

14-05 Adopt Interim Approval issued by the FHWA for Optional Use of a Bicycle Signal Face (1A-16)

Recommendations: CTCDC non-motorized members John Cicarelli requests that the Committee makes recommendations to adopt the policy for Optional Use of a Bicycle Signal Face as described under the proposal.

Requesting and Sponsor Agency: John Cicarelli, Caltrans Non-motorized Member

Background: During the February 19th and May 14th, 2014 CTCDC meetings, John Cicarelli, Caltrans Non-motorized member had discussed proposed language with the CTCDC members.

John proposed a policy by modifying the current CA MUTCD, Section 4D.014(CA) Bicycle Signals, and the Interim Approval issued by FHWA. To see the **FHWA** Interim Approval Memo, please visit on the following website:

http://mutcd.fhwa.dot.gov/resources/interim_approval/ia16/ia16.pdf

Subject	Request for CTCDC Agenda Item: Bicycle Signal Faces	Date	8/12/2014
To	Devinder Singh, Executive Secretary California Traffic Control Devices Committee (CTCDC)		

History

CTCDC first addressed Bicycle Signals in 1990 (Item 90-7) in a proposed experiment by the City of Davis. Davis has several locations where high volumes of bicycle traffic enter and leave signalized intersections as the fourth leg of what is otherwise a T intersection. In 1996 Davis reported successful outcomes, and CTCDC asked the City, with assistance from CBAC, to develop proposed warrants, standards and draft legislation for the device. In 1999 warrants were recommended for use when a separate bicycle signal phase is needed.

In 2000 Caltrans developed a Standard Plan. By 2002 the Caltrans Traffic Manual had incorporated Bicycle Signal Heads in Chapter 9, Traffic Signals and Lighting. Traffic Manual content was incorporated into the California's MUTCD in the 2006 edition, in Sections 4C.102(CA) Bicycle Signal Warrant and 4D.104(CA) Bicycle Signals. 4C.102(CA) has three warrant conditions:

- volume (peak hour motor vehicles x bicycles)
- collision history
- geometry

Recent FHWA and NCUTCD Activity

The US (FHWA) MUTCD previously did not address Bicycle Signal Faces. In December 2013 FHWA issued Interim Approval #16 for Bicycle Signal Faces, with many more configurations and operational choices than in the CA MUTCD. In response, the National Council on Uniform Traffic Control Devices (NCUTCD) Signals Technical Committee (STC) and Bicycle Technical Committee (BTC) began working jointly on a MUTCD proposal covering the layout, meaning and operation of Bicycle Signal Faces. That proposal was reviewed by NCUTCD Sponsor organizations, and at its June 2014 meeting the NCUTCD Council forwarded the approved proposal to FHWA.

CA MUTCD Proposal

This memo:

- Proposes CA MUTCD content for Bicycle Signal Faces based in large part on the NCUTCD proposal likely to appear in the next (2016?) FHWA MUTCD, with certain California exceptions and additions;
- Adds CA-specific content for use of Bicycle Signal Faces with Pedestrian Hybrid Beacons (PHBs), a context not well addressed in the NCUTCD proposal. This includes a CA-specific Figure xx-2 showing recommended phasing for use with a PHB.

The following pages are the NCUTCD proposal, with its original line numbers removed and California differences added (indicated in **GREEN TEXT**).

Joint BTC/STC #1
With California changes indicated in green



National Committee on Uniform Traffic Control Devices

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NOTE: This is a recommendation to FHWA on changes to the MUTCD by the National Committee on Uniform Traffic Control Devices (NCUTCD). This recommendation is not a revision to the MUTCD and does not constitute official standards, guidance, or options. No proposed revision to the MUTCD is effective unless and until approved by FHWA through an Interim Approval or through the Federal rulemaking process.

TECHNICAL COMMITTEE:	Bicycle Technical Committee and Signals Technical Committee
TOPIC:	Recommendation – Bicycle Signal Faces
STATUS/DATE OF ACTION:	Recommended to send to sponsors following the January 2014 NCUTCD meeting
Technical Committee Vote:	BTC – 19-1-0 STC – 35-0-0
Transmitted to Sponsors:	March 2014
Council Approval:	June 28, 2014
ORIGIN OF REQUEST:	Various
AFFECTED SECTIONS OF MUTCD:	Various portions of Parts 1, 4, & 9

SUMMARY:

An Interim Approval has been issued for the optional use of a bicycle signal face (IA-16). This joint technical committee recommendation provides proposed MUTCD language to update the existing MUTCD standards, guidance, and options to add provisions for bicycle signal faces to control certain bicycle movements. This recommendation is based on the Interim Approval.

