

**APPROVED BY NCUTCD COUNCIL ON JANUARY 19, 2007**

TECHNICAL COMMITTEE RECOMMENDATION

**TECHNICAL COMMITTEE:** Temporary Traffic Control Committee

**DATE OF ACTION:** June 29, 2006

**TOPIC:** Modifications to Section 6F.58 Channelizing Devices

**ORIGIN OF REQUEST:** Task Force of Section 6F.58 Channelizing Devices and Greg Brinkmeyer, Chair, and members of the TTC Technical Committee of the NCUTCD

**DISCUSSION:** Members of the Technical Committee Task Force have for over several years have worked on updating the section on channelizing devices.

**COMMITTEE ACTION:** The Temporary Traffic Control (TTC) Committee recommends that the National Committee submit the following proposed MUTCD change to sponsors for comments. **Below are changes voted on.**

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**VOTE:**

<b>For</b>	-23
<b>Opposed</b>	- 1
<b>Abstentions</b>	- 1

**REFERENCE TO AFFECTED PAGE NUMBERS IN MUTCD:** Page 6F-29 in the 2003 MUTCD.

Attached is that section and the modification are in red.

**Green Text: Wording Approved by TTC in January 2006**

**Red Text: Proposed Wording that was introduced to TTC in January 2006 and approved June 2006**

### **Section 6F.58 Channelizing Devices**

**Standard:**

**Designs of various channelizing devices shall be as shown in Figure 6F-7.**

**Channelizing devices shall be crashworthy.**

**Support:**

The function of channelizing devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and **longitudinal channelizers**.

Channelizing devices provide for smooth and gradual vehicular traffic flow from one lane to another, onto a bypass or detour, or into a narrower traveled way. They are also used to **channelize** vehicular traffic **away** from the work space, pavement drop-offs, pedestrian or shared-use paths, or opposing directions of vehicular traffic.

**Standard:**

**Devices used to channelize pedestrians shall be detectable to users of long canes and visible to persons having low vision.**

**Where channelizing devices are used to channelize pedestrians, they shall be located such that there are no gaps between the bases of the devices, in order to create a continuous bottom, and the height of each channelizing device shall be no less than 32 inches.**

**Guidance:**

**Where multiple channelizing devices are aligned to form a continuous pedestrian channelizer, connection points should be smooth to optimize long-cane and hand trailing.**

Channelizing devices should be constructed and ballasted to perform in a predictable manner when inadvertently struck by a vehicle.

The spacing **between** channelizing **device units** should not exceed a distance in feet equal to 1.0 times the speed limit in mph when used for taper channelization, and a distance in feet equal to 2.0 times the speed limit in mph when used for tangent channelization.

When channelizing devices have the potential of leading vehicular traffic out of the intended vehicular traffic space as shown in Figure 6H-39, the channelizing devices should be extended a distance in feet of 2.0 times the speed limit in mph beyond the end of the transition area.

Option:

Warning lights may be added to channelizing devices in areas with frequent fog, snow, or severe roadway curvature, or where visual distractions are present.

**Standard:**

**Warning lights shall flash when placed on channelizing devices used alone or in a cluster to warn of a condition. Warning lights placed on channelizing devices used in a series to channelize road users shall be steady-burn.**

Option:

A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation.

Support:

To increase recognition of the first merging taper in a rural work zone, or in an area with significant ambient light where visibility of channelizing devices used for a merging taper may be reduced, sequential warning lights can provide improved driver detection and recognition of merging tapers.

**Standard:**

**Where used, the successive flashing of the sequential warning lights shall occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.**

**Standard:**

**The retroreflective material used on channelizing devices shall have a smooth, sealed outer surface that will display a similar color day or night.**

Option:

The name and telephone number of the highway agency, contractor, or supplier may be shown on the nonretroreflective surface of all types of channelizing devices.

**Standard:**

**The letters and numbers of the name and telephone number shall be nonretroreflective and not over 2 inches in height.**

Guidance:

Particular attention should be given to maintaining the channelizing devices to keep them clean, visible, and properly positioned at all times.

