

APPENDIX C

IDOT QUALITY STANDARD FOR WORK ZONE TRAFFIC CONTROL DEVICES

September 3, 2003

**Quality Standard for
Work Zone Traffic Control
Devices**

1998



**Illinois Department
of Transportation
Bureau of Operations**

1998 Quality Standard for Work Zone Traffic Control Devices

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Introduction

Traffic controls are a necessary part of highway work zones to warn motorists of hazards, advise them of the proper path through the work 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 quality of each device and its placement. Quality could be easily controlled by requiring all devices to be new at the time of a project's initial installation. This, however, would not be in the best interest of controlling costs and reducing waste. This standard does not apply to new devices, but should aid in the determination of the quality of used devices.

The normal temporary use of work zone traffic control devices subjects them to wear that does not occur to permanent devices. Much of this wear may be due to carelessness during the storage, shipping, relocating, and removal of these devices which causes much of the deterioration of their appearance. Whenever a high percentage of these worn and damaged devices appear on the same project, the general appearance of the work zone leaves much to be desired and could lead to a potential loss of motorist confidence and compliance.

This standard has been developed in an effort to offset the deterioration in appearance of work zones. A determination of quality should be made at several stages: while in storage, during preparation for delivery to the work 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 Department involvement and reduce time, effort, and costs related to on-site replacement.

Application of This Standard

Any traffic control device which has become ineffective due to damage or defacement shall be replaced by the Contractor. All traffic control devices shall be kept clean and neat appearing. The Engineer shall be the sole judge as to the acceptability of placement and maintenance of all traffic control devices.

Quality Classifications and Requirements

The quality of the work zone devices in this standard has been divided into three categories, **acceptable**, **marginal**, and **unacceptable**.

At the time of the initial set-up and at the time of major stage changes, 100 percent of each type of device (cones, drums, barricades, vertical panels, or signs) shall be acceptable. Throughout the duration of the project, the percentage of acceptable devices may decrease to 75 percent, only as a result of damage and/or deterioration during the course of the work.

Acceptable : Devices that meet the quality requirements herein for this classification and all other requirements in the plans and specifications, shall be determined to be **acceptable** for use on highway construction or contract maintenance projects.

Marginal : Devices that meet the quality criteria for **marginal** as described herein may remain in the work zone until they reach 25 percent for that type of device or until it is determined that they have become **unacceptable**.

Unacceptable : Devices in this category shall not be delivered to the jobsite. When found in the work zone, they shall be immediately removed and replaced.

The following photographs, together with the contract requirements of each specific project, shall be used as a guide to determine if the device is **acceptable**, **marginal** or **unacceptable**. A direct comparison of each device to this standard is not required for the rejection of devices, however, this standard shall be used to resolve disputes. One aid in avoiding potential disputes is to retain samples of devices in each category to supplement the photographs shown in the Evaluation Guides on pages 4, 7, 9, and 11.

Quality Standard for Signs

This standard applies to all signs: warning, regulatory and guide, that are furnished by a supplier, subcontractor, or contractor to be used for traffic control work zones.

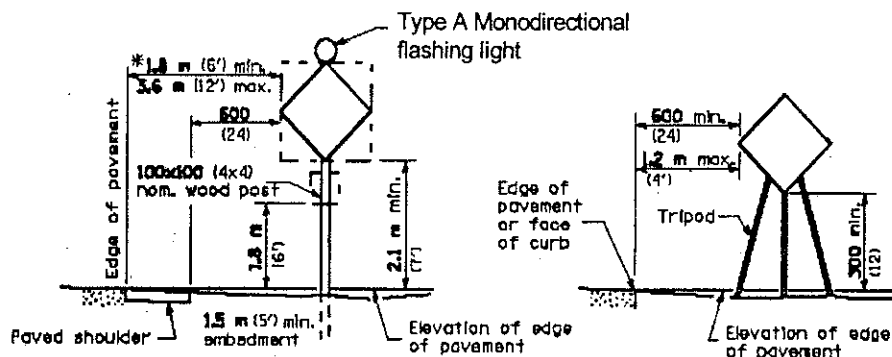
All standard signs shall conform to the requirements of the contract documents and the Manual on Uniform Traffic Control Devices and its supporting manuals. In complying with these requirements, the contractor and suppliers will furnish signs that are correct in size, shape, color and legend. Special signs, should they be required, are detailed in the plans. Article 1084.02 of the Standard Specifications provides the requirements for reflectorization.

