



TECHNICAL SUMMARY

Questions?

Contact research.dot@state.mn.us.

Technical Liaison:

Victor Lund, St. Louis County
LundV@stlouiscountymn.gov

Investigator:

Gary Davis, University of Minnesota

LRRB PROJECT COST:

\$156,561



Past studies are consistent in finding that only changing posted speed limits does not appreciably change driving speeds.



Impact of Urban Speed Limit Changes on Driving Speeds

What Was the Need?

In Minnesota, speeding is a leading contributing factor in crashes with serious injuries. Striving to meet Toward Zero Death goals, MnDOT and local transportation agencies continuously search for the most effective ways to reduce unsafe speeds.

Physical roadway modifications or strict and sustained speed enforcement can be effective in reducing speeds. Previous studies suggest that, in general, only changing speed limits has modest, if any, impact. The MnDOT Traffic Safety Fundamentals Handbook, in fact, recognized that the “majority of drivers pick a safe and comfortable speed based on their perception of the road environment and only changing the posted speed did not change their behavior.”

When roads are built and maintained, engineers assign a design speed based on the road environment, geometry and other characteristics. Some traffic engineers are concerned that if speed limits are set lower than the design value, the variation in driver speeds will increase. A higher speed variation may lead to increased crash risks, they suggest, though that correlation remains uncertain.

Before 2019, the statutory speed limit on urban roads in Minnesota was 25 mph to 30 mph. New legislation allows cities to establish lower limits on certain streets without obtaining an engineering or traffic investigation and approval from the Commissioner of Transportation, as previously required.

A city may now make blanket speed limit changes on many streets within its jurisdiction if proper procedures are followed and the new speed limits are posted. Seeing the opportunity to use the change in speed limit law as a natural experiment, the Local Road Research Board wanted to understand if lowering the posted speed limit impacted actual driving speeds.

What Was Our Goal?

To inform local speed limit policies and practices that achieve safety and livability goals, this project sought to study the effect of speed limit changes on vehicle speeds absent other changes in the roadway environment.

What Did We Do?

Researchers surveyed Minnesota cities to identify if any were planning speed limit changes. St. Louis Park was planning a citywide change and agreed to participate in a before-and-after evaluation of driver speeds. Speed limits on the chosen sample of 28 two-lane, two-way roads were initially 25 mph to 35 mph. Following the citywide change, speed limits were 20 mph to 35 mph. Some streets without speed limit changes served as comparison sites.

Pneumatic tube traffic counters placed a known distance apart combined with proprietary software facilitated the calculation of vehicle speeds. A speed radar gun confirmed the accuracy of the traffic counter setup. At each site, a few days of data were collected two to four months before the speed limit change and again six to eight months after the new speed limits were posted.

Speed limits are a popular safety measure used in urban areas. A new analysis that monitored driving speeds before and after posted changes to speed limits reveals lower speed limits may not, at least initially, cause drivers to slow down.

“While this study presented a unique opportunity to evaluate the impact of the new municipal speed limit authority, it may be that speed limits ought to reflect a roadway’s context and geometry.”

—Victor Lund,
Traffic Engineer, St. Louis
County Public Works

“This analysis showed drivers may not respond immediately to a posted speed limit change, but it’s a good start to a longer-term evaluation to see if the speed control policy objectives will be met.”

—Gary Davis,
Professor, University
of Minnesota Department
of Civil, Environmental
and Geo-Engineering

Produced by CTC & Associates for:

Minnesota Department
of Transportation
Office of Research & Innovation
MS 330, First Floor
395 John Ireland Blvd.
St. Paul, MN 55155-1899
651-366-3780
www.mndot.gov/research



Despite the popularity of reducing speed limits for safety, driving speeds are more likely impacted by a variety of factors.

After removing data collected during congested conditions or from vehicles following less than four seconds behind another vehicle, researchers identified 24 street sites with complete before and after speed distribution data. The calculated mean speeds for each site and the 85th percentiles, which traffic engineers may use to recommend an appropriate speed limit, quantified any difference in speeds before and after the posted speed limit changes.

Researchers compared the speed variances before the speed limit changes to the range of driving speeds after the changes. Finally, an analysis of three treatment-comparison pairs of road sites revealed any speed differences that might be caused by the speed limit changes.

What Did We Learn?

The monitored streets showed considerable variability in driving speeds before and after posted speed limit changes. Mean speed changes ranged from a 7 mph decrease to a 2.4 mph increase. On average, speeds decreased 1 mph to 2 mph—considerably less than the speed limit changes—on streets with changed speed limits and on those where the speed limit remained the same. Speed variances increased slightly after the speed limit changes.

Overall, researchers found that while modest decreases were seen at both treatment and comparison sites, evidence suggested that changes in posted speed limits do not lead to speed decreases. Noting that driving is a habitual behavior, researchers suggested a driver’s adaptation to a lower speed limit may happen over a longer time frame in the absence of physical roadway changes or strict speed enforcement.

What’s Next?

The evaluation of driver speeds is repeatable. Another evaluation in three to five years using the same GPS coordinates and equipment type to monitor driving speeds on roads where posted limits changed, along with study documentation, may help determine if driving habits change and if speeds eventually decrease closer to the posted limit.