DISCUSSION:

The concept of providing separate signal faces to control bicycle movements at traffic control signals has been a topic of discussion in recent years. Informal working group sessions have been held at National Committee meetings to discuss this topic and work toward the development of proposed MUTCD language. However, following the June 2013 NCUTCD meeting, FHWA indicated their intent to issue an Interim Approval by the end of 2013 to allow the optional use of bicycle signal faces. There was insufficient time for the NCUTCD technical committees to develop proposed language, submit it to the sponsoring organizations for review, and refine and present it to the NC Council for a vote prior to the time FHWA needed a response. Therefore, the Bicycle Technical Committee (BTC) and the Signals Technical Committee (STC) worked jointly to develop a joint technical committee recommendation that was submitted to FHWA in November 2013. That joint technical

committee recommendation was sent to sponsors as an information item at the time it was submitted to FHWA. The Interim Approval was issued December 24, 2013.

At the January 2014 NCUTCD meeting, the BTC and STC held a special joint session to discuss the Interim Approval and develop proposed language for inclusion in the Notice of Proposed Amendment (NPA) for the next MUTCD. The following is presented as a joint technical committee recommendation to add provisions for the use of bicycle signal faces to the MUTCD. Most of the language is new and is proposed to be in a new MUTCD chapter. However, there are some minor changes needed to existing MUTCD sections to incorporate the new chapter.

There are some items that should be considered when reviewing this recommendation.

1. While the current MUTCD does not specifically address bicycle signal faces, Section 4D.07 references “circular indications in a signal face installed for the sole purpose of controlling a bikeway or a bicycle movement”. Although no similar reference exists for the use of arrow indications to control a bikeway or a bicycle movement, there is also nothing prohibiting arrow indications for that application. Therefore, the use of bicycle signal faces with all circular indications or all arrow indications have been included in the recommendation. Since straight through yellow arrows and red arrows are not permitted, the use of bicycle signal faces with all arrow indications has been limited to all left or all right arrows.
2. A new definition has been included for a “bicycle symbol signal indication”. This definition is for a red, yellow, or green signal indication that displays a bicycle symbol rather than a circular indication. It is important to note the difference and distinction between a “bicycle symbol signal indication” and a “bicycle signal indication”. A “bicycle signal indication” simply refers to an indication in a bicycle signal face. This could be a circular indication, an arrow indication, or a bicycle symbol signal indication. However, a “bicycle symbol signal indication” refers specifically to an indication that displays a red, yellow, or green bicycle symbol.
3. The two illustrations from the Interim Approval were included as figures in the joint Technical Committee Recommendation that was sent to sponsors. However, during the joint BTC/STC session at the meeting, the committees felt that combinations of arrow indications and bicycle symbol indications in the same signal face should not be allowed. The recommendation language was therefore revised to delete references to such combinations of indications in a bicycle signal face and Attachment 1A-16-2 from the IA that included [such] signal faces was deleted from the recommendation. Attachment 1A-16-1 was revised to show bicycle signal faces that include only circular indications, only bicycle symbol indications, only left arrow indications, or only right arrow indications.
4. The following concerning the use of bicycle signal faces is included as #1 in the Interim Approval:
However, if an agency opts to use bicycle signal faces under this Interim Approval, such use shall be limited to situations where bicycles moving on a green or yellow signal indication in a bicycle signal face are not in conflict with any simultaneous motor vehicle movement at the signalized location, including right (or left) turns on red.

The BTC & STC felt this is unnecessarily restrictive and included less restrictive language. When sent to Sponsors, the second Guidance paragraph in Section xx.02 was listed as a Standard. This was changed to Guidance during the joint BTC/STC session. It was felt that an agency may desire to provide a bicycle signal face at each signalized location along a route with a bicycle lane or separate bicycle facility to provide consistency indications provided to control the bicycle movements at successive signalized locations.

5. Several revisions considered editorial were made based on Sponsor comments. In addition, the following modifications were presented to and approved by National Committee in the final recommendation:
 - Added an Option to specifically allow the use of a bicycle signal face at a mid-block signal that does not have a motor vehicle movement parallel to the bicycle crossing.
 - Added an Option to specifically allow the use of a BICYCLE SIGNAL: with a bicycle signal face that contains only bicycle symbol indications. This sign is required for a bicycle signal face that does not contain all bicycle symbol indications and the technical committees felt it was important to note that, while not required, a sign is allowed when all of the indications in a bicycle signal face are bicycle symbol indications.

committee recommendation was sent to sponsors as an information item at the time it was submitted to FHWA. layout.

