workers Present Speed Limit* (Layout 1, 2, 2a, or 2b) it should only operate during the time workers are present and be removed or turned away from traffic when workers are not present. If the sign is installed as a ground mounted permanent location, such as a long term detour, it should operate 24 hours a day, 7 days a week. If it used with a 24/7 *Construction Speed Limit* and Layout 3 is used, it should operate 24 hours a day, 7 days a week.

## SIGN SIZES and DISPLAYS

The following minimum specifications for DSD signs are to be met. The two sizes correspond to the size of the speed limit sign (R2-1) that is posted on the roadway or the advisory speed plaque posted on a warning sign. Large DSD signs may be used in place of a smaller DSD sign, but not the reverse.

DSD Sign Size Categories	Speed Limit Sign Sizes R2-1	Advisory Plaque Sizes W13-1	Digital Display Numeral Height	Minimum Font Size "YOUR SPEED"
<b>Small</b>	18" x 24" or 24" x 30"	18" x 18" or 24" x 24"	10" MIN.	4" D or E font
<b>Large</b>	36" x 48" or 48" x 60"	30" x 30" or 36" x 36"	14" MIN.	6" D or E font

The changeable message portion of the sign shall display the speed of the approaching vehicle as “XX” in MPH. For this section, the speed limit means the *Advisory Speed* in the work zone or the regulatory speed limit in the work zone. The following standards apply to the changeable message portion of the sign:

- The DSD sign shall flash at drivers traveling over the speed limit.
- The flash rate should be between 50 and 60 cycles per minute.
- Threshold speed settings should be set at 10 mph over the speed limit for low speed roadways and 20 mph over the posted speed limit for high speed roadways.
- For speeds measured over the speed threshold setting, the DSD sign shall go blank.
- The DSD sign shall either be blank or display zeroes when no vehicles are present.

The static background with the “YOUR SPEED” portion of the sign shall be retro reflective sheeting the same color as the existing speed limit sign and with black legend. If a warning sign and advisory speed plaque are being supplemented with a DSD sign, such as shown in Layout 1 or 4, then the background shall be orange. If the DSD sign is supplementing a regulatory speed limit sign, such as Layout 2 or 3, the background shall be white. See the Dynamic Speed Display Sign Drawing in the Appendix for legend spacing.

## LOCATION

The DSD sign shall be mounted above, below, or beside the regulatory speed limit sign or advisory speed plaque. DSD sign installations adjacent to permanent regulatory speed limit signs are typically post mounted when installed for long-term use or on a detour. Standard mounting heights shall comply with the MN MUTCD. In short-term work zones such as Layout 1, 2, 2a, or 2b, DSD sign installations are typically trailer-mounted but vehicle-mounted or other temporary sign mounting systems are allowed.

If the DSD sign is supplementing an *Advisory Speed* (Layout 1), then the DSD sign and advisory speed assembly should be mounted using the distances shown in Layout 4. If supplementing a regulatory *Workers Present Speed Limit* (Layout 2, 2a, or 2b) or the *24/7 Construction Speed Limit* (Layout 3), then the DSD sign should be placed next to the assembly. If this is a very long construction project, involving miles of lane closure or two-way traffic, the DSD sign may be relocated several times nearer the active work area to improve its effectiveness but it must always be adjacent to a regulatory speed limit sign.

## EXTRAORDINARY ENFORCEMENT

### BACKGROUND

Speed limit signs alone may not reduce vehicle speeds in the work zone. In many cases, special efforts must be taken to enforce speed limits and reduce the risk of traffic crashes within the work zone. Law enforcement officials provide the means for enforcing speed limits in work zones. MnDOT employs the Minnesota State Patrol (MSP) for extraordinary enforcement on trunk highway construction projects.

MnDOT has procedures for obtaining funding of extraordinary enforcement on MnDOT State Projects (SP). Funding for these enforcement services is available if approved in advance by the State Construction Engineer. These requests are considered on a project-by-project basis.

### EXTRAORDINARY ENFORCEMENT POLICY

It is the policy of the Minnesota Department of Transportation (MnDOT) to employ extraordinary enforcement and surveillance efforts when it is reasonably expected to increase the safety of the traveling public or construction personnel. Local road authorities are also encouraged to use extraordinary enforcement to increase work zone safety. The need for extraordinary enforcement should be identified early in the project development process.

