

**National Committee on Uniform Traffic Control Devices**

**Bicycle Technical Committee Recommendations  
Approved by the NCUTCD Council January 2008 & June 2008**

Note: All page numbers are referenced to the numbers shown in the draft version of the MUTCD that displays revisions and changes published on the FHWA MUTCD website.

**PART 9 - Bicycle Facilities**

**Chapter 9A - General**

Section 9A.01 Requirements for Bicyclist Traffic Control Devices

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.02 Scope

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.03 Definitions Relating to Bicycles

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.04 Maintenance

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.05 Relation To Other Documents

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.06 Placement Authority

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.07 Meaning of Standard, Guidance, Option, and Support

The National Committee endorses the content of this section as proposed by FHWA.

Section 9A.08 Colors

The National Committee endorses the content of this section as proposed by FHWA.

**Chapter 9B - Signs**

Section 9B.01 Application and Placement of Signs

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.02 Design of Bicycle Signs

The National Committee endorses the content of this section as proposed by FHWA, with the following exception:

1. Page 1116, line 38 - add "and plaques" after "of bicycle signs" for consistency with the wording used elsewhere in Section 9B.02.

#### Section 9B.03 STOP and YIELD Signs (R1-1, R1-2)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.04 Bike Lane Signs and Plaques (R3-17, R3-17aP, R3-17bP)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.05 BEGIN RIGHT TURN LANE YIELD TO BIKES Sign (R4-4)

The National Committee endorses the content of this section as proposed by FHWA, with the following exception:

1. Page 1117, line 29 - add "Figure 9C-4" after "(see Figures 9C-1 and 9C-3)", since Figure 9C-4 also shows the R4-4 sign.

#### Section 9B.06 Bicycles May Use Full Lane Sign (R4-11)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.07 Bicycle WRONG WAY Sign and RIDE WITH TRAFFIC Plaque (R5-1b, R9-3cP)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.08 NO MOTOR VEHICLES Sign (R5-3)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.09 Selective Exclusion Signs

The National Committee endorses the content of this section as proposed by FHWA, with the following exceptions:

1. Page 1118, line 16 - delete the phrase "Where authorized by public officials under State or local statutes or ordinances", since this is adequately covered in Part 1.
2. Page 1118, line 16 - add "(see Figure 9B-2)" after "Selective Exclusion signs".
3. Page 1118, lines 21-29 - Delete the entire Guidance section and replace with the following Support statement, which is consistent with the presentation of Selective Exclusion signs in Section 2B.46:

Support:

Typical exclusion messages include:

No Bicycles (R5-6)

No Pedestrians (R9-3a)

No Skaters (R9-13)

No Equestrians (R9-14)

*Note: The R9-13 and R9-14 should also be included in Section 2B.46 and Figure 2B-14, since these signs can also be used on roadways without bicycle facilities.*

Section 9B.10 No Parking Bike Lane Signs (R7-9, R7-9a)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.11 Bicycle Regulatory Signs (R9-5, R9-6, R10-4, R10-24, R10-25, and 39 R10-26)

The National Committee endorses the content of this section as proposed by FHWA, with the following exception:

1. Page 1119, lines 1-2 - Add "or other warning lights or beacons" before "have been provided" to allow the use of the R10-25 sign in other appropriate locations where other types of beacons or lights are used for traffic control for bicyclists, such as beacons at path-roadway crossings, tunnels, or other locations.

Section 9B.12 Shared-Use Path Restriction Sign (R9-7)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.13 Bicycle Signal Actuation Sign (R10-22)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.14 Other Regulatory Signs

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.15 Turn or Curve Warning Signs (W1 Series)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.16 Intersection Warning Signs (W2 Series)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.17 Bicycle Surface Condition Warning Sign (W8-10)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.18 Bicycle Warning and Combined Bicycle/Pedestrian Signs (W11-1 and W11-15)

The National Committee endorses the content of this section as proposed by FHWA, with the following exceptions:

1. In human factors testing commissioned by NCUTCD, the selected W11-15 sign symbol design depicted in the proposed MUTCD tested poorly as compared to other alternative sign designs. See comments on Figure 9B-3.

Section 9B.19 Other Bicycle Warning Signs

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.20 Bicycle Guide Signs (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, D1-3c, D11-1, D11-1c)

The National Committee endorses the content of this section as proposed by FHWA.

