

OHIO DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC ENGINEERING RESEARCH IMPLEMENTATION PLAN



Title: Evaluation of Ground Mounted Diagrammatic Entrance Ramp Approach Signs

State Job Number: 14674

PID Number:

Research Agency: Ohio University

Researcher(s): Helmut Zwahlen

Technical Liaison(s): Jim Roth

Research Manager: Monique Evans

Sponsor(s): Tony Vogel, Dave Holstein

Study Start Date: 3/31/1997

Study Completion Date: 12/30/2000

Study Duration: 45 Months

Study Cost: \$183,288.00

Study Funding Type: 80 Federal / 20 State from ODOT SPR (2)

STATEMENT OF NEED:

The effectiveness of ground mounted diagrammatic signs in the context of urban multi-lane arterials leading to a freeway are to be evaluated. This type of guide sign provides much needed information well in advance of the interchange entrance, thus giving drivers more time to change lanes, if needed.

RESEARCH OBJECTIVES:

To evaluate ground mounted advance diagrammatic guide signs with regard to their effectiveness from a driver information acquisition/processing, driver behavior, driver safety, and traffic throughput point of view. Only the advance guide signs in the interchange approach will be replaced with diagrammatic guide signs during the “after” condition. The signs present at the location for the interchange itself will be left unchanged. The signs present at the location of the interchange itself will be left unchanged. It should also be noted that the advance guide signs used during the “before” condition must be new or nearly new in order to avoid a change in driver behavior due to the higher brightness of the new diagrammatic signs used in the “after” condition. This study aims at determining the effects on driver behavior due to advance guide sign content, not brightness. The effectiveness of advance diagrammatic guide signs along freeway interchange approaches will mainly be evaluated in the field, using a “before” condition (current guide signs) vs. an “after” condition (current guide signs and advance diagrammatic signs) approach.

RESEARCH TASKS:

- Six highway-freeway interchanges were selected in the Greater Columbus, Ohio, area to determine the effectiveness of ground mounted diagrammatic signs in the field.
- Traffic flow video footage was collected at the selected sites before the diagrammatic signs were installed.
- The finalized ground mounted diagrammatic sign designs were then installed and the traffic flow videotaping was repeated. The collected video footage was automatically analyzed with Mobilizer PC.
- The resulting vehicle count, speed, and headway data were used as input to a closed form analytical model to determine the probability that drivers could successfully change lanes as needed, prior to reaching the gore of the freeway entrance.

RESEARCH DELIVERABLES:

- The Final report documenting all research activities, conclusions, and recommendations.

RESEARCH RECOMMENDATIONS:

The theoretical analysis indicated a much higher probability that an unfamiliar driver could execute a required lane change when diagrammatic signs are used. The model was tested with data obtained from additional interchange evaluations with unfamiliar test drivers. This data corroborated the findings of the theoretical model analysis, in that drivers were able to execute a needed lane change much earlier when ground mounted diagrammatic signs were provided. Eye movement recordings were performed at night at the six sites in order to determine if the presence of these diagrammatic signs was distracting. The results of the eye movement analysis indicate that ground mounted diagrammatic signs are not looked at excessively often or excessively long. The overall median first look distance to these signs was found to be 125m. ODOT/FHWA evaluators visited the six interchange sites and provided their input and opinions as to the use of ground mounted diagrammatic signs. The vast majority of the evaluators fully embraced the idea of ground mounted diagrammatic signs.

PROJECT PANEL COMMENTS:

None

IMPLEMENTATION STEPS & TIME FRAME:

Standard sign designs and specifications will be developed by 12/31/2006.

EXPECTED BENEFITS:

This will be an optional treatment to improve traffic flow and safety.

EXPECTED RISKS, OBSTACLES, & STRATEGIES TO OVERCOME THEM:

None

OTHER ODOT OFFICES AFFECTED BY THE CHANGE:

- District Planning, Production, and Construction offices.

PROGRESS REPORTING & TIME FRAME:

- All implementation steps will be monitored on quarterly basis. Progress will be monitored and reported on R&D Figure No. 5.4 named Research Implementation Progress Report.

TECHNOLOGY TRANSFER METHODS TO BE USED:

- The final report of this research will be available online at ODOT website.
- The final report was also distributed to all other state departments of transportation in addition to national libraries and repositories.

IMPLEMENTATION COST & SOURCE OF FUNDING:

None

Approved By: (attached additional sheets if necessary)

Office Administrator(s):

Signature: Dave Holstein Office: OTE Date: 4/25/2006

Division Deputy Director(s):

Signature: Tony Vogel Division: DHO Date: 4/26/2006