Florida Department of Transportation Research

Dynamic Flashing Yellow Arrow (FYA): A Study on Variable Left Turn Mode Operational and Safety Impacts, Phase II – Model Expansion and Testing

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Current Situation

In recent years, drivers have begun to see the flashing yellow arrow (FYA) in left-turn lanes in Florida. Studies have shown the safety advantages of the FYA, which has been shown to be easier for drivers to interpret than traditional yield-on-green signals. The Florida Department of Transportation has sponsored several projects to develop tools to assist traffic engineers in managing FYAs. In the first phase of this project, University of Central Florida (UCF) researchers developed a decision support system (DSS) to evaluate when to activate a flashing yellow arrow (FYA) in relationship to traffic volumes. The DSS was able to flag intersections requiring traffic engineers' attention and to assist traffic engineers in selecting FYA left-turn modes for specific times of day.

The flashing yellow arrow improves safety and efficiency, especially at times when traffic volumes are low.

Research Objectives

In phase two of this project, the UCF team further developed the DSS to automate selection of FYA left-turn modes based on traffic volumes at intersections acquired in real time from existing sensors.

Project Activities

To provide a more accurate basis for the neural network model underlying the DSS, the research team expanded the number of intersections studied in phase two. Additional video data, analyzed on a second-by-second basis, were also included. Based on conclusions reached in phase one, data included in phase two analyses were required to have a balanced number of peak and off-peak conditions. The final refined neural network model and DSS criteria were tested in a simulated environment and then in the field.

Virtual testing of the DSS was conducted using the latest version of the microscopic traffic simulation model VISSIM 7.13 along with its application programming interface modules. This allowed the researchers to conduct the testing in an advanced software environment and confirmed the applicability and validity of the procedure and its logic.

Having proven the DSS in a virtual environment, the next step was to test it in the real world as part of the decision making at a traffic management center (TMC) with real intersections as subjects. Two intersections in Seminole County were monitored by CCTV, whose output was collected and analyzed in real time at the Seminole County Traffic Engineering Lab. Results of this testing again confirmed the applicability and validity of the DSS and its ability to provide traffic engineers with a fully adjustable system and more tools to operate the intersections as efficiently as possible.

Project Benefits

The algorithm developed in this project will allow traffic signal controllers to be designed so that the appropriate left turn restriction can alter throughout the day to maximize safety and efficiency of intersections.

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