Section 9B.21 Bicycle Route Signs (M1-8, M1-8a, M1-9)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.22 Bicycle Route Sign Auxiliary Plaques

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.23 Bicycle Parking Area Sign (D4-3)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.24 Reference Location Signs (D10-1 through D10-3) and Intermediate Reference Location Signs (D10-1a through D10-3a)

The National Committee endorses the content of this section as proposed by FHWA, with the following exceptions:

1. Page 1123, line 32 - Delete the "Zero distance should begin at the south and west terminus points of shared-use paths" Guidance statement, as it does not allow for needed flexibility for local agencies in setting up reference marker systems on paths.

#### Section 9B.25 Mode-Specific Guide Signs for Shared-Use Paths (D11-1a, D11-1b, D11-2, D11-3, D11-4)

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9B.26 Object Markers

The National Committee endorses the content of this section as proposed by FHWA, with the following exceptions:

1. Add pictures of each type of object marker to a figure (existing or new) in Chapter 9B, similar to how object markers were depicted in prior editions of Part 9 of the MUTCD.
2. Include the optional use of a proportionately smaller (6" x 18") version of the Type III object marker for use on shared-use paths. This smaller size would be more useful and appropriate than the standard 12" x 36" size for many applications, and will provide adequate visibility and target value at pathway speeds.

### **Chapter 9C - Markings**

#### Section 9C.01 Functions of Markings

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9C.02 General Principles

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9C.03 Marking Patterns and Colors on Shared-Use Paths

The National Committee endorses the content of this section as proposed by FHWA, with the following exception:

1. Page 1125, lines 40-41 - Delete the words "traveling in the same direction". This proposed change is unnecessary for shared-use path operations and safety, and this change makes this statement inconsistent with normal and typical use for this marking. Marked pedestrian areas on shared-use paths are typically marked with a solid white line consistent with Section 9C.03 in the 2003 MUTCD, but are not intended or marked as directional facilities, as typical movement of pedestrian in these areas is multidirectional. A directional restriction of movement in these areas would likely have very poor user compliance, and create discrepancies between user expectations and actual experience.

#### Section 9C.04 Markings for Bicycle Lanes

The National Committee endorses the content of this section as proposed by FHWA, with the following exceptions:

1. Page 1126, lines 34-36 - Delete the Option statement and replace with the following wording: "If the word or symbol pavement markings shown in Figure 9C-6 are used, Bicycle Lane signs (see Section 9B.04) may also be used. To avoid overuse of the signs, the signs need not be adjacent to every symbol." This wording conveys the same information, but in a cleaner and more comprehensible manner.
2. Page 1126, line 38-39 - Delete the words "or other circular intersection", since there are certain types of larger circular intersections (such as ones with significant distances between exits & entrances) where bike lanes may be appropriate based on engineering judgment.

#### Section 9C.05 Bicycle Detector Symbol

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9C.06 Pavement Markings for Obstructions

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9C.07 Shared Lane Marking

The National Committee endorses the content of this section as proposed by FHWA.

### **Chapter 9D - Signals**

#### Section 9D.01 Application

The National Committee endorses the content of this section as proposed by FHWA.

#### Section 9D.02 Signal Operations for Bicycles

The National Committee endorses the content of this section as proposed by FHWA.

### **Tables & Figures**

Table 9B-1 - Bicycle Facility Sign and Plaque Minimum Sizes

The National Committee endorses the content of this table as proposed by FHWA, with the following exceptions:

1. Sheet 1, table item 3 - Replace the term "Bicycle Lane" with "Bike Lane" to be consistent with the actual wording on the sign, and to be consistent with Section 9B.04.
2. Sheet 1, table item 3 - NCUTCD recommends a minimum roadway size for the R3-17 sign of 24" x 18", not 30" x 24". Given the intentionally simple and legible design of the R3-17, the 24" x 18" size is entirely functional for all road users, the size and scale of this sign is consistent with the widely-used D11-1 BIKE ROUTE sign, and is the size actually used by many jurisdictions in the US (notwithstanding the size currently called for in the 2003 MUTCD). In fact, in Figure 9B-2 of the draft MUTCD, the R3-17 is shown to scale at a 24" x 18" size, implying that it is FHWA's intent to implement this size as standard. The 30" x 24" size can still be optionally used if a larger sign size is occasionally warranted.
3. Sheet 1, table item 4 - Replace the term "Bicycle Lane Supplemental Plaques" with "Bike Lane (plaques)" to be consistent with the actual wording on the R3-17, and to be consistent with Section 9B.04.
4. Sheet 1, table item 4 - NCUTCD recommends a minimum roadway size for the R3-17 plaques of 24" x 8", not 30" x 12". Given the simple one-word design of the R3-17 plaques, the 24" x 8" size is entirely functional for all road users, and is the size actually used by many jurisdictions in the US (notwithstanding the size currently called for in the 2003 MUTCD). In fact, in Figure 9B-2 of the draft MUTCD, the R3-17 plaques are shown to scale at a 24" x 8" size, implying that it is FHWA's intent to implement this size as standard. The 30" x 12" size can still be optionally used if a larger sign size is occasionally warranted.
5. Sheet 1, table item 10 - NCUTCD recommends a minimum roadway size for the R5-6 sign of 18" x 18", not 24" x 24". This size would still provide very good symbol legibility, and would bring the R5-6 in line with the minimum sizes called for other Selective Exclusion signs in the MUTCD. Note that a comparable change will also need to be made to Table 2B-1.
6. Sheet 1, table item 31 - NCUTCD recommends deleting the minimum roadway size for the R5-4a sign, since this sign will not be used on roadways.
7. Sheet 1, table item 37 - Replace the term "Advance Grade Crossing" with "Highway-Rail Grade Crossing Advance Warning" to be consistent with the description of the W10-1 sign in Chapter 8B.
8. Sheet 1, table item 37 - NCUTCD recommends a minimum shared-use path size for the W10-1 sign of 18" diameter, not 30". The 30" size is inappropriate (far too large) for shared-use paths, and is much larger than the 18" standard warning sign size used throughout Chapter 9B. An 18" size will bring this sign in conformance with the size proposed in Part 8 for shared-use path / rail crossings, and will provide good legibility at a size appropriate for a pathway environment.
9. Sheet 2, table item 11 - Insert a 18" x 9" minimum size for the W16-2aP AHEAD plaque for shared-use paths, as this plaque may be useful on shared-use paths, and the 18" x 9" size would be appropriate for use with typical warning signs on paths.

10. Sheet 2, table item 32 - Replace the term "Bicycle Route" with "Numbered Bicycle Route" to be consistent with the intended application of the M1-8 and M1-8a, and to reduce confusion with other non-numbered bicycle route signs.
11. Sheet 2, table item 32 - NCUTCD recommends a minimum roadway size for the M1-8 and M1-8a sign of 18" x 24". This will improve legibility on roadways, and bring the M1-8 and M1-8a into conformance with the minimum roadway size recommendations for the M1-9 sign.
12. Sheet 2, table item 33 - NCUTCD recommends a minimum shared-use path size for the M1-9 sign of 12" x 18". This will provide good legibility on paths, and bring the M1-9 into conformance with the minimum path size recommendations for the M1-8 and M1-8a signs.
13. Add the W10-9p No Train Horn plaque in a 12" x 9" size.

#### Figure 9B-1 - Sign Placement on Shared-Use Paths

The National Committee endorses the content of this figure as proposed by FHWA.

#### Figure 9B-2 - Regulatory Signs and Plaques for Bicycle Facilities

The National Committee endorses the content of this figure as proposed by FHWA, with the following exception:

1. The R5-6 sign should be depicted at the same size (18" x 18") as other Selective Exclusion signs (R9-3, R9-13, R9-14) (see comment above).

#### Figure 9B-3 - Warning Signs and Plaques for Bicycle Facilities

The National Committee endorses the content of this figure as proposed by FHWA, with the following exception:

1. In human factors testing commissioned by NCUTCD, the selected W11-15 sign symbol design depicted in the proposed MUTCD tested poorly as compared to other alternative sign designs. Implementing the proposed design as the standard sign for this application will likely result in poor comprehension and legibility. Based on the results of testing (see appendix), NCUTCD recommends the following design for the W11-15 in both Figure 9B-3 and Figure 2C-11:



2. Add the W10-9p No Train Horn plaque in a 12" x 9" size.

#### Figure 9B-4 - Guide Signs and Plaques for Bicycle Facilities

The National Committee endorses the content of this figure as proposed by FHWA, with the following exception:

1. NCUTCD recommends the use of wayfinding-type legends for the D1 series signs depicted in this figure, since these types of legends will be the most likely ones used on these signs. *Note: the NCUTCD Bicycle Technical Committee will attempt to develop a proposed revised figure for use by FHWA.*

Figure 9B-5 - Example of Signing for the Beginning and End of a Designated Bicycle Route on a Shared-Use Path

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9B-6 - Example of Bicycle Guide Signing

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9B-7 - Examples of Signing and Markings for Shared-Use Paths

The National Committee endorses the content of this figure as proposed by FHWA, with the following exceptions:

1. Add the W15-2P Number of Tracks plaque and the W15-8 LOOK sign as optional signs on the path-rail crossing in the lower right of the figure.
2. Consider relocating the path-rail crossing example in the lower right of the figure to a separate figure in the new sections on pathway-rail crossings in Part 8 and Part 10.
3. Enlarge and reformat the path-roadway intersection in the upper left of the figure to more clearly show the variety of optional devices in the figure. Note that relocating the path-rail example (as noted above) could gain the needed page space to accomplish this.