For signs to be used in work zones, all of the above must be met to the satisfaction of the Department. In addition, Standard 702001 and Article 702.05(a) regarding sign erection shall be met. Sign installation dimensions must be adhered to. Sign positioning at the work site should be determined based on site conditions.

The Evaluation Guide on page 4 is to be used to evaluate the quality of the sign face only. No mention is made of dents, bends or other deformations. If any sign is bent to the extent that its shape is nonstandard or a portion of the sign itself is missing, such as a plywood sign with a broken corner, the sign shall be determined unacceptable.

TYPICAL SIGN INSTALLATIONS

See Standard 702001 Specified in Contract
for Specific Requirements



TYPICAL SIGN INSTALLATIONS

All heights shall be measured above the pavement surface.

EVALUATION GUIDE - WORK ZONE SIGNS

Acceptable - This is an example of an **acceptable** sign. It is not new. There are several abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering. This message is legible at a minimum distance of 400' during the day and 350' with low beam headlights at night.

Letter size for this message on a 48" x 48" sign is 7C.



Marginal - This is an example of a sign with **marginal** acceptability. Of the many surface abrasions throughout the sign face, many are within the individual letters of the message. The sign surface is free of any residue. Although some color fading is evident, the background color and reflectivity are still apparent at night. This message is legible at a minimum distance of 400' during the day and 300' with low beam headlights at night.

Letter size for this message on a 48" x 48" sign is 7C.



Unacceptable - This is an example of an **unacceptable** sign. Signs with asphalt splatter or cement slurry of an amount similar to the abrasions that are evident throughout the face of this sign are **unacceptable**. Some letters have a loss of more than 50 percent. There is noticeable color fading.

Please Note: Signs are required to be fluorescent orange in color. These photos are to be used as examples of the condition of the signs only.



Quality Standard for Barricades and Vertical Panels

This standard applies to Type I, II and III barricades, wing barricades and vertical panels that are furnished by a supplier, subcontractor, or contractor for traffic control use in work zones.

Barricade type and the placement of barricades and vertical panels are specified in the contract documents. Article 1084.02 of the Standard Specifications provides the requirements for reflectorization. Article 702.03 provides the requirements for barricades and vertical panels.

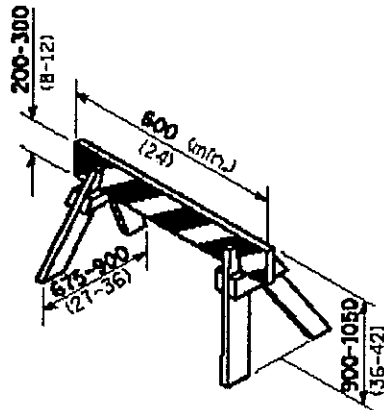
For barricades and vertical panels to be used in work zones, all of the above requirements shall be met to the satisfaction of the Department. In addition, the requirements of Standard 702001 regarding sizes, shapes, mounting heights, and structural design shall be met. Vertical panels shall be erected and maintained in a vertical position.

