

Quality Standards

Methods to determine whether the various traffic control devices are Acceptable, Marginal, or Unacceptable.

Quality Standards

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These Layouts as well as the entire Field Manual, the Flagging Handbook and other documents are available on the Mn/DOT, Traffic Engineering website at:

<http://www.dot.state.mn.us/trafficeng/>

INTRODUCTION

Traffic controls are a necessary part of a Temporary Traffic Control Zone to warn motorists of hazards, advise them of the proper path through the zone, delineate areas where they may not operate, and to separate them from the workers. This is accomplished by the deployment of a system of devices. The success of this system depends on the visibility of each device at the time of a project's initial installation as well as throughout the life of the project. Since it is not practical to require new devices at all times, standards are needed to evaluate the condition of the devices to assure their continued effectiveness. The standards in this publication should aid in the determination of the quality of temporary traffic control devices.

The use of temporary traffic control zone devices subjects them to wear which does not occur with permanent devices. Although errant vehicles cause much of the damage to the devices, they also deteriorate in appearance from wear occurred during their storage, shipment, installation, relocation, and removal. Whenever a high number of these worn and damaged devices appear on the same project, the general appearance of the Temporary Traffic Control Zone deteriorates, reducing the level of safety provided to the workers, pedestrians, and traveling public.

These standards have been developed in an effort to offset the deterioration in the appearance of Temporary Traffic Control Zone devices. A determination of the condition of device quality should be made at several stages: while in storage, during preparation for delivery to the Temporary Traffic Control Zone, during initial set up and periodically during the course of the work. Suppliers and contractors are encouraged to apply this standard prior to delivery of devices to the jobsite. Doing so will minimize agency involvement and reduce costs related to on-site replacement.

These standards are intended to address the day-to-day operations of traffic control within a Temporary Traffic Control Zone and are not meant to cover the needs of emergency situations.

CRASHWORTHY CRITERIA

FHWA policy requires that all roadside appurtenances such as traffic barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and Temporary Traffic Control Zone hardware used on the National Highway System meet the crashworthy performance criteria. Additionally, a definition for the word "crashworthy" was included. Crashworthy is now defined as "a characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard such as the National Cooperative Highway Research Program Report 350, 'Recommended Procedures for the Safety Performance of Highway Features'."

In the 2003 Federal MUTCD and the current edition of the 2005 MN MUTCD, a specific compliance date of January 17, 2005 was announced. Local road authorities were not adequately prepared for this "crashworthy" compliance.

Minnesota received permission from the FHWA to extend these compliance dates. Mn/DOT then issued Technical Memorandum No. 06-06-T-03, dated January 30, 2006, extending this compliance date to January 17, 2010, for all local roads in the State of Minnesota. Since local road authorities perform many operations on low-speed (0-40 mph) Trunk Highways, Mn/DOT also issued Technical Memorandum No. 06-09-T-04, dated April 1, 2006, to extend the compliance date on low-speed Trunk Highways until January 17, 2010. The compliance date for high-speed Trunk Highways remained at the January 17, 2005 date and "crashworthy" compliance is required with respect to temporary (work zone) signs, barricades and channelizing devices.

The 2005 MN MUTCD has been updated to reflect these new compliance dates.

QUALITY CLASSIFICATIONS AND REQUIREMENTS

The quality of the Temporary Traffic Control Zone devices in this standard has been divided into three classifications: acceptable, marginal, and unacceptable. Acceptable devices meet the all MN MUTCD requirements such as design, size, color, weight, etc., and are properly placed as specified, and clearly perform their intended function. The term "Marginal" for the purpose of this manual means "marginally acceptable", reaching the lower end of acceptability. Devices that fall into the "unacceptable" classification shall not be delivered to the jobsite.

The required minimum percentage of acceptable devices has been established for each type of device and varies upon the duration of the Temporary Traffic Control Zone.