Figure 9B-8 - Example of Mode-Specific Guide Signing on a Shared-Use Path

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-1 - Example of Intersection Pavement Markings - Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volumes, Parking, One-Way Traffic, or Divided Highway

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-2 - Examples of Center Line Markings for Shared-Use Paths

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-3 - Example of Bicycle Lane Treatment at a Right Turn Only Lane

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-4 - Example of Bicycle Lane Treatment at Parking Lane into a Right Turn Only Lane

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-5 - Example of Pavement Markings for Bicycle Lanes on a Two-Way Street

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-6 - Optional Word and Symbol Pavement Markings for Bicycle Lanes

The National Committee endorses the content of this figure as proposed by FHWA.

Figure 9C-7 - Bicycle Detector Pavement Marking

The National Committee endorses the content of this figure as proposed by FHWA.



Figure 9C-8 - Example of Obstruction Pavement Marking

The National Committee endorses the content of this figure as proposed by FHWA, with the following exception:

1. Change "Pier, abutment, grate, or other obstruction" callout in Figure 9C-8 to "Drain grate or other roadway obstruction" to be consistent with wording used in Section 9C.06.

Figure 9C-9 - Shared Lane Marking

The National Committee endorses the content of this figure as proposed by FHWA.

**Appendix - Combination Pedestrian / Bicycle Sign Study**

## **Nonmotorized Trail Crossing Sign Study**

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**May 2007**

The purpose of this study was to determine which of five alternative signs designed to instruct motorists that there was a trail crossing ahead should be adopted in the MUTCD.

### Signs Tested

The five signs tested included: A pedestrian and bicycle symbol with the bicycle symbol in front of the pedestrian symbol; a pedestrian and bicycle symbol with the bicycle symbol above the pedestrian symbol; a sign containing a pedestrian, bicycle, and skater symbol; a sign containing a pedestrian, bicycle, and equestrian symbol; and a sign showing the bicycle and pedestrian symbol in between trail crossing lines.

### Sample

A total of 220 participants were randomly divided into five groups of 44 to evaluate each of the five signs. Each group was only shown one of the five signs.

### Methodology

Each sign was placed in a digital photograph of an actual trail crossing. This sign was presented to each group using a LCD projector. The slide was only available for 3 s. Before presenting the slide the participants were given the following instruction: "In a moment I will project onto the screen a view of the roadway that a driver might see driving on a particular road segment. You will only see the slide for 3 s. Look for the yellow diamond shape sign on your right. When you have finished looking at the scene along with the sign you will be asked to open the paper you were given and answer two

questions. You will have 30 seconds to answer the both questions. Because we are evaluating which sign conveys the message best it is acceptable to respond 'I don't know.' After the 30-second period is up, I will instruct you to turn your paper over and pass it in. The purpose of this task is to help the National Committee on Uniform Traffic Control Devices select which of several signs should be included in the manual used by traffic engineers. This is not a practical assessment; the results will not be published. You are free to assist us or not. It will only take less than a minute.