## TRUCK INSPECTIONS

Truck inspections are another activity for which funding is available. MSP personnel, either Troopers or Law Compliance Representatives (LCR), can provide truck inspection support on a contract basis. Obtaining funding and support follows basically the same procedure as that used for extraordinary enforcement. A major difference is that truck inspection requires more flexibility in its planning and operation.

## PLANNED Vs. IMMEDIATE REQUESTS

Planned use for extraordinary enforcement and/or truck inspection ensures enough time for processing and provides better coordination between MnDOT and the MSP. Prior planning provides efficient use of safety and enforcement resources. A planned request is always preferable to an immediate request.

Immediate requests are requests that take less than one week to process before enforcement is desired. Procedures for immediate requests are the same as those for planned requests.

## PROCEDURE

It is important that requests, and their approval, precede contracting for extraordinary enforcement and/or truck inspection services. Also important is that a MnDOT representative be readily available to sign the MSP Weekly reports, and to check that the Weekly report identifies the correct SP. It is a good practice to provide the MSP Trooper with a cell phone or pager number to call at the conclusion of the service.

The following outlines the extraordinary enforcement process:

Responsible Organization	Action
<b>MnDOT District</b>	<ol style="list-style-type: none"> <li>1. Analyze the phases of your project to find which may require extraordinary enforcement.</li> <li>2. Contact the local State Patrol District Office and request assistance in the enforcement plan, and in an estimate of its cost. Base estimates on the current hourly rate for contracted services.</li> <li>3. Submit a request for extraordinary enforcement services funding to the State Construction Engineer; send a copy to the Work Zone Safety Coordinator. A sample of a request is on page 14, and may be found on MnDOT's internal web: <a href="http://ihub.dot.state.mn.us/minutes/residents/">http://ihub.dot.state.mn.us/minutes/residents/</a></li> </ol>
<b>State Patrol District</b>	4. Assists in the development of the Work Zone Enforcement Plan, and provides an estimate of the cost.
<b>Office of Construction and Innovative Contracting, Central Office</b>	5. Evaluates the District request for enforcement services. Send approval, or reason for denial, to requesting district. Allocate funds if approved.
<b>MnDOT District</b>	6. If the request is approved, contract with the MSP for extraordinary enforcement services. Coordinate provisions of the extraordinary enforcement plan, and modify as needed.
<b>State Patrol District</b>	7. Provides extraordinary enforcement services. Coordinates with Project Engineer, or designated representative.
<b>MnDOT District</b>	8. Validate MSP Weekly Report; log construction diary.

<b>State Patrol District</b>	9. Submits Weekly Reports, with MnDOT official's signature, and SP number, to State Patrol Headquarters.
<b>State Patrol Headquarters</b>	10. Submits invoices, with appropriate SP number, to MnDOT's Office of Construction and Innovative Contracting. Ensures Weekly Report has MnDOT official's signature, and SP
<b>Office of Construction and Innovative Contracting, Central Office</b>	11. Audits and tracks invoices and supporting documents. Submits MSP invoices for payment.
<b>Finance Office</b>	12. Makes payment to MSP.
<b>MnDOT District</b>	13. Monitor the continued need and appropriateness of the enforcement effort; modify as needed.

In the case of immediate requests, fax an information copy of the request to: (651) 366-4222, Work Zone Safety Coordinator, Office of Construction and Innovative Contracting.

Compensation for extraordinary enforcement services will be on a flat fee basis. The MSP uses the current fee for contracted services when contracting for extraordinary enforcement.

### **Eligible Costs:**

1. All contracted costs associated with extraordinary enforcement services on a MnDOT State Construction Project.
2. Travel time for enforcement personnel to and from the construction work zone, as allowed by current enforcement agency labor contract.
3. Minimum payments, as provided by current enforcement agency labor contract.

The following activities DO NOT qualify as extraordinary enforcement:

1. Patrolling outside of the work zone, except as provided by the extraordinary enforcement plan, the project engineer or designated representative.
2. Time spent on bookings, warrants, etc., beyond the scope of extraordinary enforcement duties.
3. When engaged in services not directly associated with extraordinary enforcement, e.g., escorting contractor equipment, motorist assistance, etc. This applies even if these activities are conducted within the work zone.
4. Travel and incidental costs above those allowed by contract.
5. Maintenance projects not funded with construction monies.
6. Locally initiated projects, which are done under the authority of a city or county.