The Evaluation guide on page 7 is to be used to evaluate the quality of the reflectorized portion of barricades and vertical panels. In addition to this evaluation, device supports must also be evaluated. **Any one or any combination of the following will cause a device to be unacceptable:**

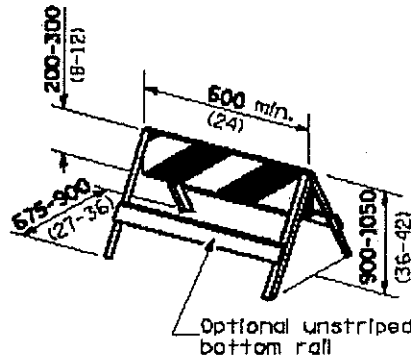
- Deformation of the support assembly to the extent that the sheeted panel is not parallel to the roadway surface.
- Device is bent or legs are twisted.
- Rusty metal parts.
- Unpainted wooden rails.

TYPICAL DRAWINGS OF TYPE I, II, AND III BARRICADES, WING BARRICADES AND VERTICAL PANELS

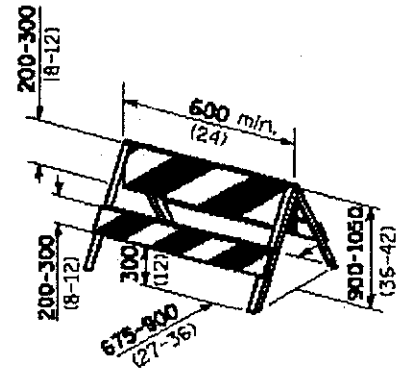
See Standard 702001 Specified in
Contract for Specific Requirements



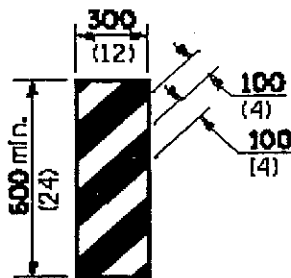
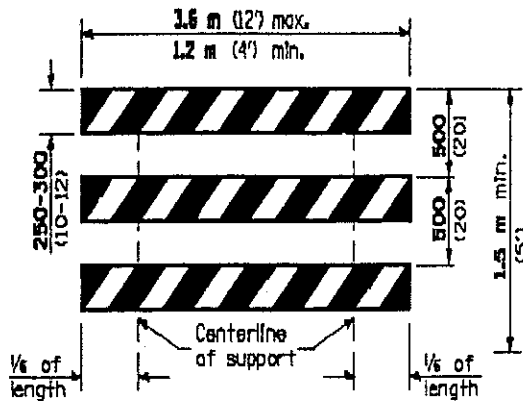
TYPE 1A BARRICADE