- Included a Standard that prohibits exclusive and simultaneous bicycle movements from perpendicular directions rather than using the language included in the IA. This is to allow an exclusive diagonal bicycle movement through an intersection, but not a “scramble” phase that could have conflicting perpendicular bicycle movements.

NOTE: The California-specific content of this modified NCUTCD proposal specifies that a flashing yellow bicycle signal indication shall be displayed on all approaches with conflicting perpendicular bicycle movements during such a “scramble” phase.

- Included Guidance that a bicycle signal face should not be used with a hybrid beacon. This was included as a Standard in the IA. It was felt that bicycle faces could be used with a hybrid beacon as long as the requirements of the hybrid beacon are satisfied, primarily the required sequence of indications.

NOTE: The California-specific content of this modified NCUTCD proposal includes a phasing sequence for use with a pedestrian hybrid beacon.

RECOMMENDED CHANGES TO THE CALIFORNIA MUTCD:

Recommended changes to the California MUTCD consist of all changes listed in the RECOMMENDED CHANGES TO THE MUTCD sections that follow, except those delimited by green lines such as these:

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California-specific commentary appears in **Green Highlight**.

RECOMMENDED CHANGES TO THE MUTCD:

Other than minor changes in Section 4D.06, there is no existing FHWA MUTCD language proposed for deletion as part of this recommendation. The deletions in 4D.06 are shown in red strikethrough (~~red strikethrough~~). Proposed additions are shown using red underline (red underline). Some text in the draft recommendation is in yellow highlight. Yellow highlighting indicates text that is providing supplemental information related to the recommendation, but is not part of the recommended text.

Add the following two new definitions (Standards) in Section 1A.13 following definition 23 Bicycle Lane:

Section 1A.13 Definitions

Standard:

xx. Bicycle Signal Face - a signal face, consisting of three or more signal sections, that exclusively controls a bicycle movement from a designated bicycle lane or from a separate facility such as a shared use path, and that displays signal indications that are applicable only to the bicycle movement.

xx. Bicycle Symbol Signal Indication - a red, yellow, or green signal indication that displays a bicycle symbol rather than a circular or arrow indication.

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Delete CA MUTCD section 4C.102(CA) Bicycle Signal Warrant. Rationale:

- The NCUTCD proposal contains no conditions comparable to 4C.102(CA)'s Volume or Collision warrant.

- Proposed new section XX.03 Warrants for Bicycle Signal Faces, in proposed new Chapter XX Bicycle Signal Faces, states that “[n]o new traffic signal warrant(s) specific to bicycle signal faces or in addition to those already provided in Chapter 4C are established”.
- 4C.102(CA)’s Geometric warrant is replaced by the NCUTCD proposal’s new Sections 4D.04 and 9D.03.

Section 4C.102(CA) Bicycle Signal Warrant

Guidance:

01 A bicycle signal should be considered for use only when the volume and collision or volume and geometric warrants have been met:

1. Volume; When $W = B \times V$ and $W > 50,000$ and $B > 50$.

Where: W is the volume warrant. B is the number of bicycles at the peak hour entering the intersection. V is the number of vehicles at the peak hour entering the intersection. B and V shall use the same peak hour.

2. Collision; When 2 or more bicycle/vehicle collisions of types susceptible to correction by a bicycle signal have occurred over a 12-month period and the responsible public works official determines that a bicycle signal will reduce the number of collisions.

3. Geometric;

(a) Where a separate bicycle/ multi-use path intersects a roadway.

(b) At other locations to facilitate a bicycle movement that is not permitted for a motor vehicle.

Delete CA MUTCD section 4D.104(CA) Bicycle Signals. Rationale:

- The NCUTCD proposal includes substantially more detail and options.

Section 4D.104(CA) Bicycle Signals

Support:

01 A bicycle signal (see Figure 4D-112(CA)) is an electrically powered traffic control device that may only be used in combination with an existing traffic signal. Bicycle signals shall direct bicyclists to take specific actions and may be used to improve an identified safety or operational problem involving bicycles. Refer to CVC-21450.

Standard:

02 Only green, yellow and red lighted bicycle symbols, shall be used to implement bicycle movement at a signalized intersection. The application of bicycle signals shall be implemented only at locations that meet Department of Transportation Bicycle Signal Warrants (see Section 4C.102(CA)).

03 A separate signal phase for bicycle movement shall be used.

Guidance:

04 Alternative means of handling conflicts between bicycles and motor vehicles should be considered first.

05 Two alternatives that should be considered are:

A.— Striping to direct a bicyclist to a lane adjacent to a traffic lane such as a bike lane to left of a right-turn-only lane.