**Standard:**

**Devices that are damaged or have lost a significant amount of their retroreflectivity and effectiveness shall be replaced.**

#### **Section 6F.59 Cones**

**Standard:**

**Cones (see Figure 6F-7, Sheet 1 of 2) shall be predominantly orange and shall be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones shall be not less than 18 inches in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 28 inches in height.**

**For nighttime use, cones shall be retroreflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6 inches wide white band located 3 to 4 inches from the top of the cone and an additional 4 inches wide white band located approximately 2 inches below the 6 inch band.**

**Retroreflectorization of cones that are more than 36 inches in height shall be provided by horizontal, circumferential, alternating orange and white retroreflective stripes that are 4 to 6 inches wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being**

**orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 3 inches in width.**

Option:

Traffic cones may be used to channelize road users, divide opposing vehicular traffic lanes, divide lanes when two or more lanes are kept open in the same direction, and delineate short duration maintenance and utility work.

Guidance:

Steps should be taken to minimize the possibility of cones being blown over or displaced by wind or moving vehicular traffic.

Cones should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Option:

Cones may be doubled up to increase their weight.

Support:

Some cones are constructed with bases that can be filled with ballast. Others have specially weighted bases, or weight such as sandbag rings that can be dropped over the cones and onto the base to provide added stability.

Guidance:

Ballast should be kept to the minimum amount needed.

### **Section 6F.60 Tubular Markers**

**Standard:**

**Tubular markers (see Figure 6F-7, Sheet 1 of 2) shall be predominantly orange and shall be not less than 18 inches high and 2 inches wide facing road users. They shall be made of a material that can be struck without causing damage to the impacting vehicle.**

**Tubular markers shall be a minimum of 28 inches in height when they are used on freeways and other high-speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.**

**For nighttime use, tubular markers shall be retroreflectorized. Retroreflectorization of **tubular markers less than 42 inches in height** shall be provided by two 3 inch wide white bands placed a maximum of 2 inches from the top with a maximum of 6 inches between the bands.**

**Reflectorization of tubular markers 42 inches and greater in height shall be provided by four 4 inch wide alternating white and orange bands placed a maximum of 4 inches from the top with a maximum of 2 inches between the bands.**

Guidance:

Tubular markers should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Tubular markers have less visible area than other devices and should be used only where space restrictions do not allow for the use of other more visible devices.

Tubular markers should be stabilized by affixing them to the pavement, by using weighted bases, or weights such as sandbag rings that can be dropped over the tubular markers and onto the base to provide added stability. Ballast should be kept to the minimum amount needed.

Option:

Tubular markers may be used effectively to divide opposing lanes of road users, divide vehicular traffic lanes when two or more lanes of moving motor vehicle traffic are kept open in the same direction, and to delineate the edge of a pavement drop off where space limitations do not allow the use of larger devices.

**Standard:**

**When a noncylindrical tubular marker is used, it shall be attached to the pavement in a manner such that the width facing road users meets the minimum requirements.**

**A tubular marker shall be attached to the pavement to display the minimum 2 inch width to the approaching road users.**

**Motion to approve as amended – Greg B; 2<sup>nd</sup> Tom – vote yes XX no 1 - approved**

### **Section 6F.61 Vertical Panels**

**Standard:**

**Reflective material on vertical panels** (see Figure 6F-7, Sheet 1 of 2) shall be 8 to 12 inches in width and at least 24 inches in height. They shall have orange and white diagonal stripes and be retroreflectorized.

Vertical panels shall be mounted with the top a minimum of 36 inches above the roadway.

Where the height of the **reflective material on the vertical panel** is greater than 36 inches, a panel stripe width of 6 inches shall be used.

**Where the height of the reflective material on the vertical panel is 36 inches or less, a panel stripe width of 4 inches shall be used.**

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward at an angle of 45 degrees in the direction vehicular traffic is to pass. Vertical panels used on freeways, expressways, and other high-speed roadways shall have a minimum of 270 square inches retroreflective area facing vehicular traffic.

Option:

Where space is limited, vertical panels may be used to channelize vehicular traffic, divide opposing lanes, or replace barricades.

#### **Motion to approve 6F.61 as amended – vote unanimous**

#### **Section 6F.62 Drums**

Standard:

Drums (see Figure 6F-7, Sheet 1 of 2) used for road user warning or channelization shall be constructed of lightweight, deformable materials. They shall be a minimum of 36 inches in height and have at least 18 inches minimum width regardless of orientation. Metal drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6 inches wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3 inches wide. Drums shall have closed tops that will not allow collection of construction debris or other debris.