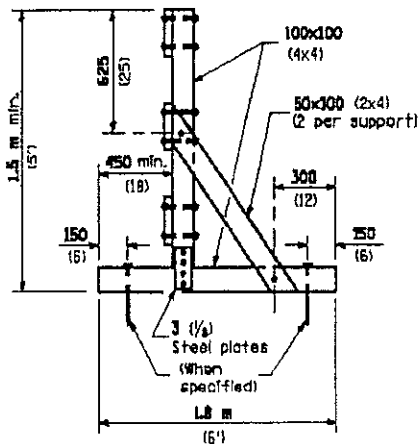
TYPE 1 BARRICADE



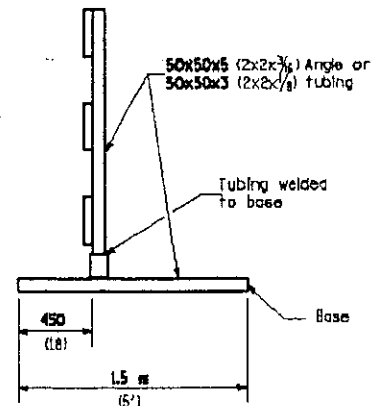
TYPE II BARRICADE



VERTICAL PANELS



TYPICAL WOOD SUPPORT



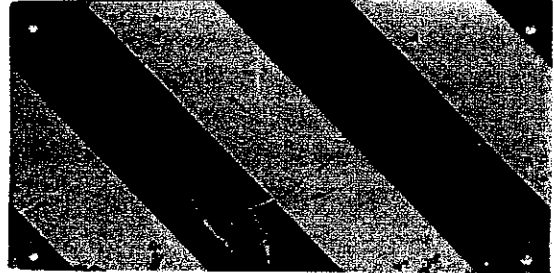
TYPICAL STEEL SUPPORT

TYPE III BARRICADES

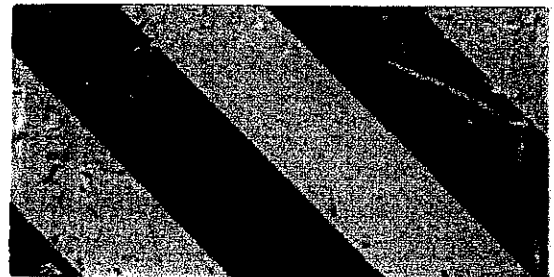
All dimensions are in millimeters (inches)
unless otherwise shown.

EVALUATION GUIDE - TYPE I, II, OR III AND WING BARRICADE PANELS OR VERTICAL PANELS

Acceptable - This is an example of an **acceptable** panel. It is not new. There are several abrasions on the surface but very little loss of reflective sheeting. The orange is vivid and the stripes provide contrast which is clearly visible at a minimum distance of 700' with low beam headlights at night.



Marginal - This is an example of a panel with **marginal** acceptability. There are numerous surface abrasions throughout the panel surface. Some color fading is evident, however, it is free of large areas of residue or missing reflective material. The colors, stripes, and reflectivity are visible and discernible at a minimum distance of 700' with low beam headlights at night.



Unacceptable - This is an example of an **unacceptable** panel. The surface is marred over a high percentage of the panel area. There is 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 similar in area to that shown here would also make a panel **unacceptable**.



Quality Standard for Drums

This standard applies to drums that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Drum placement is specified in the contract documents. Drums used in work zones shall meet the following requirements to the satisfaction of the Department: Standard 702001, Article 1084.02 of the Standard Specifications which provides the requirements for reflectorization, and Article 702.03 which provides the requirements for the drums.

High Intensity sheeting is required on drums with steady burn lights shown for lane closure tapers and run-arounds on Standards 701401, 701416, and 701421.

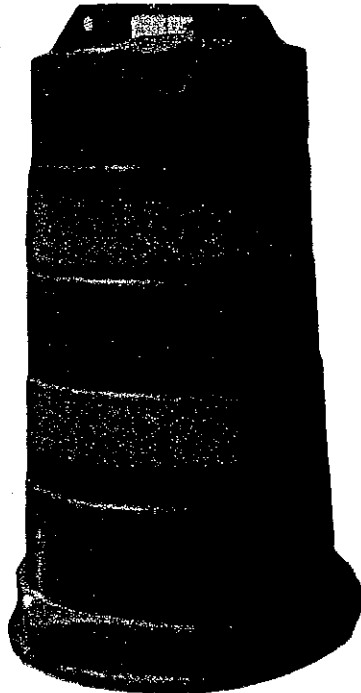
The Evaluation Guide on page 9 is to be used to evaluate the general appearance of drums. In addition, drums that are dented severely enough to affect their overall dimensions and shape or contain fractures that affect their stability or ability to retain the reflective sheeting are unacceptable.

