

When are three lanes better than four?

Guidelines are now available to help Iowa traffic engineers determine when a relatively quick, easy, and inexpensive improvement—re-marking a four-lane, undivided roadway into three lanes, with one lane in each direction and a center two-way left-turn lane (TWLTL)—might be an option for a roadway.

Funded by the Iowa Department of Transportation's Office of Traffic and Safety, Keith Knapp, former assistant professor of civil and construction engineering at ISU and manager of safety and traffic programs at CTRE, and Karen Giese, former graduate research assistant at CTRE, recently studied such conversions.

Sometimes simpler is better

To improve operations and safety along a four-lane, urban, undivided roadway, traditional improvements include constructing a raised median or a center TWLTL. Both alternatives, however, involve widening the roadway, which is costly and sometimes impractical.

Converting a four-lane, undivided roadway to three lanes with a center TWLTL can have several advantages. Compared to other improvements that involve widening the roadway, they

- are relatively inexpensive,
- have generally less impact on adjoining property, and
- interrupt traffic for a shorter time during conversion.

Because the turning lane is reserved for left-turning traffic, a three-lane roadway can improve sight distance for turning vehicles and eliminate lane changes to avoid left-turning vehicles.

Not for every roadway

The study cautions, however, that converting a four-lane, undivided roadway to

a three-lane roadway with TWLTL is not the solution for every urban corridor. For example, it may be a reasonable alternative only if the operational impacts (e.g., decrease in average arterial travel speed) are locally acceptable.

Little research had previously been done on operational impacts of four-lane to three-lane conversions. In this study, in addition to case study analyses of conversions in Iowa and elsewhere, researchers used simulation software to conduct a "sensitivity analysis" of various factors affecting average arterial travel speeds on three-lane and four-lane, undivided roadways.

The study concludes with a thorough discussion of a number of factors that must be considered to determine when a four-lane-to-three-lane conversion is an alternative improvement:

- roadway function/environment,
- traffic volume and level of service,
- turn volumes/patterns,
- frequently stopping and/or slow-moving vehicles,
- crash types and patterns,
- pedestrian/bicycle activity,
- right-of-way acquisition costs, and
- general roadway characteristics.

The guidelines presented in the study do not help owners determine if such a conversion is feasible for a specific location, only when this option might be included for further study in the alternative improvement comparison stage.

The project report is online at www.ctre.iastate.edu/reports/4to3lane.pdf. •