Support:

Drums are highly visible, have good target value, give the appearance of being formidable obstacles and, therefore, command the respect of road users. They are portable enough to be shifted from place to place within

a TTC zone in order to accommodate changing conditions, but are generally used in situations where they will remain in place for a prolonged period of time.

**Option:**

Although drums are most commonly used to channelize or delineate road user flow, they may also be used alone or in groups to mark specific locations.

**Guidance:**

Drums should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Drums should not be weighted with sand, water, or any material to the extent that would make them hazardous to road users or workers when struck. Drums used in regions susceptible to freezing should have drain holes in the bottom so that water will not accumulate and freeze causing a hazard if struck by a road user.

**Standard:**

**Ballast shall not be placed on the top of a drum.**

**Section 6F.63 Type I, II, or III Barricades**

**Support:**

A barricade is a portable or fixed device having from one to three rails with appropriate markings and is used to control road users by closing, restricting, or delineating all or a portion of the right-of-way.

As shown in Figure 6F-7, Sheet 2 of 2, barricades are classified as either Type I, Type II, or Type III.

**Standard:**

**Stripes on barricade rails shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Except as noted in the Option, the stripes shall be 6 inches wide.**

**Option:**

When rail lengths are less than 36 inches, 4 inch wide stripes may be used.

**Standard:**

**The minimum length for Type I and Type II Barricades shall be 24 inches, and the minimum length for Type III Barricades shall be 48 inches. Each barricade rail shall be 8 to 12 inches wide. Barricades used on freeways, expressways, and other high-speed roadways shall have a minimum of 270 square inches of retroreflective area facing road users.**

**Guidance:**

Where barricades extend entirely across a roadway, the stripes should slope downward in the direction toward which road users must turn.

Where both right and left turns are provided, the barricade stripes should slope downward in both directions from the center of the barricade or barricades.

Where no turns are intended, the stripes should be positioned to slope downward toward the center of the barricade or barricades.

Barricade rails should be supported in a manner that will allow them to be seen by the road user, and in a manner that provides a stable support that is not easily blown over or displaced.

**Standard:**

**Where barricades are used to channelize pedestrians, there shall be continuous detectable bottom and top rails with no gaps between individual barricades to be detectable to users of long canes. The bottom of the bottom rail shall be no higher than 6 inches above the ground surface. The top of the top rail shall be no lower than 32 inches above the ground surface.**

**Option:**

A gap not exceeding 6 inches between the bottom rail and the ground surface may be used to facilitate drainage.

The width of the existing pedestrian facility should be provided for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60 inch passing space should be provided at least every 200 ft to allow individuals in wheelchairs to pass.

Barricade rail supports and skids should not project into pedestrian circulation routes more than 4 inches from the support between 27 inches and 80 inches from the surface as described in Section 4.4.1 of the

“Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).

Option:

For Type I Barricades, the support may include other unstriped horizontal panels necessary to provide stability.

Guidance:

Barricades should be crashworthy as they are located adjacent to vehicular traffic flow and are subject to impact by errant vehicles.

On high-speed expressways or in other situations where barricades may be susceptible to overturning in the wind, ballasting should be used.

Option:

Sandbags may be placed on the lower parts of the frame or the stays of barricades to provide the required ballast.

**Standard:**

**Barricades shall be placed in accordance to application and installation requirements specific to the device.**

**Ballast shall not be placed on top of any striped rail. Barricades shall not be ballasted by nondeformable objects such as rocks or chunks of concrete. Ballast shall not extend into the accessible passage width of 60 inches.**

Support:

Type I or Type II Barricades are intended for use in situations where road user flow is maintained through the TTC zone.

Option:

Barricades may be used alone or in groups to mark a specific condition or they may be used in a series for channelizing road users.

Type I Barricades may be used on conventional roads or urban streets.

Guidance:

Type II or Type III Barricades should be used on freeways and expressways or other high-speed roadways. Type III Barricades should be used to close or partially close a road.

Option:

Type III Barricades used at a road closure may be placed completely across a roadway or from curb to curb.

Guidance:

Where provision is made for access of authorized equipment and vehicles, the responsibility for Type III Barricades should be assigned to a person who will provide proper closure at the end of each work day.

