

ATTACHMENT NO. 7

National Committee on Uniform Traffic Control Devices

RRLRT Technical Committee Recommendations  
Approved by the NCUTCD Council JUNE 20 & 21, 2008

Underline – Additions shown in NPA

~~Strike-out~~ – Deletions shown in NPA

Underline – Additions Approved by  
NCUTCD Council

~~Strike-out~~ – Deletions Approved by  
NCUTCD Council

**Introduction (Compliance Dates)**

*Page 590, Lines 36-37*

Section 8B.03 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks ~~Sign Plaque~~ (R15-2P)— vertical retroreflective strip on crossbuck support— ~~January 17, 2011~~ 5 years from the effective date of the Final Rule for the 2009 MUTCD.

*Page 591, Lines 10-11*

Chapter 8E Pathway-Rail Grade Crossings—new Chapter—5 10 years from the effective date of the Final Rule for the 2009 MUTCD.

*Page 592, Lines 1-2, moved to 10D.02 (5 yrs) and 10D.06 (10 yrs)*

Section ~~10D.01~~ 10D.02 Introduction—audible device requirement—5 years from the effective date of the Final Rule for the 2009 MUTCD.

*Page 592, insert between Lines 4-5*

Section 10D.06 Introduction—audible device requirement—10 years from the effective date of the Final Rule for the 2009 MUTCD.

*Page 592, Lines 11-12*

Chapter 10F Pathway-Light Rail Transit Grade Crossings—new Chapter—5 10 years from the effective date of the Final Rule for the 2009 MUTCD.

**Section 1A.11 Relation to Other Publications**

*Page 602, Line 34-35*

10. “~~2000~~ 2009 AREMA Communications & Signals Manual,” American Railway Engineering & Maintenance-of-Way Association (AREMA)

### **Section 1A.13 Definitions of Words and Phrases in This Manual**

*Page 606, Lines 18-23*

43. Highway-Light Rail Transit Grade Crossing—the general area where a highway and a light rail transit<sup>2</sup>s right-of-way cross at the same level, within which are included the light rail transit tracks, highway, and traffic control devices for traffic traversing that area.
44. **Highway-Rail Grade Crossing—the general area where a highway and a railroad<sup>2</sup>s right-of-way cross at the same level, within which are included the railroad tracks, highway, and traffic control devices for highway traffic traversing that area.**

### **Section 5F.02 Highway-Rail Grade Crossing (Crossbuck) Sign and Number of Tracks Plaque (R15-1, R15-2P)**

*Page 937, Line 13-14*

The Highway-Rail Grade Crossing (Crossbuck) (R15-1) sign (see Figure 5F-1) shall be used at all highway-rail grade crossings, except as otherwise noted in Section 8B.03.

*Page 937, Lines 21-26*

A vertical strip of retroreflective white material, not less than 50 mm (2 in) in width, shall be used on each support at passive highway-rail grade crossings for the full length of the front and back of the support from the Crossbuck sign or Number of Tracks sign plaque to within 0.6 m (2 ft) above the edge-of-the-roadway ground, except on the side of those supports where a STOP (R1-1) or YIELD (R1-2) sign or flashing lights have been installed or on the back side of supports for Crossbuck signs installed on one way streets.

### **Section 8A.01 Introduction**

*Page 1087, insert between Lines 51-52*

10. Entrance Gate – an automatic gate used on the approach side of a highway-rail grade crossing.
11. Exit Gate – a special application of an automatic gate used on the departure side (in contrast to the typical approach side) of the highway-rail grade crossing to block road users from entering the crossing by driving in the opposing traffic lanes.

*Page 1088, Lines 29-31*

18. Pathway-Rail Grade Crossing—the general area where a pathway and a railroad<sup>2</sup>s right-of-way cross at the same level, within which are included the railroad tracks, pathway, and traffic control devices for pathway traffic traversing that area.

Page 1089, Add starting at Line 1

**27. Swing Gate**—a self-closing fence-type gate designed to swing open away from the track area and return to the closed position upon release.

Page 1089, Lines 9-10

**30. Wayside Horn**—a stationary horn located at a highway-rail grade crossing, designed to provide audible warning to ~~oncoming motorists road users~~ of the approach of a train.

**31. Wayside Horn System**—one or more wayside horns used in conjunction with train activated warning systems to provide audible warning of an approaching train for road users on the approaches to a highway-rail grade crossing as the primary alternative to the sounding of a locomotive-mounted horn.

### Section **8C.01 8A.05** **Illumination at Highway-Rail Grade Crossings**

Page 1090, Lines 24-32

**Option Support:**

Illumination ~~may be~~ is sometimes installed at or adjacent to a highway-rail grade crossing.