B.— Redesigning the intersection to direct a bicyclist from an off-street path to a bicycle lane at a point removed from the signalized intersection.

06 A bicycle signal phase should be considered only after these and other less restrictive remedies have had an adequate trial with enforcement and with the result that the collision frequency has not been reduced.

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Add the following new Section 4D.04 following existing Section 4D.03 and renumber later sections in Chapter 4D. Note: Any references to 4D in this document refer to the existing 4D section numbers, not renumbered section numbers.

Section 4D.04 Provisions for BicyclistsOption:

Where it is desired to provide separate signal indications to control bicycle movements at a traffic control signal, bicycle signal faces may be used (see Chapter XX).

Modify Paragraph 01 in Section 4D.06 to not require circular or arrow indications for bicycle symbol signal indications.

Section 4D.06 Signal Indications – Design, Illumination, Color, and Shape**Standard:**

01 Each signal indication, shall be circular or arrow except those used for pedestrian signal heads, ~~and~~ lane-use control signals, and bicycle symbol signal indications shall be circular or arrow.

Add the following new Section 9D.03.

Section 9D.03 Provisions for BicyclistsOption:

Where it is desired to provide separate signal indications to control bicycle movements at a traffic control signal, bicycle signal faces may be used (see Chapter XX).

Add the following new chapter for bicycle signal faces. NOTE: All of the following is new.

CHAPTER XX. BICYCLE SIGNAL FACES**Section XX.01 General**Support:

See Section 1A.13 for the definitions of bicycle signal face and bicycle symbol signal indication.

Section XX.02 Use of Bicycle Signal FacesSupport:

The use of a bicycle signal face is optional.

A bicycle signal face can be used to provide separate control of the bicycle movement for various situations such as the following:

- A. Bicyclist non-compliance with the previous traffic control.
- B. Provide a leading or lagging bicycle interval.
- C. Continue the bicycle lane on the right-hand side of an exclusive turn lane that would otherwise be in non-compliance with Paragraph 6 of Section 9C.04.
- D. Augment the design of a contra-flow bicycle facility.
- E. Provide for unusual or unexpected arrangements of the bicycle movement through complex intersections, conflict areas, or signal control.

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- F. Provide for bicycle movements parallel to the pedestrian crossing movements controlled by a Pedestrian Hybrid Beacon.

< END CALIFORNIA-ONLY >Guidance:

Agencies should exercise consistency with the decision to introduce bicycle signal faces to a roadway or bikeway network and use caution with any non-systematic policy to use bicycle signal faces.

Support:

The use of bicycle traffic signal faces containing bicycle symbol indications and bicycle signal faces containing circular indications in the same corridor or jurisdiction could create comprehension issues by the roadway user or violate bicyclist expectation.

Guidance:

A bicycle signal face should only be used to control bicycle movements from a designated bicycle lane or from a separate facility such as a shared use path, and, other than as provided in the Option below, only where the bicycle movement controlled by the bicycle signal face is sometimes allowed to proceed or sometimes required to stop at times when other traffic, making the same movement, and controlled by other vehicular signal faces, is required to stop or allowed to proceed respectively.

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Option:

A bicycle signal face may be used at a mid-block traffic control signal where there are no motor vehicle movements parallel to the bicycle crossing.

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Option:

A bicycle signal face may be used at a mid-block traffic control signal or Pedestrian Hybrid Beacon.

Guidance:

When a bicycle signal face is used to control bicycle movements in the direction parallel to the pedestrian crossing movement of a Pedestrian Hybrid Beacon, the phasing should be as described in Figure xx-2 (see Section XX.13).

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Section XX.03 Warrants for Bicycle Signal Faces

Support:

No new traffic signal warrant(s) specific to bicycle signal faces or in addition to those already provided in Chapter 4C are established. Retrofitting existing traffic signals with bicycle signal faces is analogous to retrofitting existing traffic signals with pedestrian signals where such a determination is not required through an engineering study.

Standard:

New designs or installations for any traffic control signal shall be based on an engineering study in accordance with Paragraph 1 of Section 4C.01. For the purposes of an engineering study, the appropriate warrant(s) provided in Chapter 4C shall be followed.

Guidance:

The need to incorporate bicycle signal faces into a new location or design should be established through the engineering study performed in accordance with Paragraph 1 of Section 4C.01 to determine that the installation of a traffic control signal is justified.

Engineering judgment should be exercised in determining whether or not it would be advantageous or beneficial to install a bicycle signal face(s) or pedestrian signals at an existing traffic control signal.

Support:

For the purpose of warrant analyses, provisions for classifying bicycles are provided in Paragraph 15 of Section 4C.01 and Paragraph 2 of Section 9D.01.