Support:

When a highway is legally closed but access must still be allowed for local road users, barricades usually are not extended completely across the roadway.

**Standard:**

**A sign (see Section 6F.09) shall be installed with the appropriate legend concerning permissible use by local road users. Adequate visibility of the barricades from both directions shall be provided.**

Option:

Signs may be installed on barricades (see Section 6F.03).

**Motion to approve as amended – Greg B; 2<sup>nd</sup> Sue R – vote unanimous**

#### **Section 6F.64 Direction Indicator Barricades**

**Standard:**

**The Direction Indicator Barricade (see Figure 6F-7, Sheet 2 of 2) shall consist of a One-Direction Large Arrow (W1-6) sign mounted above a diagonal striped, horizontally aligned, retroreflective rail.**

**The One-Direction Large Arrow (W1-6) sign shall be black on an orange background. The stripes on the bottom rail shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. The stripes shall be 4 inches wide. The**

**One-Direction Large Arrow (W1-6) sign shall be 24 x 12 inches. The bottom rail shall have a length of 24 inches and a height of 8 inches.**

Guidance:

The Direction Indicator Barricade, including any associated ballast or lights, should be crashworthy.

Option:

The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.

Guidance:

If used, Direction Indicator Barricades should be used in series to direct the driver through the transition and into the intended travel lane.

### **Section 6F.65 Temporary Traffic Barriers as Channelizing Devices**

Support:

Temporary traffic barriers are not TTC devices in themselves; however, when placed in a position identical to a line of channelizing devices and marked and/or equipped with appropriate channelization features to provide guidance and warning both day and night, they serve as TTC devices.

**Standard:**

**Temporary traffic barriers serving as TTC devices shall conform to requirements for such devices as set forth throughout Part 6.**

**Temporary traffic barriers shall not be used solely to channelize road users, but also to protect the work space (see Section 6F.81). If used to channelize vehicular traffic, the temporary traffic barrier shall be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.**

Guidance:

Temporary traffic barriers should not be used for a merging taper except in low-speed urban areas.

Temporary traffic barriers should not be used for a constricted/restricted TTC zone.

When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.

**Standard:**

**Temporary traffic barriers shall be placed in accordance to application and installation requirements specific to the device.**

Guidance:

When used for channelization, temporary traffic barriers should be of a light color for increased visibility.

**Standard:**

**Where temporary traffic barriers are used to channelize pedestrians, there shall be a continuous detectable bottom with no gaps between individual barricades to be detectable to users of long canes. The top of the temporary traffic barrier shall be no lower than 32 inches above the ground surface.**

### **Section 6F.66 Longitudinal Channelizing Devices**

Support:

Longitudinal channelizing devices, are lightweight, deformable devices that are highly visible, have good target value and can be connected together. Longitudinal channelizing devices can be used singly as Type I, II or III barricades conforming to the general size, color, stripe pattern, retroreflectivity and placement characteristics established for devices described in Chapter 6F.

Option:

Longitudinal channelizers may be used instead of a line of cones, drums, or barricades.

**Standard:**

**Longitudinal channelizing devices shall be placed in accordance to application and installation requirements specific to the device.**

Option:

Longitudinal channelizing devices may be used for pedestrian traffic control.

Guidance:

If used for pedestrian traffic control, longitudinal channelizing devices should be interlocked to delineate or channelize flow. The interlocking devices should not have gaps that allow pedestrians to stray from the channelizing path.

Guidance:

Although longitudinal channelizing devices might give the appearance of being formidable obstacles, they have not met the crashworthy requirements for temporary traffic barriers and, therefore, should not be used to provide positive protection for obstacles or provide positive protection for pedestrians, including workers, from vehicular impacts.

### **Section 6F.67 Other Channelizing Devices**

Option:

Channelizing devices other than those described in this Chapter may be used in special situations based on an engineering study.

Guidance:

Other channelizing devices should conform to the general size, color, stripe pattern, retroreflection, and placement characteristics established for the devices described in this Chapter.