**Guidance:**

~~If an engineering study is conducted and if the engineering study determines that in order to provide~~ better nighttime visibility of the train and the highway-rail grade crossing ~~is needed~~ (for example, where a substantial amount of railroad operations ~~is are~~ conducted at night, where ~~train speeds are low and~~ highway-rail grade crossings are blocked for ~~extended long~~ periods, or ~~where~~ crash history indicates that ~~drivers road users~~ experience difficulty in seeing trains or traffic control devices during hours of darkness), ~~then illumination should be installed at and adjacent to the highway-rail grade crossing.~~

### Section **8B.03** **Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign Plaque (R15-2P)**

Page 1092, lines 31-33

**Option:**

The Crossbuck sign may be omitted on one or both sides of passive highway-rail grade crossings where all of the following conditions exist:

- A. Train speeds are 16 km/h (10 MPH) or less; and
- B. Trains always approach the crossing prepared to yield to road users; or authorized personnel on the ground always manually direct road users to not enter the crossing prior to a train occupying the crossing; and
- C. There is no reasonable location to install one.

The supplemental Number of Tracks sign plaque may also be used at highway-rail grade crossings with automatic gates.

**Guidance:**

At crossings where train speeds are above 16 km/h (10 mph) or where rail traffic movements cannot appropriately yield to road users, Crossbuck signs should be provided and reasonable locations for such signs should be created by necessary roadway realignment or railway relocation.

Reasonable locations for Crossbuck signs should not be in conflict with turning vehicles from roadways closely parallel to the track or visually obstructed from approaching roadway users.

Page 1092, lines 44-49

A vertical strip of retroreflective white material, not less than 50 mm (2 in) in width, shall be used on each support at passive highway-rail grade crossings for the full length of the front and back of the support from the Crossbuck sign or Number of Tracks sign plaque to within 0.6 m (2 ft) above the edge of the roadway ground, except on the side of those supports where a STOP (R1-1) or YIELD(R1-2) sign or flashing lights have been installed or on the back side of supports for Crossbuck signs installed on one way streets.

Section **8B.08 8B.04 Use and Meaning of the Crossbuck Assembly with a STOP (R1-1) or YIELD (R1-2) Signs at Passive Highway-Rail Grade Crossings**

Page 1093, lines 34-51 and Page 1094, lines 1-2

Standard:

A YIELD (R1-2) sign or STOP (R1-1) sign shall be installed at all passive highway-rail grade crossings, except where a Crossbuck sign may be omitted (see Section 8B.03) or where an authorized person train crews on the ground always manually stop directs road users from entering not to enter the crossing prior to a train occupying the crossing.

A YIELD sign shall be the default traffic control device on all highway approaches to passive highway-rail grade crossings unless an engineering study or engineering judgment determines that a STOP sign is appropriate. The determination to include a STOP (R1-1) sign in a Crossbuck Assembly shall be made by the regulatory agency or highway authority having jurisdiction over the roadway approach.

Support

The meaning of a Crossbuck Assembly that includes a YIELD sign is that a road user approaching the highway-rail grade crossing needs to be prepared to yield the right-of-way to any rail traffic that might be occupying the crossing or might be approaching and in such close proximity to the crossing that it would be unsafe for the road user to cross.

The meaning of a Crossbuck Assembly that includes a STOP sign is that a road user approaching the highway-rail grade crossing must come to a stop and remain stopped, while the road user determines if there is rail traffic either occupying the crossing or approaching and in such close proximity to the crossing that the road user must yield the right-of-way to rail traffic. The road user is permitted to proceed when it is safe to cross.

Because a STOP sign establishes a legal requirement for all approaching vehicles to come to a full stop, the indiscriminate use of STOP signs at all or many passive grade crossings can result in a high rate of non compliance by road users, thus increasing the risk of collisions that are associated with non-compliance.

Guidance:

The use of STOP signs at passive crossings should be limited to unusual conditions where requiring all vehicles to make a full stop is deemed essential by an engineering study or by engineering judgment. The following are among the factors that an engineering study or engineering judgment should consider:

- A. The lines of sight from an approaching highway vehicle to an approaching train, giving due consideration to seasonal crops or vegetation beyond both the highway and railroad rights-of-way;

- B. The higher of the posted, statutory or 85<sup>th</sup> percentile highway speed characteristics of the highway, such as the functional classification, geometric conditions, and traffic volumes and speed;
- C. The characteristics of the railroad including, but not limited to, the frequency, type, and speed of trains, and the number of tracks;
- D. The crash history at maximum speed at which a road user can safely approach the crossing and still be able to yield to any train observed approaching the crossing when the available lines of sight permit; and
- E. The need for active control devices.

## Section 8B.05 Crossbuck Assemblies with YIELD (R1-2) Signs or STOP (R1-1)

### Signs at Passive Highway-Rail Grade Crossings

Page 1094, Lines 18-30 (moved Guidance below to 8B.03)

#### Standard:

At all public highway-rail grade crossings that are not equipped with the active traffic control systems that are described in Chapter 8C, a Crossbuck Assembly shall be installed on the right hand side of the highway on each approach to the highway-rail grade crossing. Where restricted sight distance or unfavorable highway geometry exists on an approach to a highway-rail grade crossing, or where there is a one-way multi-lane approach, an additional Crossbuck Assembly shall be installed on the left hand side of the highway.