TYPICAL DRAWINGS OF DRUMS See Standard 702001 Specified in Contract for Specific Requirements



**DRUMS AND SAND MODULE
IMPACT ATTENUATORS**

EVALUATION GUIDE - DRUMS

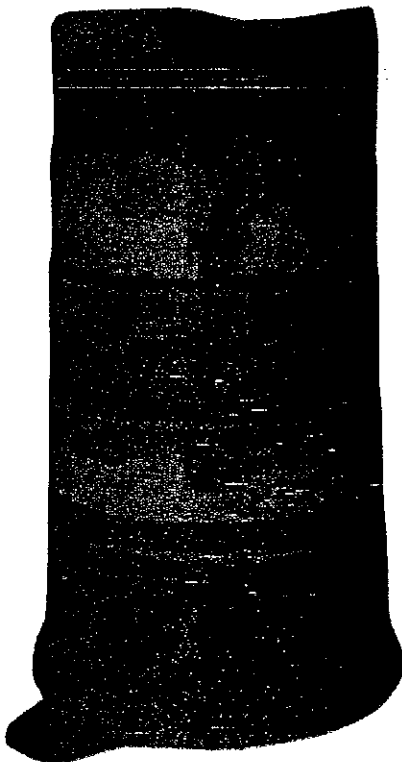


Acceptable - This is an example of an **acceptable** drum. It is not new. The sheeting has only minor tears and scratches. The dent shown does not seriously reduce the reflectivity.

Marginal - This is an example of a drum with **marginal** acceptability. The sheeting has numerous tears and scratches, however, it is free of large areas of residue or missing reflective material. The large dent shown reduces the effectiveness of the upper reflective band, however, the drum strength is not reduced.



Unacceptable - This is an example of an **unacceptable** drum. The large areas of missing reflective material or the fractured upper area makes this drum **unacceptable**. Drums with asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material, similar in area to the missing reflective material would also make a drum **unacceptable**.



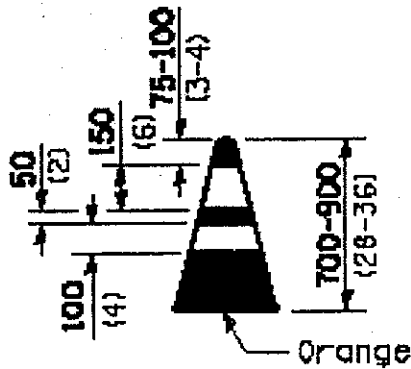
Quality Standard for Cones

This standard applies to cones of 18, 28, and 36-inch heights that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

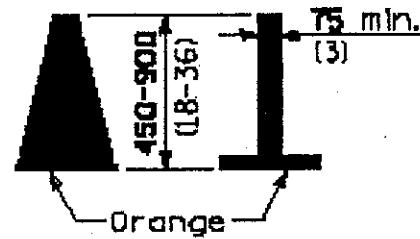
Cone placement and required minimum height is specified in the contract documents. Cones used in work zones shall be orange in color, a minimum height of 18 inches, and shall meet the requirements of Standard 702001 and Article 702.03 of the Standard Specifications.

The Evaluation Guide on page 11 is to be used to evaluate the general appearance of cones. **In addition, cones that contain fractures that affect their stability or their ability to maintain their placement are unacceptable.**

TYPICAL DRAWINGS OF CONES See Standard 702001 Specified in Contract for Specific Requirements



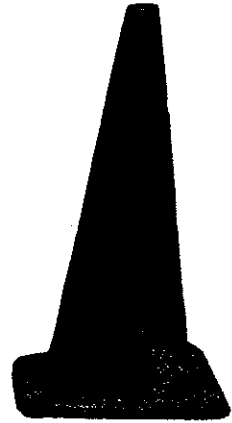
REFLECTORIZED CONES



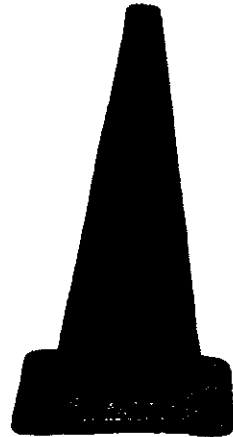
CONES

EVALUATION GUIDE - CONES

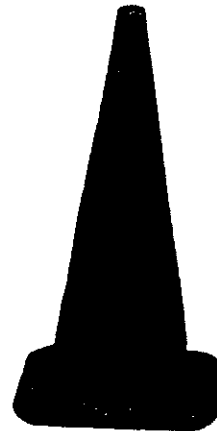
Acceptable - This is an example of an **acceptable** cone. Although it is not new, the surface is free of punctures and abrasions and the color is bright. The surface may be dirty, but will readily respond to washing.