### **Section 6F.68 Temporary Lane Separators**

**Standard:**

**Temporary lane separators shall be crashworthy. Temporary Lane Separators shall not exceed 4” in height, and shall have sloping sides in order to facilitate crossover by emergency vehicles. Temporary Lane Separators shall be a maximum of 12” wide. Appropriate channelizing devices may supplement Temporary Lane Separators. Supplemental channelizing devices shall be retroreflectORIZED to provide maximum nighttime visibility. Where channelizing devices are not used, curbing shall contain retroreflectorization for visibility.**

Option:

Temporary lane separators may be used to channelize road users, divide opposing vehicular traffic lanes, divide lanes when two or more lanes are open in the same direction, and as a continuous pedestrian channelizer.

Temporary lane separators may be supplemented by including any of the approved channelizing devices contained in Section 6F, such as tubular markers, vertical panels and opposing traffic lane dividers.

Guidance:

Lane separator should be stabilized by affixing it to the pavement in a manner suitable to its design, while allowing the unit to be shifted from place to place within the TTC zone in order to accommodate

changing conditions. In general, they should be used in situations where they will remain in place for prolonged periods of time.

## **Section 6F.69 Detectable Edging for Pedestrians**

Support:

Individual channelizing devices, tape or rope used to connect individual devices, other discontinuous barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian facilities.

Guidance:

When it is determined that a facility should be accessible to and detectable by pedestrians with visual disabilities, a continuously detectable edging should be provided throughout the length of the facility such that it can be followed by pedestrians using long canes for guidance. This edging should protrude at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2.5 inches above the surface. This edging should be continuous throughout the length of the facility except for gaps at locations where pedestrians or vehicles will be turning or crossing. This edging should consist of a prefabricated or formed-in-place curbing or other continuous device that is placed along the edge of the sidewalk or walkway. This edging should be firmly attached to the ground or to other devices. Adjacent sections of this edging should be interconnected such that the edging is not displaced by pedestrian or vehicular traffic or work operations, and such that it does not constitute a hazard to pedestrians, workers, or other road users.

Support:

Examples of detectable edging for pedestrians include:

- A. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected and fixed in place to form a continuous edge.
- B. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected, fixed in place, and placed at ground level to provide a continuous connection between channelizing devices located at intervals along the edge of the sidewalk or walkway.
- C. Sections of lumber interconnected and fixed in place to form a continuous edge.
- D. Formed-in-place asphalt or concrete curb.
- E. Prefabricated concrete curb sections that are interconnected and fixed in place to form a continuous edge.

F. Continuous temporary traffic barrier or longitudinal channelizing barricades placed along the edge of the sidewalk or walkway that provides a pedestrian edging at ground level.

G. Chain link or other fencing equipped with a continuous bottom rail.

Guidance:

Detectable pedestrian edging should be orange, white, or yellow and should match the color of the adjacent channelizing devices or traffic control devices, if any are present.

### **Section 6F.70 Temporary Raised Islands**

**Standard:**

**Temporary raised islands shall be used only in combination with pavement striping and other suitable channelizing devices.**

Option:

A temporary raised island may be used to separate vehicular traffic flows in two-lane, two-way operations on roadways having a vehicular traffic volume range of 4,000 to 15,000 average daily traffic (ADT) and on freeways having a vehicular traffic volume range of 22,000 ADT to 60,000 ADT.

Temporary raised islands also may be used in other than two-lane, two-way operations where physical separation of vehicular traffic from the TTC zone is not required.

Guidance:

Temporary raised islands should have the basic dimensions of 4 inches high by at least 18 inches wide and have rounded or chamfered corners.

The temporary raised islands should not be designed in such a manner that they would cause a motorist to lose control of the vehicle if the vehicle inadvertently strikes the temporary raised island. If struck, pieces of the island should not be dislodged to the extent that they could penetrate the occupant compartment or involve other vehicles.

**Standard:**

**At pedestrian crossing locations, temporary raised islands shall have an opening or be shortened to provide at least a 60 inches wide pathway for the crossing pedestrian.**

### **Section 6F.71 Opposing Traffic Lane Divider**

Support:

Opposing traffic lane dividers are delineation devices used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation.

**Standard:**

**Opposing traffic lane dividers shall not be placed across pedestrian crossings.**

**The Opposing Traffic Lane Divider (W6-4) sign (see Figure 6F-4, Sheet 2 of 4) is an upright, retroreflective orange-colored sign placed on a flexible support and sized at least 12 inches wide by 18 inches high.**

End of Doc.