#### Guidance:

At crossings where train speeds are above 16 km/h (10 mph) or where rail traffic movements cannot appropriately yield to road users, Crossbuck Assemblies should be provided and reasonable locations for such signs should be created by necessary roadway realignment or railway relocation.

Reasonable locations for Crossbuck Assemblies should not be in conflict with turning vehicles from roadways either closely parallel to the track or visually obstructed from approaching roadway users.

Page 1094, lines 39-48 (moved to 8B.04)

#### Support:

The meaning of a Crossbuck Assembly that includes a YIELD sign is that a road user approaching the highway-rail grade crossing needs to be prepared to decelerate, and when necessary, yield the right-of-way to any rail traffic that might be occupying the crossing or might be approaching and in such close proximity to the crossing that it would be unsafe for the road user to cross.

The meaning of a Crossbuck Assembly that includes a STOP sign is that a road user approaching the highway-rail grade crossing must come to a full and complete stop not less than (15 ft) short of the nearest rail, and remain stopped while the road user determines if there is rail traffic either occupying the crossing or approaching and in such close proximity to the crossing that the road user must yield the right-of-way to rail traffic. The road user is permitted to proceed when it is safe to cross.

Page 1095, Lines 1-20

When the YIELD sign or STOP sign is installed on the same support as the Crossbuck sign, a strip of retroreflective material shall be used on the front and back (except as noted in the Option below) of the support. The dimensions and placement of

the retroreflective strip shall be in compliance with the Standards in Section 8B.03. The color of the retroreflective strip on the back of the support shall be white.

Option:

The vertical strip of retroreflective material may be omitted from the back sides of Crossbuck Assembly supports installed on one-way streets.

When the YIELD sign or STOP sign is installed on the same support as the Crossbuck sign, a vertical strip of retroreflective material, not less than 50 mm (2 in) in width, may be used on the front of the Crossbuck Assembly support from the YIELD or STOP sign to within 0.6 m (2 ft) above the ground.

If used, the color of the retroreflective strip on the front of the support where a YIELD sign or STOP sign is installed on the same support as the Crossbuck sign may be red (see Section 2A.21) or white (see Section 8B.03).

Guidance:

On paved roadway approaches to passive highway-rail grade crossings, except where a YIELD (R1-2) sign is installed in conjunction with a Crossbuck sign, a stop line (see Section 3B.16) should be installed to indicate the point behind which vehicles are or may be required to stop or as near to that point as practical. The stop line should be placed no closer than 4.6 m (15 ft) measured perpendicular from the nearest rail as shown in Figure 8B-6.

On paved roadway approaches to highway-rail grade crossings where a YIELD (R1-2) sign is installed in conjunction with the Crossbuck sign, a yield line (see Section 3B.16) may should be installed to supplement the YIELD sign.

Guidance:

If a The yield line is used, it should be a transverse line at a right angle to the traveled way at a point where a vehicle is to yield or stop or as near to that point as practical. The yield line should be placed no closer than 4.6 m (15 ft) measured perpendicular from the nearest rail as shown in Figure 8B-7.

If a STOP (R1-1) sign is installed in conjunction with the Crossbuck sign, a stop line (see Section 3B.16) should be installed to indicate the point behind which vehicles are required to stop. The stop line should be placed no closer than 4.6 m (15 ft) measured perpendicular from the nearest rail as shown in Figure 8B-6.

## **Section 8B.04 8B.06 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)**

Page 1095, Lines 30-42

Standard:

A Highway-Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-3) with a supplemental plaque describing the type of traffic control at the highway-rail grade crossing shall be used on each highway in advance of every highway-rail grade crossing except in the following circumstances:

- A. On an approach to a highway-rail grade crossing from a T-intersection with a parallel highway if the distance from the edge of the track to the edge of the parallel roadway is less than 30 m (100 ft) and W10-3 signs are used on both approaches of the parallel highway;
- B. On low-volume, low-speed highways crossing minor spurs or other tracks that are infrequently used and are flagged by where an authorized person train-crews directs road users not to enter the crossing prior to a train occupying the crossing;
- C. In business or commercial districts areas where active highway-rail grade crossing traffic control devices are in use; or

- D. Where physical conditions do not permit even a partially effective display of the sign.

**Section ~~8B.14~~ 8B.15 NO TRAIN HORN Sign Plaque (W10-9P)**

Page 1098, Lines 34-38

Standard:

A NO TRAIN HORN (W10-9P) sign plaque (see Figure 8B-6) shall be installed at each highway-rail grade crossing where there is a Federal Railroad Administration authorization for trains to not sound a horn. The sign plaque shall ~~be mounted as a supplemental plaque~~ and be mounted directly below the Highway-Rail Grade Crossing Advance Warning (W10-1, W10-2, W10-3, and W10-4) sign (see Figure 8B-3).

