Florida Department of Transportation Research

Dynamic Flashing Yellow Arrow (FYA) – A Study on Variable Left Turn Mode Operational and Safety Impacts – Phase III

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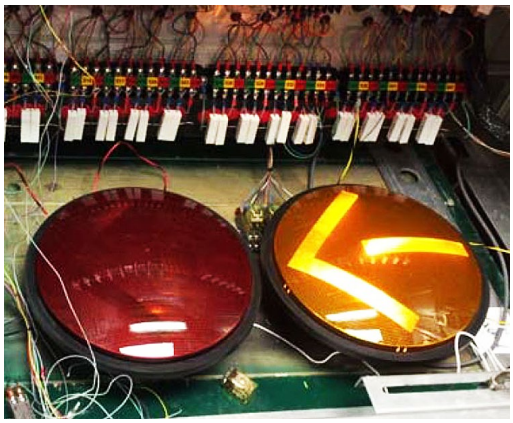
Current Situation

Analysis of left turns resulting in crashes alerted engineers to the fact that some drivers were misinterpreting a circular green as an indicator that they had the right of way to make a left turn, sometimes resulting in crashes. Thus, the idea for a flashing yellow arrow (FYA) was born in the 1990s. The new signal was believed to be more specific as a directional sign, with the flashing yellow clearly communicating that drivers must wait for a safe gap in traffic before proceeding. Studies showed that the new signal reduced crashes, and it was recommended for use by the National Cooperative Highway Research Program (NCHRP) in 2003. Implementation began under an FHWA provisional rule in 2006. Subsequent studies have found that the FYA reduces left-turn crashes at signalized intersections by 20-25%.



A flashing yellow turn signal is activated in a test setup that determines the phasing of turn signals based on real-time traffic information.

Research Objectives

University of Central Florida researchers continued a project to increase the effectiveness of FYA signals by developing hardware that can interface with a wide variety of controllers and software to automatically select left-turn modes, in real time, based on gaps in opposing traffic and using existing sensors.

Project Activities

In this third phase of the project, the FYA decision support system (DSS) was further developed through an exclusive hardware platform to allow the DSS to interface with existing traffic signal controllers used in Florida. The goal was to produce a hardware-software combination that would connect to existing controllers without requiring the user to know details about the controller hardware. The basis of the setup was a peer-to-peer logic scheme that facilitates real-time acquisition of data from loop detectors via the controllers and from video traffic detectors. These data are then used by the DSS to adjust the phasing of the FYA.

Testing verified that the system was able to accurately acquire real-time information about traffic flows and switch to FYA mode when there were sufficient gaps in opposing traffic for drivers to make safe left turns. Gaps in opposing traffic were calculated using two different methodologies, discrete and average. The average method was determined to be more conservative, and the discrete method was determined to be more accurate in analyzing sufficient gaps for drivers to complete the left turn maneuver. The hardware-software platform developed in this project can be used with various traffic signal controllers to adjust left-turn phasing in real time.

Project Benefits

Technologies like those developed in this project make intersections "smarter," automatically adjusting to traffic flows and increasing traffic efficiency and safety.

For more information, please see www.fdot.gov/research/.