**SAMPLE**



**OFFICE MEMORANDUM**

xxxx xx xxxxxxxx xxx xxxxxx xxxxxxxx Phone: xxx-xxx-xxxx  
xxx xxx xxxxxxxx xxxxxx Fax: xxx-xxx-xxxx  
xxxxxxxxxxxx, MN 5xxxx-xxxx

**DATE:** *XXXXXXXX XX, 20XX*

**TO:** **Tom Ravn**  
**State Construction Engineer**

**FROM:** *(Resident Engineer)*

**SUBJECT: Request for Extraordinary Enforcement Funds**  
**S.P. 123-4567, TH 1 from Illgen City to Finland**

With the approval of the Assistant District Engineer, I request funding for extraordinary traffic enforcement in this construction work zone. We determine that use of the Minnesota State Patrol (MSP) is necessary for the safety of construction personnel and the travelling public.

The construction work zone is approximately X miles long, with a posted speed limit of XX mph. We expect that MSP presence on the site will help reduce traffic speeds to a safe level. I am requesting *one* trooper and unit for XX hours a day each week during the project duration:

**xxx hours (\$ xx.xx/hour) = \$ x,xxx.xx**

**Total: \$ x,xxx.xx**

	<u>Office</u>	<u>Mobile</u>
<i>(Resident/Project Engineer)</i>	(612) 777-7777	(612) 555-5555
<i>(Project Inspector)</i>	(612) 123-4567	(800) 222-3333

**cc: Craig Mittelstadt - MS 650**  
J. Hancock - ADE  
B. Harrison - Traffic  
Lt. Getum - MSP  
*(Others you think appropriate.)*  
File

**SAMPLE**

# 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 \_\_\_\_\_

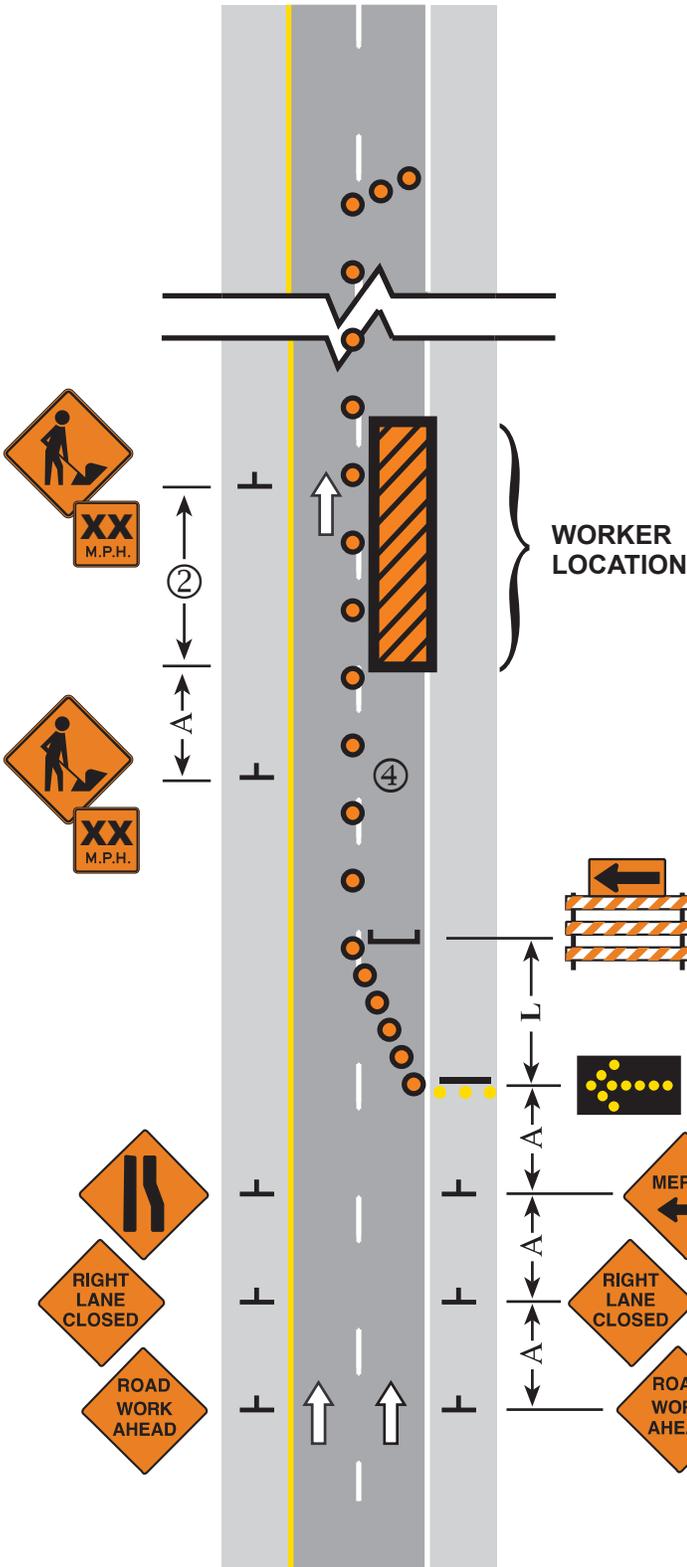
\_\_\_\_\_  
Signature                      Time/Date Installed