**Section 8B.20 Pavement Markings**

Page 1100, Lines 22-25 – keep pre-NPA text

Guidance:

When pavement markings are used, a portion the center a portion of the X symbol should be directly opposite in-line with opposite the Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

**Section ~~8D.01~~ 8C.01 Introduction**

Page 1102, insert between Lines 35-36

The top of the signal foundation should be no more than 4 inches above the surface of the ground. The top of the foundation should be at the same elevation as the crown of the roadway to permit use of standardized traffic control devices that meet the vertical clearances shown in Figure 8C-1. Where site conditions require the top of the foundation to be at different elevation than the crown of the roadway, then re-grade the shoulder side slope or adjust the height of the signal mast to maintain the vertical clearance requirements of Figure 8C-1.

**Section ~~8D.02~~ 8C.02 Flashing-Light Signals, Post-Mounted**

Page 1103, Lines 4-6

Bell(s) or other audible warning device(s) may be included in the assembly and may be operated in conjunction with the flashing lights to provide additional warning for pedestrians, ~~and~~ bicyclists, and/or other non-motorized road users.

**Section ~~8D.05~~ 8C.05 Four-Quadrant Gate Systems**

Page 1104, Lines 33-51

Option:

Four-Quadrant Gate systems may be installed to improve safety at highway-rail grade crossings based on an engineering study when less restrictive measures, such as automatic gates and median islands, are not effective.

Standard:

A Four-Quadrant Gate system shall consist of a **number series** of **entrance and exit automatic gates used as an adjunct to in conjunction with flashing light signals** to control **traffic road users** on all lanes entering and exiting the highway-rail grade crossing.

The Four-Quadrant Gate system shall **consist of utilize** a **series of** drive mechanism and fully retroreflectorized red- and white-striped gate arms with lights, and when in the down position the gate arms extend individually across the entrance and exit lanes of **highway traffic the roadway** as shown in Figure 8C-2. Standards contained in Sections 8C.01 through 8C.03 for flashing-light signals shall be followed for signal specifications, location, and clearance distances.

Support:

A highway-rail grade crossing traffic control system consisting of a number of automatic gates used in conjunction with flashing light signals which does not block all of the approach and departure lanes at the crossing is not a Four-Quadrant Gate system.

Standard:

In the normal sequence of operation, unless constant warning time or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal upright positions) shall be activated immediately upon detection of the approaching train. The gate arms for the entrance lanes of traffic shall start their downward motion not less than 3 seconds after the flashing light signals start to operate and shall reach their horizontal position at least 5 seconds before the arrival of the train.

## Section 8C.06 Wayside Horn Systems

*Page 1105, Lines 43-49 and Page 1106 Lines 1-5*

### Section 8C.06 Wayside Horns and Wayside Horn Systems

Option:

One or more Wayside horns systems may be installed to provide directional audible warning at highway-rail and pathway-rail grade crossings, including pedestrian or other non-motorized facility grade crossings or other applications, as determined by a diagnostic team. Wayside horns systems may either be installed to provide supplemental audible warning where the locomotive-mounted horn is sounded or as part of a system designed as the primary an alternative to the sounding of a locomotive-mounted horn.

Standard:

A wayside horn system shall consist of a horn or series of horns used in conjunction with train activated warning systems to provide audible warning of an approaching train for traffic on the highway approaches to the highway-rail grade crossing.

Location and operating characteristics of wayside horn(s) used to provide supplemental audible warning shall be determined by a diagnostic team.

The wayside horn systems shall be designed using fail-safe principles. A means shall be employed to verify the sound output from the wayside horn system.

*Page 1106, Lines 1-3*

A wayside horn system shall consist of a horn or series of horns used in conjunction with train activated warning systems to provide audible warning of an approaching train for traffic road users on the highway approaches to the highway-rail grade crossing.

### **Section ~~8D.06~~ 8C.07 Train Detection**

Page 1106, Lines 48 to 50

On tracks where all trains operate at less than 30 km/h (20 mph) and where an authorized person ~~flagging is performed by an employee~~ on the ground ~~manually stops~~ directs road users ~~from not to enter~~ ing the crossing, a shorter signal operating time for the flashing-light signals may be used.

### **Section ~~8D.07~~ 8C.08 Traffic Control Signals at or Near Highway-Rail Grade Crossings**

Page 1108, Lines 12-18

**Standard:**

If a pre-signal is installed at an interconnected highway-rail grade crossing near a signalized intersection, a STOP HERE ON RED (R10-6) sign shall be installed near the pre-signal or at the stop line if used. If there is a nearby signalized intersection with insufficient clear storage distance for a design vehicle, or the highway-rail grade crossing does not have gates, a No Turn on Red (R10-11, R10-11a, or R10-11b) sign (see Section 2B.59) shall be installed for the approach that crosses the railroad track, if applicable.

### **Section 8E.04 Stop Lines and Detectable Warnings**

Page 1111, Line 36

**Section 8E.04 Stop Lines, Edge Lines and Detectable Warnings**

Page 1111, Add between Lines 45-46

**Option:**

Edge lines specified in Section 3A.03 may be used on approach to and across the tracks at a pathway-rail grade crossing, a station crossing, or sidewalk at a highway-rail grade crossing to delineate the designated pathway user route.

**Support:**

This delineation is desirable where the distance across the tracks is long, commonly due to a skew track angle or multiple tracks, or where the surface is immediately adjacent to a traveled way.