Intermediate and Long Term Duration

Within each Temporary Traffic Control Zone that is planned to remain in place for more than twelve (12) hours, the following requirements shall be followed:

- At the time of the initial set up or at the time of major stage changes, one hundred percent (100%) of each type of device (channelizers, barricades, signs, warning lights, arrow panels, portable changeable message signs, pavement tape and raised pavement markers) shall be classified as "acceptable".
- Throughout the duration of the project, the number of acceptable devices may decrease to seventy-five percent (75%) of the initial quantity of each particular device, as a result of damage and/or deterioration during the course of the work with the remainder of the devices in the "marginal" category.
- Devices in the marginal category may remain in the Temporary Traffic Control Zone until their total number exceeds the twenty-five percent (25%) maximum for that type of device, which is considered an "unacceptable" situation. Should the percentage of devices in the marginal category exceed twenty-five percent (25%), all marginal devices shall be replaced so as to bring the group of devices back up to acceptable standards.
- All devices categorized as unacceptable shall be replaced within twelve (12) hours of notification.
- Missing or knocked down devices should be replaced or re-set in a timely manner.

Short Term Duration

Within Temporary Traffic Control Zones that are planned to be in place for less than twelve (12) hours, the following requirements may be followed:

- At the time of the initial set up, one hundred percent (100%) of all TTC devices except channelizing devices and barricades shall be classified as "acceptable". During the short term duration of the project, the intermediate and long term duration standards shall be maintained for these devices.
- At the time of the initial set up, a minimum of seventy-five percent (75%) of each type of channelizer and barricade shall be classified as "acceptable". Up to a maximum of twenty-five percent (25%) of these devices may be classified as "marginal". "Unacceptable" devices shall not be installed.
- During the short term duration of the project, the number of marginal devices may increase beyond the twenty-five percent (25%) of the initial quantity, as a result of damage and/or deterioration during the course of the work.
- Missing or knocked down devices should be replaced or re-set in a timely manner.

The following descriptions, together with the accompanying photographs, should be used to determine if the device is acceptable, marginal or unacceptable.



EVALUATION GUIDE: WARNING SIGNS

Acceptable

To be considered acceptable, a sign shall meet all of the following conditions:

- There may be several abrasions on the surface, but very little loss of lettering.
- There has been no touchup of the lettering.
- This message is legible both day and night.
- Signs on portable structures shall be longitudinally perpendicular to the ground and may be placed on a side slope resulting in 3 inches maximum out-of-plumb per foot of height.
- Post mounted signs shall be installed within 3 inches of plumb for the height of the posts.
- The back side is free of any reflective materials except small logos or identification markings and have a bare surface or be painted a uniform color as approved by the local road authority.
- The sign is in place at the specified spacing and properly aligned to traffic.
- The sign support structure has been installed according to the approved crashworthy requirements.

Examples of "Acceptable" warning signs



EVALUATION GUIDE: WARNING SIGNS

Marginal

The sign is considered marginal, if it meets any of the following conditions:

- There are many surface abrasions throughout the sign face, and only a few are within the individual letters of the message.
- The sign face is free of any residue.
- Some color fading may be evident, but the background color and reflectivity are still apparent at night.
- This message is legible both day and night.
- Signs on portable structures are longitudinally perpendicular to the ground and the side slope results in no more than 3 inches out-of-plumb per foot of height.
- Post mounted signs shall be within 3 inches of plumb for the height of the posts.
- All warning signs are in place at the specified spacing and properly aligned to traffic.

Examples of "Marginal" warning signs



EVALUATION GUIDE: WARNING SIGNS

Unacceptable

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

- Asphalt splatter, cement slurry, or abrasions that are evident throughout the face of this sign.
- A letter has a loss of more than 50 percent or more of its stroke area or portions of letters are missing such that they become confusing to identify.
- There is noticeable color fading or loss of reflectivity is noticeable at night.
- The message is illegible.
- The sign is missing, knocked down or turned such that the message can not be seen.