Section XX.04 BICYCLE SIGNAL Sign

Support:

The purpose of the BICYCLE SIGNAL (R10-10b) sign is to inform road users that the signal indications in the bicycle signal face are intended only for bicyclists.

Standard:

A BICYCLE SIGNAL (R10-10b) sign shall be installed adjacent to (including above or below) a bicycle signal face unless all indications in that face are bicycle symbol signal indications.

Option:

A BICYCLE SIGNAL sign may be installed, based on engineering judgment, adjacent to a bicycle signal face consisting of all bicycle symbol indications.

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Guidance:

A BICYCLE SIGNAL sign should be installed where a parallel motor vehicle movement is controlled by a STOP or YIELD sign.

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Standard:

Except when used with a supplemental near side bicycle signal face containing 4-inch indications, the BICYCLE SIGNAL sign shall be a minimum size of 18 inches x 24 inches as shown in Figure xx.

Option:

A BICYCLE SIGNAL sign that is a minimum size of xx inches x xx inches may be used with a supplemental near-side bicycle signal face containing 4-inch indications.

Section XX.05 Meaning of Bicycle Signal IndicationsStandard:

Steady and flashing RED BICYCLE and YELLOW BICYCLE signal indications and steady GREEN BICYCLE signal indications shall have the same meanings as described in Paragraph 3 of Section 4D.04 for steady and flashing CIRCULAR RED and CIRCULAR YELLOW indications and steady CIRCULAR GREEN signal indications except that the bicycle signal indications shall only be applicable to bicyclists within the designated bicycle facility.

Section XX.06 Application of Bicycle Signal IndicationsStandard:

Steady bicycle signal indications shall be applied as follows:

- A. A steady RED BICYCLE signal indication shall be displayed when it is intended to prohibit bicycle traffic from entering the intersection or other controlled area. Turning after stopping shall be permitted as stated in Item C.1 in Paragraph 3 of Section 4D.04.
- B. A steady YELLOW BICYCLE signal indication shall be displayed following a GREEN BICYCLE signal indication in the same signal face. A YELLOW BICYCLE signal indication or a steady YELLOW ARROW indication shall be displayed following a GREEN ARROW in the same signal face. A yellow indication shall not be displayed in conjunction with the change from the RED BICYCLE signal indication to a green signal indication. The YELLOW BICYCLE indication shall be followed by a RED BICYCLE signal indication.
- C. A steady GREEN BICYCLE signal indication shall be displayed only when it is intended to permit bicyclists to proceed in any direction that is lawful and practical.

Section XX.07 Layout of Bicycle Signal FacesOption:

Bicycle signal faces may be oriented vertically or horizontally.

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Support:

See Figures XX-1 and XX-2 for typical arrangements of signal sections in bicycle signal faces.

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Support:

See Figure XX-1 for typical arrangements of signal sections in bicycle signal faces.

<END REPLACEMENT CONTENT WITH EDIT CORRECTION>

Standard:

Bicycle signal faces shall consist of one of the following:

- A. All bicycle symbol signal indications,
- B. All circular indications, or
- C. All left arrow or all right arrow indications.

The layouts and arrangements of the bicycle signal face shall be in accordance with the following provisions:

- A. Only the bicycle symbol shown on Page 6-7 in the 2004 Standard Highway Signs book shall be used for bicycle symbol signal indications. The bicycle symbol shall only be positioned horizontally and shall face to the left.
- B. The RED BICYCLE, YELLOW BICYCLE, and GREEN BICYCLE symbol signal indications shall be in the same relative position to each other as specified for the CIRCULAR RED, CIRCULAR YELLOW, and CIRCULAR GREEN signal indications respectively, in Sections 4D.09 and 4D.10.
- C. Circular signal indications and bicycle symbol signal indications shall not be used in the same bicycle signal face.
- D. Bicycle symbol signal indications and arrow signal indications shall not be used in the same bicycle signal face.
- E. As a specific exception to Paragraph 5 of Section 4D.09, two YELLOW BICYCLE signal indications or two GREEN BICYCLE signal indications shall not be arranged horizontally adjacent to each other at right angles to the basic straight line arrangement to form a clustered signal face.
- F. Single sections for continuous movements that would implement the bicycle symbol as illustrated in Group C of Figure 4D-2 shall not be used.

Section XX.08 Size of Bicycle Signal Faces

Standard:

The provisions of Section 4D.07 apply to the sizes of bicycle signal faces except as follows:

- A. There shall be three nominal diameter sizes for bicycle signal indications: 4 inches, 8 inches, and 12 inches.
- B. The bicycle symbol used for bicycle symbol signal indications shall be proportioned to fit within the signal lens.
- C. All signal indications in a bicycle signal face shall be of the same size.
- D. Four-inch signal indications shall only be used in supplemental, post-mounted, near-side bicycle signal faces.