Marginal - This is an example of a cone with **marginal** acceptability. The surface is dirty and may not be readily cleaned due to abrasion and discoloration.



Unacceptable - This is an example of an **unacceptable** cone. The punctures and the large area of staining make this an unlikely candidate for improvement. Large areas of asphalt splatter or cement slurry would also make a cone **unacceptable**.



Quality Guidelines for Work Zone Traffic Control Devices

The following guidelines are for several other work zone traffic control devices which are not previously covered by this booklet. Whereas the Quality Standards addresses individual devices, the new Guidelines address complete groups of worksite traffic control devices. When a certain percentage of devices as a group come in non-conformance, that portion of the traffic control installation will become **unacceptable**. In this manner, these devices may be reported on form BT 726, Traffic Control Inspection Report, as **unacceptable**.

As an example, when an arrow board has too many lights out or it does not dim properly, the entire device will be considered as **unacceptable** and it will be reported on BT 726 as such.

The following are guidelines which are to be used to rate a group of devices as **acceptable, marginal or unacceptable**. **A direct comparison of each device to this standard is not required nor do all devices have to be counted in order to determine the exact percentage of individual devices to make this determination.** This guideline establishes IDOT intent. The Engineer shall be the sole judge as to the acceptability of devices and the action that is to be taken with regard to these Guidelines.

Quality Guideline for Sand Attenuators

This guideline applies to sand attenuators that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Sand attenuator placement is specified in the contract documents. The Recurring Special Provision for Sand Module Impact Attenuators provides that the attenuator to be striped according to Standard 702001 for drums. This requires the striping to completely encircle the drum. Sand attenuators used in work zones shall meet the above requirements to the satisfaction of the Department.

Acceptability of appearance for sand attenuators shall be the same as that for drums, see page 9.

The Engineer shall be the sole judge as to the acceptability of damaged sand attenuators.

EVALUATION GUIDE -- SAND ATTENUATORS

Acceptable: No cracks or holes. Device has not been damaged.

Marginal: Any small holes can be easily patched and any cracks are smaller than 1/4 the diameter of the drum in any direction and neither affect the structural integrity of the drum.

Unacceptable: When any of the following conditions exist: 1) All holes cannot be easily patched. 2) There is a crack which is greater than 1/4 the diameter of the drum in any direction. 3) The attenuator has been damaged such that it affects the structural integrity of the drum.

Quality Guidelines for Warning Lights

This guideline applies to Type A and Type C low intensity flashing and steady burning lights that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Warning light type and placement shall be as specified in the applicable traffic control standard, Article 702.04 of the Standard Specifications. Article 1084.01 provides the material requirements for the lights. For all lights to be used in work zones, all the above requirements shall be met to the satisfaction of the Department.

Please Note: Article 702.04 requires, "The Contractor shall be responsible for replacing lighting units which have become defective. The Contractor shall be responsible for replacing light batteries on a group basis at such time as may be specified by the Engineer."

Please Note: Article 1084.01 requires, "Lights shall be maintained so as to be visible on a clear night from a distance of 900 m (3,000 ft.)." **Lights which are out of alignment from the drivers line of vision and lights not visible from a distance of 900 m (3,000 ft.) shall be considered to be unacceptable.**

EVALUATION GUIDE -- LIGHTS

Acceptable: 100% of the Type A or C lights are lit and meeting the above requirements.

Marginal: When all the following conditions exist: 1) More than 90% of the Type A or C lights are lit. 2) No more than 3 consecutive lights failing. 3) The lights meet the above requirements.