\_\_\_\_\_  
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.

**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 2 for spacing details and sign specifications.



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

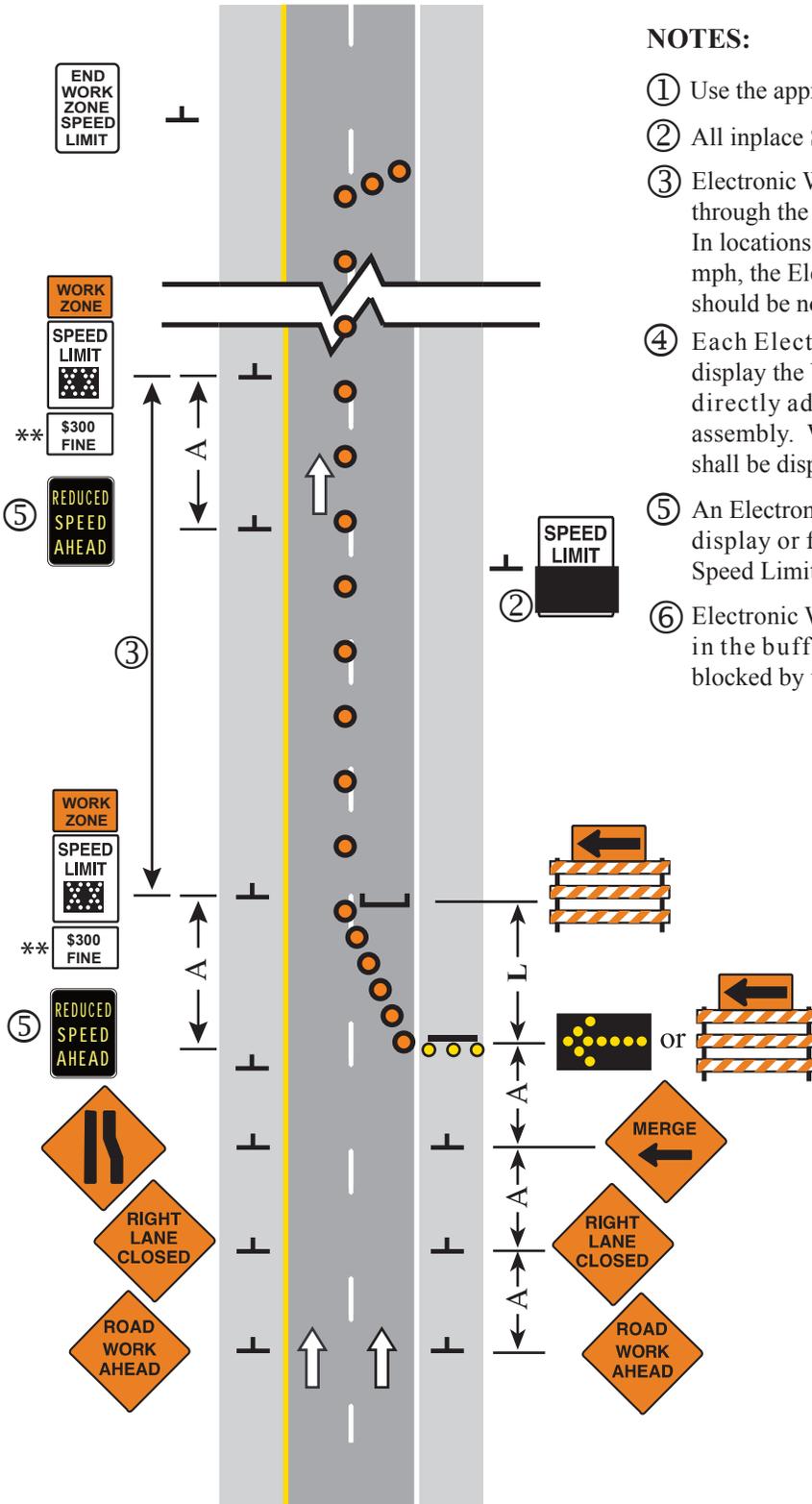
**Minimum Sign Sizes For Advisory Speed Limit Signing**