Examples of "Unacceptable" warning signs



EVALUATION GUIDE: TYPE A & B CHANNELIZING DEVICES

Acceptable

To be considered acceptable, a channelizing device shall meet all of the following conditions:

- The devices' shape should remain clearly identifiable with no significant distortion and must be free standing in its normal position.
- Surface is free of punctures and abrasions.
- Surface is free of asphalt splatter, cement slurry, or other material and will readily respond to washing.
- The reflective bands have little or no loss of reflectivity, with only minor tears and scratches.
- Any dents do not seriously reduce the reflectivity of the sheeting
- Any dents do not seriously reduce the reflectivity of the sheeting



Marginal

The channelizing device is considered marginal, if it meets any of the following conditions:

- The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasions and discoloration.
- The reflective bands have numerous tears and scratches; but have no large areas of residue or missing reflective material.
- Any dents do not reduce the strength of the device.
- The device maintains its intended shape.
- No more than one device in a row is missing.



EVALUATION GUIDE: TYPE A & B CHANNELIZING DEVICES

Unacceptable

A channelizing device is considered unacceptable if it meets any of the following conditions:

- Punctures and large areas of staining asphalt splatter or cement slurry that cannot be cleaned due to abrasions or discoloration.
- There is noticeable fading of the device's color.
- Large areas of missing or stained reflective material.
- Substantial deformation of a device, which reduces the original dimensions, or the device has lost the intended shape.
- Several dents or fractures that affect their stability or ability to retain the reflective sheeting.
- Two or more consecutive devices are missing.



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 reflective sheeting.
- The orange is vivid and the stripes provide contrast.
- The barricade is installed in its specified location with adequate ballast, and properly aligned to traffic.
- 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:

- There are numerous surface abrasions through the panel surface.
- Some color fading is evident; however, it has no large areas of residue or missing reflective material.
- The orange is vivid and the stripes provide contrast.
- The barricade is turned at a skew to traffic that reduces it's effectiveness.



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 reflectivity and obvious color fading.
- Panels with asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material would make the panel unacceptable.
- 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.
- The barricade is missing, knocked down, or turned away from traffic.



EVALUATION GUIDE: WARNING LIGHTS

Acceptable

To be acceptable, the warning lights shall meet all of the following conditions:

- One hundred percent (100%) of all warning lights shall be operating properly. Any warning light that is out of alignment from the intended driver's line of vision is considered not operating properly.
- Type A Low-Intensity Flashing warning lights and Type C Steady-Burn warning lights shall be maintained so as to be capable of being visible on a clear night from a distance of 3000 feet.
- Type B High-Intensity Flashing warning lights shall be maintained so as to be capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1000 feet.
- Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens.

Marginal

The warning light is marginal, when it meets any of the following conditions:

- Type A and C warning lights - at least ninety percent (90%) of the warning lights shall be operating properly with no more than three (3) adjacent lights failing.
- Type B warning lights - one (1) light failing.

Unacceptable

A warning light is considered unacceptable if it meets any of the following conditions:

- Type A and C warning lights - less than ninety percent (90%) of the warning lights operating properly, or more than three (3) adjacent lights failing.
- Type B warning lights - more than one (1) light failing.

EVALUATION GUIDE: ARROW PANEL

Acceptable conditions for all arrow panels

For an arrow panel to be acceptable, it must meet all of the following conditions:

- All lamps are properly aligned for the intended driver's line of vision. Any operating lamp which is out of alignment shall be considered not functioning properly.
- No lamps are burnt out.
- All lamps dim properly.
- All lamps are the same level of intensity.

Unacceptable conditions only for trailer-mounted arrow panels

An arrow panel is considered unacceptable if it meets any of the following conditions:

- The arrow panel is not within 3 inches of plumb for the height of the panel.
- The arrow panel is not raised to at least 7 feet above the roadway surface (measured to the bottom of the panel).

FLASHING ARROW MODE (Sequential Arrow)

Marginal



An arrow panel in this mode is marginal, when it meets the following condition:

- Up to two (2) lamps out in the stem and no lamps out in the head.