### **Section 8E.05 Passive Devices for Pathway-Rail Grade Crossings**

Page 1112, Lines 14-24

**Standard:**

Where **H** used, swing gates shall open away from the track(s) and return to the closed position after use.

Where used, swing gates shall be equipped with a smooth surface on the push side extending the full width of the gate within 0.25 m (10 in) of the pathway surface (kick plate).

Option:

When used in conjunction with automatic gates at pathway-rail grade crossings, swing gates may be equipped with a latching device that permits the gate to be opened only by pedestrians who are on from the track side of the gate.

~~Refuge areas may be provided to provide a place for large numbers of pedestrians to congregate during the passage of a train.~~

Guidance:

~~Where refuge areas are provided, f~~ Encing may should be installed to limit access to only to the pathway-rail grade crossing.

## Section 8E.06 Active Traffic Control Systems for Pathway-Rail Grade Crossings

Page 1112, Lines 25-50 and Page 1113 Lines 1-12

Standard:

~~If an active traffic control system is~~ used at a pathway-rail grade crossing, an active traffic control system shall include flashing-light signals for each direction of the pathway, and a bell or other audible warning device shall also be provided for each direction of the pathway.

Support Option:

~~Separate active traffic control devices may be omitted for~~ If a pathway-rail grade crossing located within 7.6 m (25 ft) of the traveled way at a highway-rail grade crossing equipped with an active traffic control system, a separate active traffic control system for the pathway is usually not provided.

Standard:

~~If used at pathway-rail grade crossings, flashing light signals shall be alternately flashing red lights that are aligned horizontally and the light units shall have a diameter of at least~~ shall utilize minimum 100 mm (4 in) diameter light units, be aligned horizontally, and ~~The mounting height for flashing red lights installed at pathway-rail grade crossings shall be a minimum of 1.2 m (4 ft) above the near edge of the pathway, measured vertically from the bottom edge of the lights to the elevation of the near edge of the pathway surface.~~

Option:

~~At station crossings where more than one track is present, additional t~~ Traffic control devices may be installed between the tracks at multiple track locations at station crossings as recommended by a diagnostic team.

Standard:

~~The mounting height for~~ If used at station crossings, flashing red lights installed located between the tracks at station crossings shall be installed at a minimum of 0.300 m (12 in ft), measured vertically from the bottom above ~~edge of the lights to the elevation of~~ the near edge of the pathway surface.

Option:

Automatic gates may be used at pathway-rail grade crossings as recommended by a diagnostic team.

Guidance:

If used at a pathway-rail grade crossing, each automatic gate should be installed to ~~rest~~ a minimum of 0.9 m (3 ft) above the pathway when in the down position.

If used, the gate configuration should provide for full width coverage of the pathway on both approaches to the track.

If automatic gates providing full width coverage are used at a pathway-rail grade crossing, a station crossing, or a sidewalk at a highway-rail grade crossing, and an alternate

exit route or refuge area is not available, an emergency exit swing gate should be considered to avoid entrapment.

If used, emergency exit swing gates should be marked to guide users on proper operation.

Support:

Further guidance on spring hinges and door and gate opening force for swing gates can be found in “American with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).

Standard:

Where sidewalks are located between the edge of a roadway and active traffic control devices, the location, placement, and height prescribed for roadway gates shall be used (see Section 8C.04).

Guidance:

~~Separate~~ Where automatic gates are used at sidewalks the height of the gate arm when lowered should be ~~installed to rest~~ a minimum of 0.9 0.8 m (3 2.5 ft) and a maximum of 1.2 m (4 ft) above the sidewalk ~~when in the down position~~.

Standard:

A single automatic gate mechanism which includes a vehicular gate and a pedestrian gate shall not be used unless a means is provided to prevent the vehicular gate from being raised in the event the pedestrian gate is manually raised.

Option:

~~If separate automatic gates are used for a sidewalk, a~~ separate gate mechanism ~~should be provided for the a sidewalk~~ may be provided in lieu ~~gate, instead~~ of a supplemental or auxiliary gate arm ~~installed as a part of the same mechanism~~ to prevent a pedestrian from raising the vehicular gate at a highway-rail grade crossing.

## **Section ~~10A.05~~ 10A.06 Temporary Traffic Control Zones**

Page 1131, Lines 5 to 7

Standard:

Temporary traffic control operations on highways with highway-light rail transit grade crossings shall be as outlined in Part 6 of this Manual.

## **Section 10B.01 Introduction**

Page 1132, Lines 26 to 27

Support:

Section ~~8B.03~~ 8B.05 contains information regarding the use and placement of Crossbuck Assemblies. Section 10C.04 describes the appropriate conditions for the use of STOP or YIELD signs alone at a highway-light rail transit grade crossing.