Option:

As a specific exception to Paragraph 2 in Section 4D.07, 4-inch and 8-inch arrow signal indications may be used in bicycle signal faces.

If used, 4-inch signal indications may exclude the accompanying visor(s) and backplate.

Near-side bicycle signal faces may alternatively be either 8-inch or 12-inch.

Section XX.09 Placement of Bicycle Signal Faces

Standard:

The provisions of Sections 4D.13 through 4D.16 shall apply to the placement of the bicycle signal faces except as follows:

- A. As a specific exception to Item A in Paragraph 1 of Section 4D.11, a minimum of one primary bicycle signal face shall be provided to control traffic for the bicycle movement, even if a bicycle through movement exists.

- B. The primary bicycle signal face shall have either 8-inch or 12-inch signal indications, even if it is located at the near side of the signal-controlled location.
- C. When the primary bicycle signal face is located more than 120 feet beyond the stop line, a supplemental near-side bicycle signal face shall be provided.

Guidance:

When the primary bicycle signal face is located more than 80 feet and up to 120 feet beyond the stop line, a supplemental near-side bicycle signal face should be provided.

Bicycle signal faces should be placed such that visibility is maximized for bicyclists and minimized for adjacent or conflicting vehicle movements not controlled by the bicycle signal face. In cases where drivers not controlled by the bicycle signal face might be confused by viewing the bicycle signal indications, such as when the start or end of a green bicycle signal indication occurs at a different time than the start or end of a green signal indication for a concurrent adjacent vehicle movement controlled by other than the bicycle signal face, consideration should be given to using visibility-limited bicycle signal faces.

A bicycle signal face should be separated vertically or horizontally from the nearest vehicular traffic signal face for the same approach by at least 3 feet.

Section XX.10 Mounting Height of Bicycle Signal Faces

Standard:

The provisions of Section 4D.15 apply to the mounting height of bicycle signal faces except as follows:

- A. The bottom of the signal housing (including brackets) of a bicycle signal face that is not located over a roadway shall be a minimum of 7 feet above the sidewalk or ground, except where a BICYCLE SIGNAL (R10-10b) sign is installed below the bicycle signal face. If a BICYCLE SIGNAL (R10-10b) sign is installed below the bicycle signal face, the minimum mounting height to the bottom of the sign shall be 6 feet. If the bottom of the sign is mounted less than 7 feet above a pedestrian sidewalk or pathway, the supplemental sign shall not project more than 4 inches into the pedestrian facility.
- B. If 4-inch signal indications are used in a supplemental, post-mounted, near-side bicycle signal face, the bottom of the signal housing (including brackets) shall be a minimum of 4 feet and a maximum of 8 feet above the sidewalk or ground. Bicycle signal faces with 4" signal indications installed above a pedestrian sidewalk or pathway shall not project more than 4 inches into the pedestrian facility.

Section XX.11 Intensity and Light Distribution of Bicycle Signal Faces

Guidance:

Except for the 4-inch nominal size of the lens diameter, the intensity and distribution of light from each illuminated bicycle signal face should be similar to that recommended for vehicular traffic signal faces in accordance with Paragraph 10 of Section 4D.06 to the extent practicable.

Section XX.12 Backplates for Bicycle Signal Faces

Option:

Backplates may be used with bicycle signal faces.

Standard:

If backplates are used, ancillary legends of any kind that identify the purpose or operation of the bicycle signal face shall not be placed on the backplate.

Section XX.13 Operation of Bicycle Signal Faces

Standard:

If a bicycle signal face contains a green arrow that would otherwise be readily visible to drivers in the adjacent lane(s) controlled by other than the bicycle signal face, the bicycle signal face shall be visibility-limited.

The mode of operation of the bicycle signal faces at a traffic control signal shall be the same as the mode of operation of the other traffic signal faces. Bicycle signal faces shall operate in the steady (stop-and-go) mode when

the other traffic signal faces are operating in the steady (stop-and-go) mode. Bicycle signal faces shall operate in the flashing mode when the other signal faces are operating in the flashing mode, whether programmed or due to a malfunction.

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Bicycle signal faces shall not be placed in a dark mode when other vehicular traffic signal faces are operating in the flashing mode.

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Bicycle signal faces shall not be placed in a dark mode when other vehicular traffic signal faces for the same approach are operating in the flashing mode.

When used to control simultaneous bicycle movements from perpendicular directions, all bicycle signal faces for those approaches shall display a flashing YELLOW indication or flashing YELLOW ARROW indication as appropriate.

