Flashing yellow arrow for safer left turns

A left turn is one of the most dangerous movements a motorist makes. Left-turn traffic signals are designed to let drivers know when to yield to oncoming traffic and when they have the right of way, but the wide variety of these signals in use across the country can be confusing.

Traffic engineers have long felt the need for a comprehensive national study to evaluate the operational and safety advantages of left-turn controls used in different states. NCHRP responded with Project 3-54, the most exhaustive study of this topic to date, led by Kittelson & Associates. In 2003 the research team completed NCHRP Report 493, *Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control.*

Drivers understand flashing yellow arrow

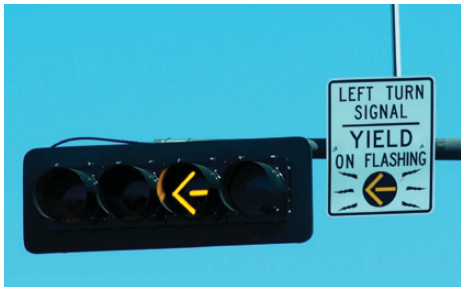
Researchers performed a comprehensive array of field and laboratory studies to assess driver understanding of and response to various protected/permissive left-turn (PPLT) controls. In a protected phase, turning drivers see a green arrow and are protected from opposing traffic, while during the permissive phase, drivers are permitted to turn left only when oncoming traffic is clear.

> "I see the flashing yellow arrow very much as the wave of the future."

Investigators concluded that the flashing yellow arrow (FYA) was safer and more effective than the simple circular green light and other signals at conveying to drivers that they need to yield before turning left. Based on Report 493 recommendations, the draft revision of the Manual on Uniform Traffic Control Devices includes the flashing yellow arrow as a permitted signal, making it a likely part of the 2009 edition.

Engineers across the country have already begun installing flashing yellow arrows using FHWA's Interim Approval for the signals. About half the states now have at least one FYA, for an estimated total of about 600 intersections, says Scott Wainwright, a highway engineer on FHWA's MUTCD team.

"I see the flashing yellow arrow very much as the wave of the future," says Wainwright.



"Everyone who's used it so far has been extremely pleased with it."

Oregon DOT was one of the first agencies to adopt the flashing yellow arrow display as the state standard for PPLT control. "For us, NCHRP 493 was a catalyst that helped us actually change our policies and standards regarding our left-turn signal display," says Ed Fischer, ODOT State Traffic Engineer. "We've converted more than 30 displays to the flashing yellow arrow and have seen a considerable reduction in left-turn crashes."

FYA—a safer signal

To quantify the safety benefits of the flashing yellow arrow, NCHRP initiated a follow-up study that evaluated before-and-after crash data at intersections with FYAs. The encouraging results were published in 2007 as NCHRP Web-Only Document 123.

"We found that the flashing yellow arrow made significant improvements to left-turn safety compared with the circular green signal," says David Noyce, associate professor at the University of Wisconsin–Madison and an investigator for both NCHRP Report 493 and Web-Only Document 123. "We now know that we've found the solution to the permissive left-turn problem that we're having across the country."

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In Washington state, where the city of Kennewick has installed more than 25 flashing yellow arrows in the last four years, engineers have seen operational as well as safety benefits.

"We had three intersections that needed capacity improvements, typically additional lanes and roadway improvements," says John Deskins, a traffic engineer with the city. "Simple conversions from protected-only phasing to protected-permitted with the flashing yellow arrow allowed the intersections to operate much better, so major investments will be pushed out 10 to 20 years."

NCHRP Report 493 is available online at http://www.trb.org/news/blurb_detail.asp?id=1710, and may be purchased from the TRB Bookstore at http://www.trb.org/bookstore. NCHRP Web-Only Document 123, *Evaluation of the Flashing Yellow Arrow Permissive-Only Left-Turn Indication Field Implementation*, is available at http://www.trb.org/news/blurb_detail.asp?id=8835.

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