

# **The influence of road design speed, posted speed limits and lane widths on speed selection: A literature synthesis**

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## **Extended Abstract**

Speed is an important factor in road safety and not only affects the severity of a crash, but is also related to the risk of being involved in a crash. With the link between speed, severity and risk of a crash it has been speculated that any reduction in speed as a result of changes to geometric elements will have a positive impact on road safety. Lane and shoulder width elements play a role in driver speed choice as empirical evidence generally suggests that narrower roads, and narrower lanes on roads, lead to slower travel speeds. This lower speed selection of drivers in turn leads to lower speeds and crash rate.

Drivers select the speed at which they travel as a function of a variety of driving clues and risk assessment, directly affecting the operating speed of that road. Resulting speed distributions are routinely used to justify posted speeds. Operating speeds are fundamental to the development of any roadway corridor and are used to determine appropriate roadway design elements. Roadway corridors are generally developed to maintain the tenets of cross section consistency, operating speed consistency, and driver work-load consistency.

These tenets are interrelated within a road corridor and must be designed to ensure appropriate speed choices are made. Some empirical evidence suggests that narrower roads, and narrower lanes on roads, lead to slower travel speeds. In contrast, the literature reveals that the effects of narrower cross-sections to lower traffic speeds, and associated crash frequencies, have been inconsistent. Some researchers have concluded that reducing lane widths has had no impact on speed selection. Moreover, a lack of geometric design consistency and the associated disparity with drivers' expectations has led to increased crash rates when differences between design and posted speeds exist. Of note was the dated nature of published research and this in of itself highlights a need to provide more current data. The majority of research though has focused on rural roads. This is expected, as the rural road environment is likely to be more homogenous than in urban areas where more complexity typically exists from more interactions of traffic, local circulation, access functions and inconsistencies of operating speeds.

Whilst it is important to be aware of corridor characteristics such as the road grade, cross-section and surface conditions, there has been insufficient research to accurately understand their impacts on speed choice (distributions) and associated design and posted speeds. It recommended that further research be undertaken with a focus on urban roads to resolve inconsistencies found in the literature to better understand the effects on speed choice from specific geometric elements within a complex urban road corridor and potentially change the way the certain geometric elements influence design and posted speed.

The presentation will discuss gap in the literature and provides a current and comprehensive literature synthesis on this important subject, identifying research gaps and critical research needs moving forward.