

ATTACHMENT NO. 31

Not Approved by NCUTCD Council

TECHNICAL COMMITTEE: Guide and Motorist Information Signs Technical Committee

DATE OF ACTION: June 22, 2005

TOPIC: Guide Signing for Multi-Lane Freeway Exits with an Option Lane

ORIGINS OF REQUEST: AASHTO Traffic Engineering Subcommittee
Guide and Motorist Information Signs Technical Committee

DISCUSSION:

Guide sign design for multi-lane freeway exits with an option lane presents numerous challenges. It is desirable for the sign design to communicate several types of information to the motorist, including:

- a) the concept that a vehicle in the option lane is able to either exit the freeway or continue on the mainline;
- b) the concept that a vehicle in the option lane does not have to change lanes to the left to continue on the mainline;
- c) the concept that a vehicle in the option lane does not have to change lanes to the right in order to exit; and
- d) the provision of identifying information about each destination (mainline and exit), such as street name, route number, or destination name.

Although previous editions of the MUTCD have covered the signing requirements for multi-lane exits with an option lane, there is a tremendous lack of uniformity in sign design for this application throughout the United States. From state to state, and even within individual states, a wide variety of sign designs are in use.

The AASHTO Traffic Engineering Subcommittee became interested in this issue in the early 1990's. The Subcommittee was interested in both identifying a sign design that would very effectively communicate to the motorist and in promoting uniformity in guide signing for this application.

In 2002 a project was initiated in the National Cooperative Highway Research Program to objectively evaluate a variety of guide sign designs. The project panel directing that project included representation from both the AASHTO Traffic Engineering Subcommittee and the Guide and Motorist Information Signs Technical Committee.

The project panel identified the four signs designs that it believed would be most effective in communicating information to the motorist. These four designs included the sign design that is probably the most commonly used in the field, as well as the sign design that is currently recommended in the MUTCD. The four sign designs were subjected to controlled human factors experimentation to evaluate the effectiveness of each. Ninety-six test subjects evaluated the sign designs in a simulated, but realistic, driving environment in a driving simulator.

The sign design recommended by the NCHRP project provided the best overall performance in the human factors evaluation. This means, that overall, the recommended sign design was best in satisfying the following objectives:

- 1) minimizing the number of failures to reach an assigned destination (a mainline destination or an exit destination);
- 2) minimizing unnecessary lane changes (unnecessary lane changes create turbulence, reduce capacity, and increase the probability of crashes);
- 3) minimizing lane changes made close to the gore;
- 4) maximizing the distance between the last needed lane change and the gore;
- 5) maximizing test subject confidence in the proper lane to reach their destination;
- 6) maximizing test subject perception of ease of understanding the sign message; and
- 7) minimizing the cost of signs and structures.

Twenty-nine traffic engineering professionals contributed to the evaluation of the relative importance of each of the above objectives. These individuals were comprised of 7 members of the NCHRP project panel, 18 members of the Guide and Motorist Information Signs Technical Committee, and 4 State Traffic Engineers.

The following recommendations of the Guide and Motorist Information Signs Technical Committee are based largely upon the sign design recommended by the NCHRP project. Adoption of this recommendation in the MUTCD will provide a sign design that will very effectively communicate to the motorist and will promote uniformity in guide signing for this application.

RECOMMENDED WORDING AND FIGURE CHANGES:

The Guide and Motorist Information Signs Technical Committee recommends the following revisions to the MUTCD.

(Changes to delete have the strike through symbol and changes to add are in bold and underlined)

1. Section 2E.11 Pull-Through Signs

Guidance:

Modify the last sentence to read as follows:

Pull-Through signs with down arrows should be used where the alignment of the through lanes is curved and the exit direction is straight ahead, where the number of through lanes is not readily evident, ~~and~~ at multi-lane exits where there is a reduction in the number of through lanes **or where a through lane becomes an option lane for through or exiting traffic.**

2. Section 2E.18 Arrows for Interchange Guide Signs

Standard:

Modify the 1st paragraph to read as follows:

On all Exit Direction signs **for single lane exits,** both overhead and ground mounted, arrows shall be upward slanting and shall be located on the side of the sign consistent with the direction of the exiting movement. **For multi-lane exits, upward slanting arrows shall be**

located on the bottom of the overhead mounted sign with each arrow positioned near the center of each exiting lane. Upward slanting arrows on the bottom of an Exit Direction sign shall be at the same angle as the arrow on Exit Direction Signs (see Figure 2E-20). The size of upward slanting arrows on the bottom of the sign panel shall be based on the EXIT ONLY letter size in accordance with the “Standard Highway Signs” book.