## **Section 10C.15 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)**

Page 1137, Lines 42-49 and Page 1138 Lines 1-6

Standard:

A Highway-Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 10C-4) with a supplemental plaque describing the type of traffic control at the highway-light rail transit grade crossing shall be used on each highway in advance of every

highway-light rail transit grade crossing in semiexclusive alignments except in the following circumstances:

- A. On an approach to a highway-light rail transit grade crossing from a T-intersection with a parallel highway if the distance from the edge of the track to the edge of the parallel roadway is less than 30 m (100 ft) and W10-3 signs are used on both approaches of the parallel highway;
- B. On low-volume, low-speed highways crossing minor spurs or other tracks that are infrequently used and ~~are flagged by where~~ an authorized person transit crews manually stop directs road users from not to entering the crossing prior to a light rail transit vehicle occupying the crossing;
- C. In business or commercial districts areas where active highway-light rail transit grade crossing traffic control devices are in use; or
- D. Where physical conditions do not permit even a partially effective display of the sign.

### Section ~~10C.23~~ 10C.22 Pavement Markings

Page 1140, Lines 31-34 - keep pre-NPA text

Guidance:

When pavement markings are used, ~~a portion~~ the center of the X symbol should be directly ~~opposite~~ in line with the Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

### Section 10D.01 Introduction

Page 1142, Lines 15-18 (*split and move to 10D.02 and 10D.06*)

Option Standard:

If flashing-light signals or traffic control signals are in operation at a crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, audible devices may shall also be provided and shall be operated in conjunction with the flashing lights or traffic control signals.

### Section 10D.02 Flashing-Light Signals

Page 1142, Lines 25-33 (*moved from 10D.01*)

Support:

Sections 8C.02 and 8C.03 contain additional details regarding flashing-light signals.

**Standard:**

Highway-light rail transit grade crossings in semiexclusive alignments shall be equipped with flashing-light signals where light rail transit speeds exceed 60 km/h (35 mph). Flashing-light signals shall be clearly visible to motorists, pedestrians, and bicyclists.

If flashing-light signals are in operation at a crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, bell(s) or other audible device(s) shall be provided.

Guidance:

Where the crossing is at a location other than an intersection, ~~where~~ and light rail transit speeds exceed 40 km/h (25 mph), flashing-light signals should be installed.

## **Section 10D.04 Four-Quadrant Gate Systems**

Page 1143, Lines 13-25 (same edits as for 8C.05)

Option:

Four-Quadrant Gate systems may be installed to improve safety at highway-light rail transit grade crossings based on an engineering study when less restrictive measures, such as automatic gates and channelization devices, are not effective.

**Standard:**

A Four-Quadrant Gate system shall consist of a **number series of entrance and exit automatic gates used as an adjunct to in conjunction with flashing light signals** to control **traffic road users** on all lanes entering and exiting the highway-light rail transit grade crossing.

The Four-Quadrant Gate system shall **consist of utilize a series of** drive mechanism and fully retroreflectorized red- and white-striped gate arms with lights, and which in the down position extends individually across the entrance and exit lanes of **highway traffic the roadway** as shown in Figure 8C-2. Standards contained in Section 10D.02 for flashing-light signals shall be followed for signal specifications, location, and clearance distances.

**Support:**

**A highway-light rail transit grade crossing traffic control system consisting of a number of automatic gates used in conjunction with flashing light signals which does not block all of the approach and departure lanes at the crossing is not a Four-Quadrant Gate system.**

**Standard:**

## **Section 10D.05 Wayside Horn Systems**

Page 1144, Lines 26-37 (same edits as 8C.06)

Option:

**One or more Wayside horns systems** may be installed to provide directional audible warning at highway-light rail transit and pathway-light rail transit grade crossings or other applications as determined by a diagnostic team. Wayside horns may either be installed to provide supplemental audible warning or as **part of a system designed as the primary an** alternative to the sounding of a train mounted horn.

**Standard:**

**A wayside horn system shall consist of a horn or series of horns used in conjunction with light rail transit activated warning systems to provide audible warning of an approaching train for traffic on the highway approaches to the highway light rail transit grade crossing.**

**Location and operating characteristics of wayside horn(s) used to provide supplemental audible warning shall be determined by a diagnostic team.**

**The wWayside horn systems shall be designed using fail-safe principles. A means shall be employed to verify the sound output from the wayside horn system.**

## **Section ~~10D.05~~ 10D.06 Traffic Control Signals**

Page 1146, Lines 40-43 (moved from 10D.01)

**Standard:**

The provisions of Parts 4 and 8 relating to traffic control signal design, installation, and operation, including interconnection with nearby automatic gates or

flashing-light signals, shall be applicable as appropriate where traffic control signals are used at highway-light rail transit grade crossings.

If traffic control signals are in operation at a crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, audible devices shall be provided.

#### **Section ~~10D.08~~ 10D.09 Pedestrian and Bicycle Signals and Crossings**

Page 1147, Lines 22 to 47

This Section should be deleted, because the material has been moved to other Sections.

### **CHAPTER 10E. QUIET ZONE TREATMENTS AT HIGHWAY-LIGHT RAIL TRANSIT GRADE CROSSINGS**

Page 1149

This Chapter should be deleted, because Quiet Zones do not apply to Light Rail only crossings.

