NEBRASKA
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DEPARTMENT OF TRANSPORTATION

RESEARCH SUMMARY

Results from this research verify the safety, operational and cost benefits of ORTLs.

Assessing the Benefits of Offset Right-Turn Lanes

Offset right-turn lanes (ORTLs) have been used in Nebraska for many years to improve sight distance at two-way stop-controlled intersections on high-speed highways. An ORTL is similar to a standard right-turn lane but includes a painted or raised island that separates it from the through lanes, providing unobstructed visibility for vehicles crossing or entering the intersection. As the Nebraska Department of Transportation (NDOT) began considering expanded use of ORTLs for state highway projects and access roads serving new developments, traffic engineers wanted updated evidence on the safety, operations and cost-effectiveness of these treatments to guide decisions about when and where to use them.

THE CHALLENGE

NDOT regularly decides which type of right-turn lane to install at two-way stop-controlled intersections and access roads along high-speed facilities. A primary concern is visibility. In a traditional right-turn lane, a right-turning vehicle can obstruct the view of drivers stopped in the through lane, increasing crash risk. While an ORTL can improve sight distance, it typically comes at a higher construction cost.

The type of installation chosen for a location affects internal project design, developer access permits and coordination with counties. As ORTL use increased across the state, NDOT needed stronger documentation of the safety, operational and economic benefits of these lanes to support decision-making before investing time and resources in broader implementation.

"This research aimed at providing the evidence that the safety benefits of offset right-turn lanes justify the cost to improve safety for the traveling public."

— Alan Swanson, Nebraska DOT

THE RESEARCH

The study built on limited research conducted in the 2010s, when NDOT was among the first state transportation departments exploring ORTL designs. Researchers began with a review of previous studies and state practices, followed by a crash-based comparison of 47 two-way stop-controlled intersections in Nebraska using data from 2012 to 2015. Crash data and corresponding traffic volumes were analyzed to assess differences in traditional right-turn lanes, ORTLs and intersections with no right-turn lanes.

Researchers also collected field video at six ORTL sites to evaluate driver stopping behavior. Finally, the team conducted a cost–benefit analysis to estimate the economic value of each right-turn lane type.

THE RESULTS

Among the three intersection categories, ORTL locations had the lowest average crash rates. Although differences in crash rates were not statistically significant, traffic volume was a statistically significant factor related to crash frequency. NDOT also examined specific crash types and higher-severity patterns where ORTLs demonstrated clearer benefits.

Since random or unrelated events can influence crash data, researchers considered statistical findings alongside practical field experience. Video analysis showed that geometric features, such as the number of lanes, right-turn lane width and offset width, were associated with stopping position. In general, observed drivers stopped in positions that allowed them to use the improved sight distance that ORTLs provided.

Compared to intersections with no right-turn lanes, ORTLs were associated with an annual reduction of 0.202 crashes per million entering vehicles — an estimated $22,662 in crash cost savings per year. Right-turn lanes showed smaller estimated crash reductions and lower associated savings.

THE BENEFITS FOR NEBRASKA

While the study did not produce a definitive solution, the results directly support NDOT's approach. The research provides clearer guidance on where ORTLs are appropriate and has informed updates to NDOT's Roadway Design Manual, strengthening coordination among the Traffic Engineering and Roadway Design divisions and private partners.

The findings also give NDOT stronger justification when requiring ORTLs for private developments. Rather than relying solely on agency preference, staff can reference the documented safety and economic benefits of ORTLs, improving transparency, consistency and strategic use of limited transportation funds and developer investments to improve safety and operations for Nebraska's traveling public.

ABOUT THIS PROJECT

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