Project Summary

Texas Department of Transportation

0-6407: Evaluation of the Effectiveness of Automated Flagger Assistance Devices

Background

Automated flagger assistance devices (AFADs) are temporary traffic control devices that direct traffic at lane closures on two-lane, two-way roadways. AFADs are designed to be remotely operated by a flagger positioned outside of the travel lane, thereby reducing employee exposure to traffic. Figures 1 and 2 show examples of the two types of AFADs. The first type uses a STOP/SLOW sign to alternately control the right-of-way. The other type uses red and yellow lenses for the same purpose. While AFADs may increase the safety of flaggers, there were concerns that AFADs may be misunderstood by motorists and increase the potential for motorists to enter the lane closure under the STOP condition. Research was needed to assess motorist understanding and the operational and safety effectiveness of AFADs relative to the use of flaggers at lane closures on two-lane, two-way roadways before widespread implementation in Texas.

A similar issue arose with the safety of crossing guards stopping motorists before children enter a crosswalk. Researchers explored safety issues encountered by crossing guards to identify and evaluate potential devices for improving the safety and effectiveness of crossing guards.

What the Researchers Did

Researchers surveyed motorists to determine their understanding of AFADs. In addition, researchers conducted field studies on two-lane, two-way roadways to assess the operational and safety effectiveness of AFADs relative to the use of flaggers.

Researchers conducted a closed-course study to determine the effectiveness of five STOP paddles with embedded lights compared to a standard, un-lit STOP paddle. Researchers also conducted a before and after study to identify the impact of a remotely operated, lighted, in-street school crossing sign on driving behavior near a school crossing with active crossing guard operations.

What They Found

The motorist survey showed that the current design of STOP/SLOW AFADs may lead to motorists misinterpreting the AFAD as a standard stop sign; thus, increasing the potential for motorists to proceed before they were allowed.

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Project Completed: 8-31-11

Alternative symbol supplemental signs developed in this research decreased the likelihood for motorists to misinterpret the AFAD as a standard STOP sign and increased their understanding that the AFAD would change when they were allowed to proceed. The survey also showed that the signal indications used with the red/yellow lens AFADs may conflict with motorist expectations, but that the use of a gate arm ultimately informed motorists when to proceed or stop.

Field study data indicated that violation rates for both types of AFADs were higher than the violation rate for flaggers. The violation rate for the current design of STOP/SLOW AFADs was the highest; however, adding a gate arm decreased the violation rate. Once a gate arm was added to the STOP/SLOW AFAD, the supplemental signs evaluated did not appear to impact compliance.

Researchers found that some embedded light configurations on crossing guard STOP paddles may negatively impact a motorist's ability to recognize the three critical characteristics that define a STOP sign: red background color, octagon shape, and white STOP legend. While the prototype, remotely operated in-street school crossing sign was well understood by motorists, the limited field study observations did not indicate a change in motorist behavior. However, the crossing guards had a positive experience using the device and believed it improved their ability to perform their duties.

What This Means

While some motorists may misunderstand the directions provided by AFADs and enter the lane closure under the stop condition, AFAD violations were infrequent. In addition, for all the documented violations workers were able to stop the motorist before they encountered oncoming traffic. Overall, researchers recommended that both STOP/SLOW and red/yellow lens AFADs be used in Texas to control traffic at lane closures on two-lane, two-way roadways. Researchers also recommended that a gate arm and the alternative symbol supplemental signs be required with STOP/SLOW AFADs.

Figure 1. STOP/SLOW AFAD

Figure 2. Red/Yellow Lens AFAD

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