#### **Section 10F.04 Stop Lines, Edge Lines and Detectable Warnings**

Page 1150, Lines 39 to 47 (same edits as 8E.04)

##### Guidance:

If used at pathway-light rail transit grade crossings, the stop line should be a transverse line at the point where a pathway user is to stop. The stop line should be placed at least 0.6 m (2 ft) upstream from the gate or counterweight (if present), and at least 3.7 m (12 ft) from the nearest rail.

If used on pathway-light rail transit grade crossings or sidewalks at highway-light rail transit grade crossings, detectable warnings (see Section 3B.18) should extend across the full width of the pathway or sidewalk and should be 0.6 m (2 ft) wide in the pedestrian direction of travel. Detectable warnings should be placed at least 0.6 m (2 ft) upstream from the gate or counterweight (if present), and no closer than the stop line (if present) or 3.7 m (12 ft) from the nearest rail.

##### Option:

Edge lines specified in Section 3A.03 may be used on approach to and across the tracks at a pathway-light rail transit grade crossing, a station crossing, or sidewalk at a highway-light rail transit grade crossing to delineate the designated pathway user route.

##### Support:

This delineation is desirable where the distance across the tracks is long, commonly due to a skew track angle or multiple tracks, or where the surface is immediately adjacent to a traveled way.

#### **Section 10F.05 Passive Devices for Pathway-Light Rail Transit Grade Crossings**

Page 1151, Lines 1 to 25

##### Standard:

Except as noted in the Option below, where active traffic control devices are not used, a Crossbuck Assembly shall be installed on each approach to a pathway-light rail transit grade crossing.

Option:

The Crossbuck Assembly may be omitted at station crossings and on the approaches to a pathway-light rail transit grade crossing that is located within 7.6 m (25 ft) of the traveled way at a highway-light rail transit grade crossing.

Guidance:

The pathway user's ability to detect the presence of an approaching train should be considered in determining the type and placement of traffic control devices or design features (such as fencing or swing gates).

Nighttime visibility should be considered if design features (such as fencing or swing gates) are used to channelize pathway users.

When automatic gates and swing gates are used, the pathway should be channelized to direct users to the entrance to and exit from the pathway-light rail transit grade crossing.

Standard:

**Where ~~if~~ used, swing gates shall open away from the track(s) and return to the closed position after use.**

**Where used, swing gates shall be equipped with a smooth surface on the push side extending the full width of the gate within 0.25 m (10 in) of the pathway surface (kick plate).**

Option:

When used in conjunction with automatic gates at pathway-light rail transit grade crossings, swing gates may be equipped with a latching device that permits the gate to be opened only **by pedestrians who are on** from the track side of the gate.

**Refuge areas may be provided to provide a place for large numbers of pedestrians to congregate during the passage of a light rail transit vehicle.**

Guidance:

**Where refuge areas are provided, f** Fencing **may should** be installed to limit access **to** only **to** the pathway-light rail transit grade crossing.

## Section 10F.06 Active Traffic Control Systems for Pathway-Light Rail Transit Grade Crossings

*Page 1151, Lines 28 to 51 and Page 1152, Lines 1 to 15*

Guidance:

**Where light rail transit tracks are immediately adjacent to other tracks or a road, pedestrian signalization should be designed to avoid having pedestrians wait between sets of tracks or between the tracks and the road. If adequate space exists for a pedestrian refuge and is justified based on engineering judgment, additional pedestrian signal heads, signing, and detectors should be installed (see Section 4E.08).**

**Flashing-light signals (see Figure 10D-2) with a Crossbuck (R15-1) sign and an audible device should be installed at pedestrian and bicycle crossings where an engineering study has determined that the sight distance is not sufficient for pedestrians and bicyclists to complete their crossing prior to the arrival of the light rail transit vehicle at the crossing, or where light rail transit speeds exceed 60 km/h (35 mph).**

**If an engineering study shows that flashing-light signals with a Crossbuck sign and an audible device would not provide sufficient notice of an approaching light rail transit vehicle, the LOOK (R15-8) sign (see Figure 10D-2) and/or pedestrian gates should be considered (see Figures 10D-3, 10D-4, and 10D-5).**

Standard:

**If ~~an active traffic control system is~~ used at a pathway-light rail transit grade crossing, an active traffic control system shall include flashing light signals for each**

direction of the pathway, and a bell or other audible warning device shall also be provided for each direction of the pathway.

Support-Option:

Separate active traffic control devices may be omitted for a pathway-light rail transit grade crossing is located within 7.6 m (25 ft) of the traveled way at a highway-light rail transit grade crossing equipped with an active traffic control system, a separate active traffic control system for the pathway is usually not provided.

Standard:

If used at pathway-light rail transit grade crossings, flashing light signals shall be alternately flashing red lights that are aligned horizontally and the light units shall have a diameter of at least shall utilize minimum 100 mm (4 in) diameter light units, be aligned horizontally, and The mounting height for flashing red lights installed at pathway-light rail transit grade crossings shall be a minimum of 1.2 m (4 ft) above the near edge of the pathway, measured vertically from the bottom edge of the lights to the elevation of the near edge of the pathway surface.