3. Section 2E.19 Diagrammatic Signs

1st Guidance:

Diagrammatic signs should be designed in accordance with the following additional criteria:

Delete Item G in its entirety replace with new text and add a new Item H as follows:

~~G. The cardinal direction should be placed adjacent to the route shield, and the destination should be placed below and justified with the route shield.~~

G. For splits or other exits leading in a single cardinal direction, the cardinal direction should be placed adjacent to the route shield.

H. The destination should be placed below and justified with the route shield.

Diagrammatic signs should be used at the Advance Guide sign location(s) for the following:

Modify Item D as follows:

D. Where a ~~two-lane~~ **multi-lane** exit has an optional lane that carries the through route (see Figures 2E-6 and 2E-7). These interchanges create serious expectancy problems for drivers who are unfamiliar with the interchange.

4. *Modify Figure 2E-6 and Figure 2E-7 to reflect the Recommended Sign Configuration from the NCHRP Project 20-7 (155), Signing of Two-Lane Exits with Option Lane. The diagrammatic arrows should be wider with heavier lane lines to emphasize the auxiliary and option lanes. See attached graphic showing a comparison of existing Figures 2E-6 and 2E-7 and the proposed new Figures 2E-6 and 2E-7. The following note should be added to Figures 2E-6 and 2E-7:*

Adjacent to the 1 mile and ½ mile advance guide signs add the following:

“Sign should be centered over the approach lanes”

Adjacent to the gore sign add the following:

“The signs should be longitudinally located at the theoretical gore, i.e. at a point where the right edgeline for the mainline and the left edgeline for the ramp begin at a common point and then diverge. The signs shall be laterally located so that arrows are centered above the lanes to which each applies.”

In addition the appropriate pavement markings should be shown on the roadway for the right hand lane that is required to exit, i.e. elephant tracks, followed by a solid lane line, approaching the gore.

5. Section 2E.20 Signing for Interchange Lane Drops

1st Guidance:

Add text to the Guidance section to read as follows:

The EXIT ONLY (down arrow) (E11-1) panel (see Figure 2E-9) should be used on all signing of lane drops on all Advance Guide signs for right exits (see Figure 2E-10). For lane drops on the left side, diagrammatic signing with the EXIT ONLY (E11-1c) panel (see Figure 2E-9) should be used without a down arrow for Advance Guide signs (see Figure 2E-8). **When diagrammatic Advance Guide signs are used for multi-lane exits with an option lane, EXIT ONLY panels should not be used on the Advance Guide signs. For multi-lane exits with an option lane the sign designating the exiting lanes and the E11-1d panel should be of the format shown in Figure 2E-6 and Figure 2E-7.**

2nd Standard:

Modify the Standard to read as follows:

The Exit Direction sign (see Figure 2E-20) and E11-1a panel (see Figure 2E-9) shall be of the format shown in Figures 2E-8 and 2E-20 for all **single lane** lane drops. The standard slanted up arrow (left or right side) shall be included on the Exit Direction sign.

6. *Modify Figure 2E-9 to include Exit Only panel E11-1d (new) which shows the Exit Only message between two upward slanting arrows. See attached graphic showing a comparison of existing Figure 2E-9 and the proposed new Figure 2E-9.*
7. Section 2E.33 Exit Direction Sign

2nd Standard:

Modify to read as follows:

Where a through lane **or auxiliary lane (at a multi-lane exit)** is being terminated (dropped) at an exit, the Exit Direction sign shall be placed overhead at the theoretical gore (see Figure **2E-6, 2E-7, 2E-8, and 2E-10**).

8. Standard Highway Signs Book - The design of the Advance Guide Signs for a multi-lane exit with an option lane is extremely important. The design of these signs should be included in the SHS Book.

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| TECHNICAL COMMITTEE | For | - 19 |
| VOTE: | Opposed | - 0 |
| | Abstentions | - 0 |

REFERENCE TO AFFECTED SECTIONS, FIGURES AND PAGE NUMBERS IN MUTCD:

Section 2E.11 on page 2E-4
Section 2E.18 on page 2E-9
Section 2E.19 on page 2E-13
Figure 2E-6 on page 2E-17
Figure 2E-7 on page 2E-18
Section 2E.20 on page 2E-14
Figure 2E-9 on page 2E-20
Section 2E.33 on page 2E-33