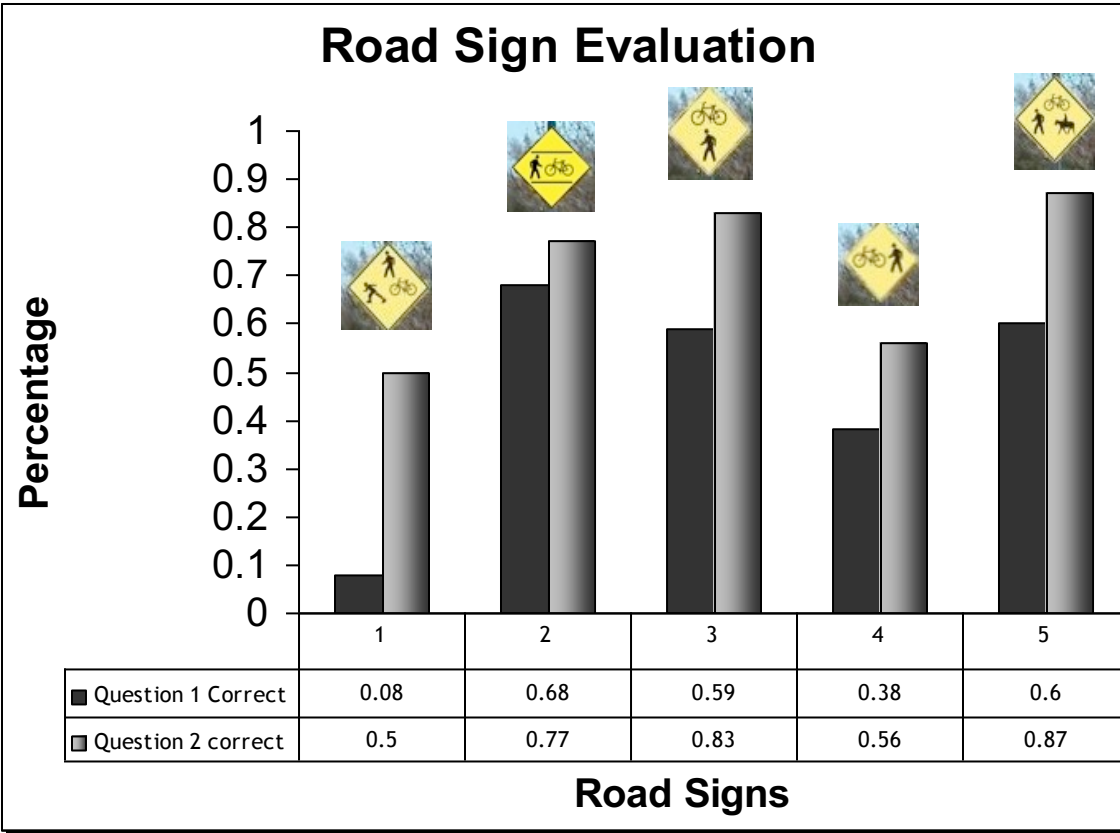
### Questions

Question 1 asked "What does this sign mean?" Question 2 asked "What should you do when you see this sign?"

Figure 1 shows a sample picture of one of the slides. The sign shown in Figure 1 was also the most effective option.



The percentage of participants answering each question correctly is presented in Figure 2. The results showed that signs 2, 3 and 5 received the highest percentage correct



answers for both questions. Typical correct answers for question 1 were “Bike and pedestrian crossing ahead” and “Be prepared to stop or yield to a cyclist or pedestrian ahead.” Results were worse for sign 1 and moderate for sign 4.

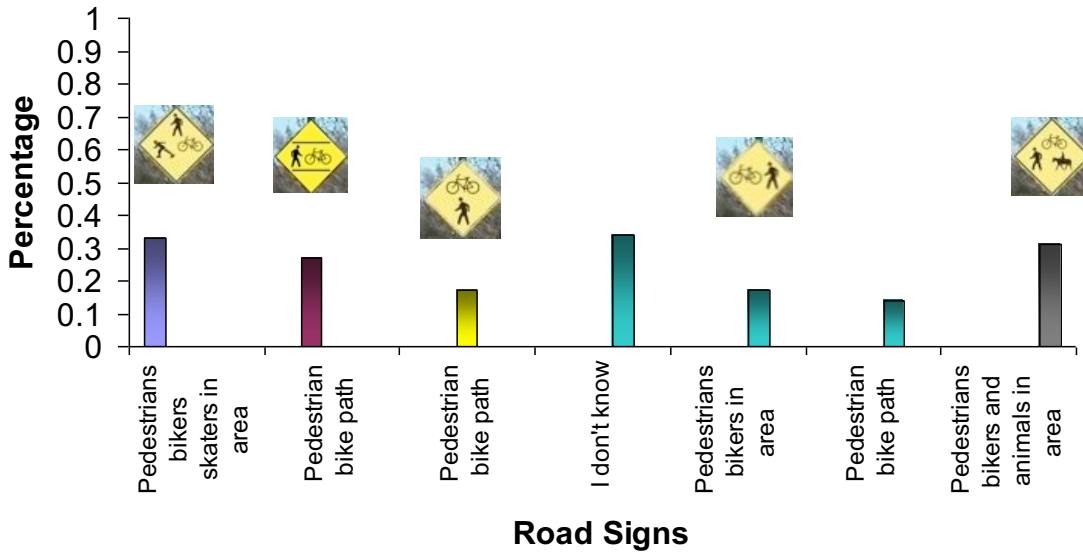
**Error Analysis**

The most common errors for questions 1 and 2 for each sign are presented in Figures 3 and 4. These data show that the most common errors for signs 1 and 2 were bicyclists and pedestrians in the area, and look for cyclists and pedestrians using the bike lane. The lane markings in sign 2 may have contributed to this error.

**Conclusions**

Overall it appears that sign 3 is most easy to read, and best understood. Sign 5 was also reasonably will understood.

### Most Incorrect Response for Question 1



### Most Common Incorrect Response for Question 2