Marginal for Tapers: When all the following conditions exist: 1) More than 90% of the Type A or C lights are lit. 2) The lights meet the above requirements.

Unacceptable: When any of the following conditions exist: 1) Less than 90% of the Type A or C lights are lit. 2) Four (4) or more consecutive lights failing. 3) The lights do not meet the above requirements.

Unacceptable for Tapers: When any of the following conditions exist: 1) Less than 90% of the Type A or C lights are lit. 2) The lights do not meet the above requirements.

Quality Guideline for Arrow Boards

This guideline applies to arrow boards that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Arrow board placement shall be as specified in the applicable traffic control standard, Article 702.05 (b) of the Standard Specifications, or the Traffic Control Plan. Standard 702001 and Article 1106.03 of the Standard Specifications provides the requirements for the arrow board. For arrow boards to be used in work zones, all the above requirements shall be met to the satisfaction of the Department.

Also please note: 1. Any arrow board which is out of alignment from the drivers line of vision or not placed within 5° of a horizontal position (1"/1') shall be considered to be an unacceptable device. 2. Article 1106.03 has specific distance requirements for an arrow board to be visible, if it is not legible at the required distance, it is an unacceptable device.

EVALUATION GUIDE -- ARROW BOARDS **FLASHING ARROW MODE**

Acceptable: No lights are out and the arrow board is dimming properly.

Marginal: Two (2) or less lights out total, with only 1 light being out in the head, and the arrow board is dimming properly.

Unacceptable: When any of the following conditions exist: 1) Three (3) or more lights out total. 2) Two (2) or more lights out in the head. 3) **The arrow board is not dimming properly.**

CAUTION MODE

Acceptable: No lights are out and the arrow board is dimming properly.

Marginal: Minimum of 4 lamps operating and dimming properly.

Unacceptable: When either of the following conditions exist: 1) Three or less lamps operating. 2) **The arrow board is not dimming properly.**

Quality Guideline for Work Zone Pavement Marking

This guideline applies to work zone pavement markings that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Work zone pavement markings placement shall be as specified in the applicable traffic control standard, Article 703 of the Standard Specifications, and the Traffic Control Plan. Articles 1095.02 and 1095.06 of the Standard Specifications provides the requirements for the pavement marking materials. All the above requirements shall be met to the satisfaction of the Department.

EVALUATION GUIDE -- WORK ZONE PAVEMENT MARKINGS

Acceptable: All pavement marking tape and paint required is in place and meets the above specifications.

Marginal: Ninety percent or more of all pavement marking tape or paint is present, and 2 or less consecutive skip lines are missing, and less than 15 meters (50') of continuous solid line is missing or nonreflective.

Unacceptable: When any of the following conditions exist: 1) Less than ninety percent of all pavement marking tape or paint is present, 2) Three (3) or more consecutive skip lines are missing. 3) More than 15 meters (50') of continuous solid line are missing or nonreflective.

Quality Guideline for Reflectors on Pavement or Barrier Wall

This guideline applies to reflectors used in work zones to delineate the pavement or temporary concrete barrier that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

The placement of pavement or temporary concrete barrier reflectors shall be as specified in the applicable traffic control standard and the Traffic Control Plan. Articles 1096.02 and 1097.02 of the Standard Specifications provides the requirements for the reflectors. All the above requirements shall be met to the satisfaction of the Department.

Please Note: The color of the reflector must be as specified in the contract, or the reflectors are unacceptable.

EVALUATION GUIDE -- REFLECTORS **PAVEMENT MARKING AND BARRIER WALL**

Acceptable: All reflectors are in place and meet the above specifications.

Marginal: Ninety percent or more reflectors are present, having 2 or fewer consecutive reflectors missing.

Unacceptable: When either of the following conditions exist: 1) Less than 90 % of all reflectors are present. 2) Three (3) or more consecutive reflectors missing.