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As a specific exception to Paragraph 10 of Section 4D.05, the simultaneous display of a straight-through GREEN ARROW signal indication in a bicycle signal face and a CIRCULAR RED signal indication in another vehicle signal face for the same approach shall be permitted.

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Guidance:

When a bicycle signal face is used to control bicycle movements in the direction parallel to the pedestrian crossing movement of a Pedestrian Hybrid Beacon, the phasing should be as described in Figure xx-2.

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Section XX.14 Yellow Change and Red Clearance Intervals for Bicycle Signal Faces

Standard:

The provisions of Section 4D.26 shall apply to the duration of the yellow change and the red clearance intervals of a bicycle signal phase except as follows:

- A. The minimum duration of the yellow change interval shall be 3 seconds.
- B. The exclusive function of the yellow change interval shall be to warn bicyclists approaching a signalized location that their permission to proceed is being terminated after which they will be directed to stop.

Support:

Providing clearance time for a bicyclist to travel through the intersection or conflict area is the purpose of the red clearance interval rather than the yellow change interval.

Guidance:

The maximum duration of the yellow change interval should be 6 seconds.

If discernible non-concurrent activations or terminations of phases for bicycles controlled by bicycle signal faces and other vehicular traffic controlled by other signal faces are necessary, visibility-limiting devices should be used on the bicycle signal face.

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Section XX.15 Prohibited Use of Bicycle Signal Faces

Standard:

Bicycle signal faces shall not be used to control exclusive and simultaneous bicycle movements from perpendicular directions.

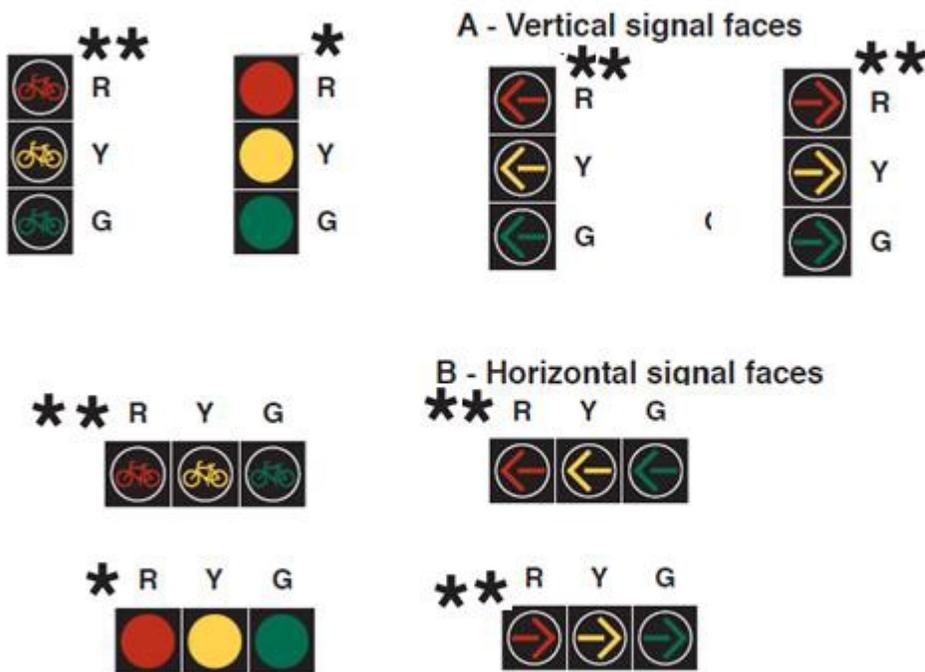
Guidance:

Bicycle signal faces should not be used in any manner with respect to the design and operation of a hybrid beacon.

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Figure xx-1

Typical Arrangements of Signal Sections in Bicycle Signal Faces

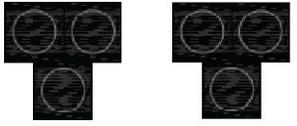
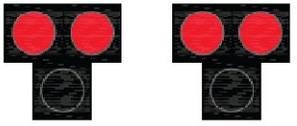
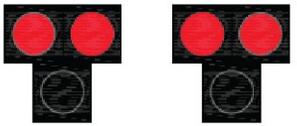