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.







**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.

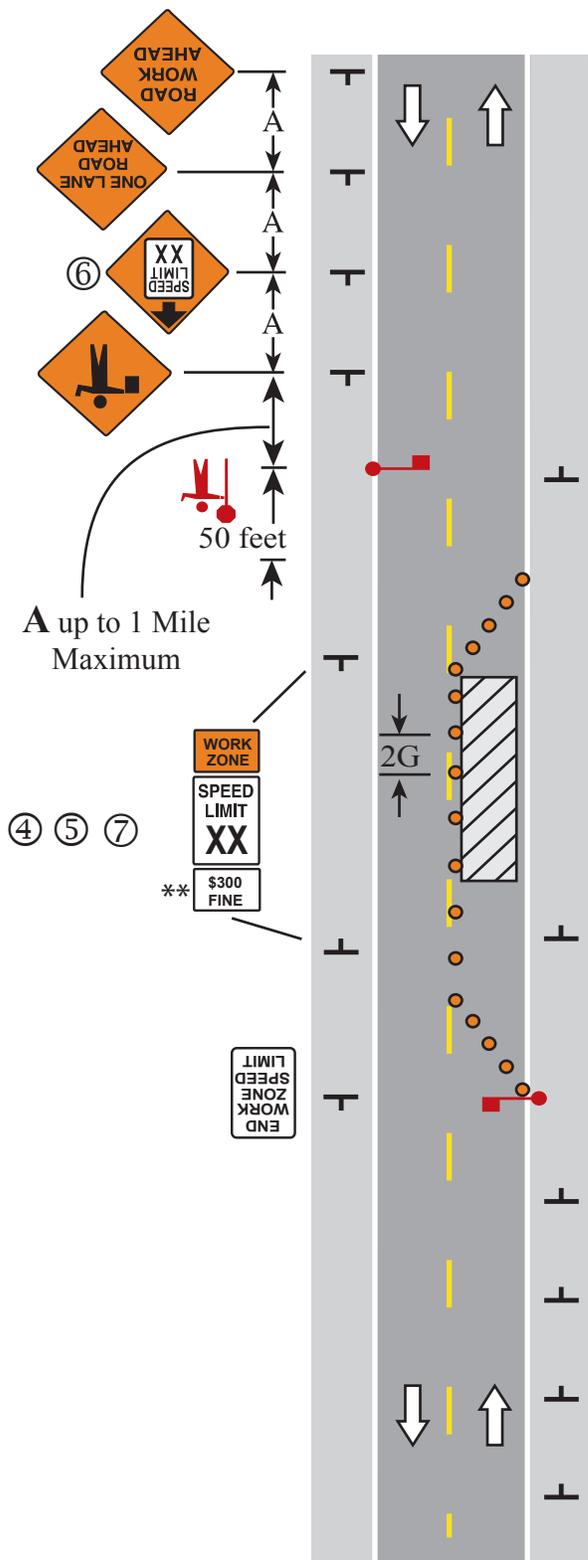
Minimum Sign Sizes		
Sign	Posted Speed Limit Prior to Work Starting	
	≤40 mph	>40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (Electronic Display or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

\*\* - Optional

● - Retroreflective channelizing device.