Unacceptable

An arrow panel in this mode is considered unacceptable if it meets any of the following conditions:

- Any lamp out in the head
- More than two (2) lamps out in the stem
- The arrow panel not dimming properly.

EVALUATION GUIDE: ARROW PANEL

CHEVRON MODE



Marginal

An arrow panel in this mode is marginal, when it meets the following condition:

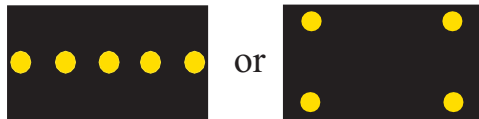
- No more than one (1) lamp out in any one chevron segment.

Unacceptable

An arrow panel in this mode is considered unacceptable if it meets any of the following conditions:

- Two (2) or more lamps out in any one chevron
- The arrow panel is not dimming properly.

CAUTION MODE (Bar or 4 Corners)



Marginal

An arrow panel in this mode is marginal, when it meets the following condition:

- At least four (4) lamps functioning properly.

Unacceptable

An arrow panel in this mode is considered unacceptable if it meets any of the following conditions:

- Less than four (4) lamps functioning properly
- The arrow panel is not dimming properly.

EVALUATION GUIDE: ARROW PANEL

DOUBLE ARROW MODE



Marginal

An arrow panel in this mode is marginal, when it meets the following condition:

- Two (2) lamps out in the stem and both heads completely functional with no lamps out.

Unacceptable

An arrow panel in this mode is considered unacceptable if it meets any of the following conditions:

- More than two (2) lamps out in the stem
- One (1) lamp out in the head
- The arrow panel is not dimming properly.



EVALUATION GUIDE: PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)

Acceptable

To be acceptable, a PCMS shall meet the following condition:

- One hundred percent (100%) of the pixels per character module shall be operating properly.

Marginal

A PCMS is marginal, when it meets the following condition:

- At least ninety percent (90%) of the pixels per character module shall be operating properly.

Unacceptable for all PCMSs

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

- Less than ninety percent (90%) of the pixels per character module are operating properly
- The PCMS is not properly aligned for the intended driver's line of vision..

Unacceptable for Trailer-Mounted PCMS

A trailer-mounted PCMS is considered unacceptable if it meets any of the following conditions:

- The sign panel is not within 3 inches of plumb for the height of the panel.
- The sign panel is not raised to at least 7 feet above the roadway surface (measured to the bottom of the panel).

EVALUATION GUIDE: PAVEMENT MARKING TAPE & PAINT

Acceptable

Pavement marking tape or paint is acceptable, when it meets the following condition:

- All pavement marking tape or paint (solid lines and skip lines) shall be in place and meet all material specifications.

Marginal

Pavement marking tape or paint is marginal, when it meets any of the following conditions:

- Less than ten percent (10%) of all tape, paint, message, or symbol is missing.
- Less than two (2) consecutive skip lines is missing.
- Less than a fifty (50) foot section of solid line is missing.

Unacceptable

Pavement marking tape or paint is considered unacceptable if it meets any of the following conditions:

- More than ten percent (10%) of all tape, paint, message, or symbol is missing.
- More than two (2) consecutive skip lines is missing.
- More than a fifty (50) foot section of solid line is missing.



EVALUATION GUIDE: TEMPORARY RAISED PAVEMENT MARKERS (TRPM)

Acceptable

TRPMs are acceptable, when it meets the following condition:

- All temporary raised pavement markers required are in place and meet all material specifications.

Marginal

TRPMs are is marginal, when it meets any of the following conditions:

- Less than ten percent (10%) of all TRPMs are missing.
- Less than three (3) consecutive temporary raised pavement markers are missing.

Unacceptable

TRPMs are considered unacceptable if it meets any of the following conditions:

- More than ten percent (10%) of all TRPMs are missing.
- More than three consecutive temporary raised pavement markers are missing.