Option:

At station crossings where more than one track is present, additional traffic control devices may be installed between the tracks at multiple track locations at station crossings as recommended by a diagnostic team.

Standard:

The mounting height for If used at station crossings, flashing red lights installed located between the tracks at station crossings shall be installed at a minimum of 0.3300 m (12 in ft), measured vertically from the bottom above edge of the lights to the elevation of the near edge of the pathway surface.

Option:

Automatic gates may be used at pathway-light rail transit grade crossings as recommended by a diagnostic team.

Guidance:

If used at a pathway-light rail transit grade crossing, each automatic gate should be installed to rest a minimum of 0.9 m (3 ft) above the pathway when in the down position.

If used, the gate configuration should provide for full width coverage of the pathway on both approaches to the track.

If automatic gates providing full width coverage are used at a pathway-light rail transit grade crossing, a station crossing, or a sidewalk at a highway-light rail transit grade crossing, and an alternate exit route or refuge area is not available, an emergency exit swing gate should be considered to avoid entrapment.

If used, emergency exit swing gates should be marked to guide users on proper operation.

Support:

Further guidance on spring hinges and door and gate opening force for swing gates can be found in "American with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11).

Standard:

Where sidewalks are located between the edge of a roadway and active traffic control devices, the location, placement, and height prescribed for roadway gates shall be used (see Section 10D.03).

Guidance:

Separate automatic gates used at sidewalks should be installed to rest a minimum of 0.9 m (3 ft) above the sidewalk when in the down position.

If separate automatic gates are used for a sidewalk, a separate gate mechanism should be provided for the sidewalk should be provided in lieu gate, instead of a

supplemental or auxiliary gate arm installed as a part of the same mechanism as the vehicular gate, in order to prevent a pedestrian from raising the vehicular gate at a highway-light rail transit grade crossing.

# Figures

## Figure 8B-1

Page 368

On note for front retroreflective Strip edit as follows:

Optional 50 mm (2 in) white or red retroreflective strip on front

Edit footnotes as follows:

Notes:

1. YIELD or STOP sign used only at passive crossings
2. Mounting height of at least 1.2 m (4 ft) for installations of YIELD or STOP signs on existing Crossbuck sign supports
3. Mounting height of at least 1.5 m (5'0") for new installations.
34. Mounting height of at least 2.1 m (7 ft) in areas with pedestrian movements or parking

Alter the drawing to lift the multiple track sign as close as possible under the crossbuck.

## Figure 8B-3

Page 371

Add an example of the roundabout with the crossing (modified W10-3 with the traffic circle).

Add the following note:

Note: The signs can be modified for geometrics. Other signs can be oriented or revised as needed to satisfy the geometrics of the roadways, including roundabouts, and the railroad tracks.

## Figure 8B-5

Page 373

Use DOT number with proper format, such as 987654A

## Figure 8B-7

Page 375

Change the Note:

If a transverse line is used at the crossing. Yield lines shall be used instead of stop lines if YIELD signs are used at the crossing.

Move W10-1 in figure in reference to the RXR pavement marking as shown in current MUTCD.

## Figure 8C-1

Page 378

Delete the last 4 dashes on the right end of the crown-roadway dashed line.

Figure 10C-1  
Page 399

On note for front retroreflective Strip edit as follows:

Optional 50 mm (2 in) white or red retroreflective strip on front

Edit footnotes as follows:

Notes:

1. YIELD or STOP sign used only at passive crossings
2. Mounting height of at least 1.2 m (4 ft) for installations of YIELD or STOP signs on existing Crossbuck sign supports

3. Mounting height of at least 1.5 m (5'0") for new installations.

34. Mounting height of at least 2.1 m (7 ft) in areas with pedestrian movements or parking

Alter the drawing to lift the multiple track sign as close as possible under the crossbuck.

Figure 10C-3  
Page 402

Add signs R8-10a and R10-6a to be consistent with Figure 8B-4

Figure 10C-4  
Page 403

Add an example of the roundabout with the crossing (modified W10-3 with the traffic circle).

Add the following note:

Note: The signs can be modified for geometrics. Other signs can be oriented or revised as needed to satisfy the geometrics of the roadways, including roundabouts, and the railroad tracks.

Figure 10C-6  
Page 405

Change the Note:

If a transverse line is used at the crossing, Yield lines shall be used instead of stop lines if YIELD signs are used at the crossing.

Move W10-1 in figure in reference to the RXR pavement marking as shown in current MUTCD.

Figure 10D-1  
Page 411

Revise to show 4 different indications. RRLRT Committee will submit revised figure.

Figure 10D-4

Page 413

Edit existing Fig 10D-4, call existing figure drawing 10D-4a, and then add a new drawing 10D-4b to show a stand alone pedestrian gate.

## Tables

Table 8B-1

*Page 77*

ENS Sign on last column

Change dimension to 300 x 225 (12 x 9)

Table 9B-1

*Page 78*

The W10-1 sign minimum size should be 450-Dia. (18-Dia.)

Add "No Train Horn (Plaque)" – W10-9P – 300 x 225 (12 x 9)