**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:



END WORK ZONE SPEED LIMIT

SPEED LIMIT

A up to 1 Mile Maximum

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

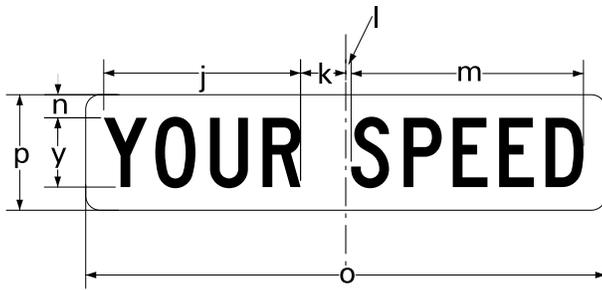
Sign	Posted Speed Limit Prior to Work Starting	
	≤ 40 mph	> 40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"



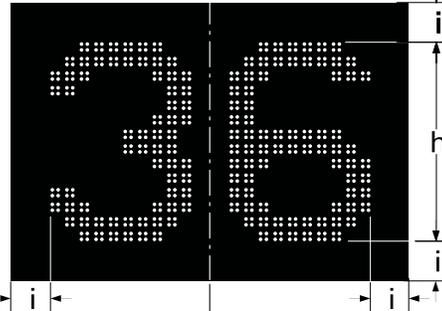
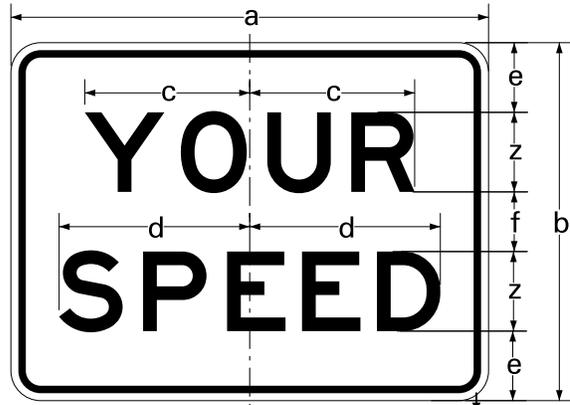




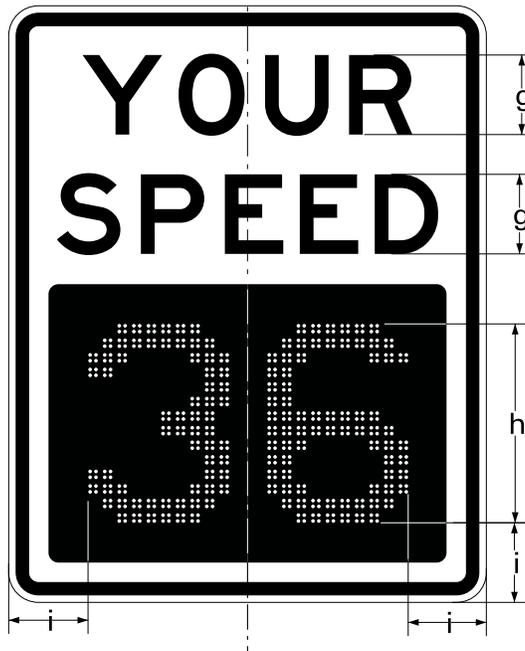
Separate Static Sign & Dynamic Display



One Line Static Sign



SIZE DIMENSION	Small Signs	Large Signs
RADIUS	1.5	1.5
MARGIN	.38	.38
BORDER	.38	.63
a	24	36
b	18	24
c	8.3	12.4
d	9.6	14.4
e	3.5	4
f	3	4
g	4 Min. <sup>4</sup>	6 Min. <sup>4</sup>
h	10 Min.	14 Min.
i	2 Min. <sup>3</sup>	2 Min. <sup>3</sup>
j	13.8	
k	3	
l	.5	
m	16.2	
n	1.5	
o	36	
p	8	
q		
r		
s		
t		
u		
v		
w		
x		
y	5C	
z	4E	6E



Complete Static Sign & Dynamic Display

NOTES:

1. All dimensions are in inches.
2. Color - Black legend and border on reflective background.
3. There shall be a minimum of 2" of opaque contrasting area between the usable display and the edge of the panel.
4. Use D Series or E Series Highway Font.



**SPEED LIMITS IN WORK ZONES  
GUIDELINES  
OCTOBER 2014**

**DYNAMIC SPEED DISPLAY SIGNS**

**SIGN NUMBER**