* BICYCLE SIGNAL sign required

** BICYCLE SIGNAL sign optional

Figure xx-2

Typical Bicycle Signal Face Phasing for Use With Pedestrian Hybrid Beacon

<p>Remains in this phase until pedestrian beacon (PPBI) is illuminated or bicycle beacon (PHB).</p> <p>Bike Signal: Solid Red ("Wait") indication.</p> <p>Pedestrian Signal: Solid Red ("Wait") indication.</p> <p>Proposed Duration: 4 seconds</p>	 <p>Both Beacon Faces > Dark ("Face How Condition")</p>	 <p>Steady "Don't Walk"</p>
<p>Phase 1 (Motorists Slow Down)</p> <p>Not start flashing yellow until pedestrian beacon (PHB) is activated (the Pedestrian Hybrid Beacon (PHB)).</p> <p>Bike Signal: Solid Red ("Wait") indication.</p> <p>Pedestrian Signal: Solid Red ("Wait") indication.</p> <p>Proposed Duration: 4 seconds</p>	 <p>Flashing Yellow ("Slow Down")</p>	 <p>Steady "Don't Walk"</p>
<p>Phase 2 (Motorists Stop)</p> <p>Motorists: Solid Yellow or Low Intensity Red (LIR) and Pedestrian still have a steady red ("Wait") indication.</p> <p>Bike Signal: Solid Red ("Wait") indication.</p> <p>Pedestrian Signal: Solid Red ("Wait") indication.</p> <p>Proposed Duration: 4 seconds</p>	 <p>Steady Yellow ("Prepare to Stop")</p>	 <p>Steady "Don't Walk"</p>
<p>Phase 3A (Bicycle Green Indication)</p> <p>Motorists: Solid Red. Pedestrian: "Proceed"</p> <p>Site Signal: Solid Green ("Proceed")</p> <p>Pedestrian Signal: "Walk" indication.</p> <p>Proposed Duration: 7.2 (min) to 10 (max) seconds</p>	 <p>Steady Red ("Stop")</p>	 <p>Steady "Walk" Indication</p>
<p>Phase 3B (Bicycle Yellow Clearance Interval)</p> <p>Motorists: Solid Red. Pedestrian: "Walk" indication.</p> <p>Site Signal: Solid Yellow ("Stop", Pedestrians/Bikes Crossing)</p> <p>Proposed Duration: 3 seconds</p>	 <p>Steady Red ("Stop", Pedestrians/Bikes Crossing)</p>	 <p>Steady "Walk" Indication</p>
<p>Phase 4A (4-Way Stop Condition)</p> <p>Motorists: All lights off. Pedestrian: Flashing Red.</p> <p>Site Signal: Flashing Red (Stop, Pedestrians/Bikes Crossing)</p> <p>Proposed Duration: 14 seconds</p>	 <p>Flashing Red ("Stop, Proceed with Caution")</p>	 <p>Flashing Red Hand & Countdown</p>
<p>Phase 4B (Bike/Ped Red Clearance Interval)</p> <p>Motorists: All lights off. Pedestrian: Solid Red.</p> <p>Site Signal: Solid Red ("Wait") indication.</p> <p>Proposed Duration: 3 seconds</p>	 <p>Steady Red ("Stop, Proceed with Caution")</p>	 <p>Steady "Don't Walk"</p>

BICYCLE SIGNAL Sign Issued by FHWA



R10-10b
11iSIGWLL

* Reduce character spacing 20%.

A	B	C	D	E	F	G	H	J	K	L
12	1B	0.315	0.375	4	5	25	2.s C·	4.564	4.5&4	1.5
18	24	0.315	0.625	4.25	B	3.5	4 C·	7.303	7.302	1.5

COLORS: LffiEKD,BOOIR – BLACK
BAGKROO1D – \WHIT (REmo.RER.fGTN'E}

See following page for alternate design/size proposed to be used in place of this

Proposed alternate BICYCLE SIGNAL sign design/size



Bicycle Signal (R10-xx) sign - 24" x 24"
 10" symbol, 6" B text
 (design could also be used for a 6" x 6" size
 under 4" near-side indications with
 a 2.5" symbol and 1.5" B text)



Bicycle Signal (R10-xx) sign - 18" x 24"
 8" symbol, 4" B text

Note: The text includes an Option for the use of a smaller size BICYCLE SIGNAL sign with signal faces that have 4-inch indications. However, a size was not determined at the time this item was presented to the National Committee Council so the size is unspecified. Therefore, a sign design/size needs to be developed for the small size signal face.

This sign would be used with near-side supplemental bicycle signals with 4" indications and therefore the sign and signal face may be mounted relatively low. Considering possible impacts on pedestrian traffic and that the sign is intended for bicyclists that are at or near the signal face, it is anticipated that a relatively small minimum size would be acceptable. The use of a BICYCLE SIGNAL sign with a signal face with 4-inch indications would be optional unless the signal face contained something other than all bicycle symbols.