Three lanes really can be safer than four

Do four-lane to three-lane conversions of urban roadways really make a safety difference? Several cities in Iowa say yes.

Does their experience hold up under scientific scrutiny? Recently the Iowa DOT's Office of Traffic and Safety decided to find out.

About the research

Four-lane to three-lane conversions generally involve re-marking a four-lane, undivided urban roadway into three lanes: one through lane in each direction with a two-way, continuous left-turn lane in the center.

The Iowa DOT sponsored two projects to study the safety impacts of such conversions. One study was conducted by CTRE, and the other was conducted by Iowa State University's Department of Statistics.

CTRE did a classical before-and-after study using 10 years of annual data. These data were compared to annual crash trends citywide and to similar, unconverted roadways.

The Department of Statistics used a Bayesian before-and-after analysis with monthly crash data and estimated volumes for all sites over 23 years (1982–2004).

Both studies started with the same 15 conversion sites and 15 comparison (unconverted) sites. The conversion and comparison sites had traffic volumes ranging from 2,000 to 17,400 annual daily traffic (ADT) from 1982 to 2004 and were mostly located in smaller urbanized areas. See Table 1 for a list of the study sites.

Results

Both study methods yielded similar results:

- Compared to crashes citywide, at converted sites major injury crashes were reduced by 11 percent, minor injury crashes by 30 percent, and possible injury crashes by 31 percent.
- Crash frequency on the converted sites was reduced by about 24 percent—after subtracting the change in citywide crashes.
- Fewer people under 25 and over 65 (two groups with traditionally higher crash risk) were involved in crashes.
- There were significantly fewer crashes related to left turns and stopping.

For more information

Contact Tom Welch, Iowa DOT Office of Traffic and Safety, 515-239-1267, tom.welch@dot.iowa.gov. Also see www.ctre.iastate.edu/research/4laneto3lane.htm for links to related documents, including a tech transfer summary with more details about these two studies. ■

US 34 in Osceola is one conversion site.

Table 1. Description of conversion sites

City	AADT*	Population	Length	Land use
Storm Lake	7,333	10,076	1.41	Primarily commercial and industrial
Clear Lake	12,000	8,161	1.51	Mostly strip commercial, with some residential remnants
Mason City	7,100	29,172	1.78	Primarily agricultural and industrial
Osceola	6,100	4,659	2.04	Residential, strip commercial, and downtown
Manchester	11,200	5,257	0.35	Downtown commercial
Iowa Falls	10,422	5,193	1.23	Industrial, with some residential street access at one end
Rock Rapids	4,532	2,573	0.35	Downtown commercial and office
Glenwood	6,313	5,358	1.09	Strip commercial, residential, and transition between two
Des Moines	13,767	198,682	1.19	Mixed residential and commercial
Council Bluffs	10,900	58,268	0.20	Residential (few drives) and open space
Blue Grass	2,218	1,169	0.72	Residential with commercial and industrial
Sioux Center	9,231	6,002	1.52	Single-residential through downtown commercial
Indianola	13,069	12,998	1.57	Strip commercial with some residential
Lawton	9,233	697	0.64	Residential, access to side streets only
Sioux City	10,650	85,013	0.77	Residential, access to side streets or alleys only

*AADT = annual average daily traffic
(AADT and population data from year 2000)

Cost is not the only factor

Traditional safety and/or operational improvements for urban four-lane corridors include constructing a raised median or adding a fifth (center), two-way, left-turn lane. Both these alternatives involve widening the roadway, which is costly and sometimes impractical.

Converting four lanes to three, with a center left-turn lane, may improve traffic operations and safety as effectively as traditional improvements, at significantly lesser cost.

The three-lane conversion is not appropriate for every four-lane urban street. Several factors to consider can be found in an earlier ISU study sponsored by the Iowa DOT's Office of Traffic and Safety. See www.ctre.iastate.edu/research/detail.cfm?projectID=339.