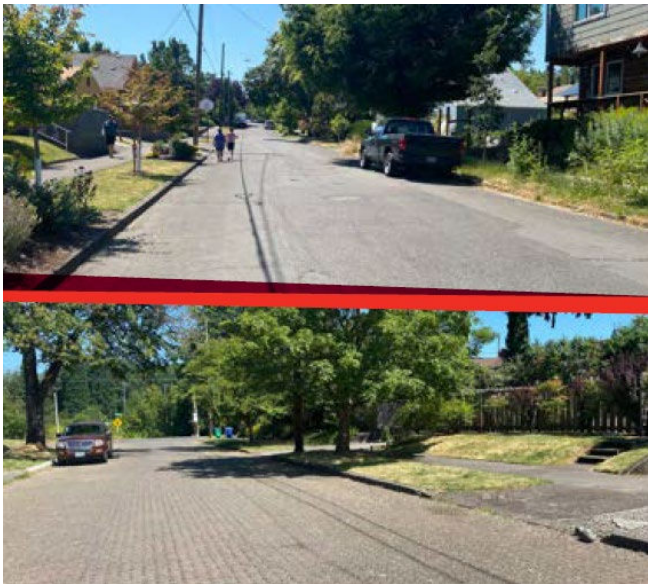
Traffic Calming Research on Interlocking Concrete Pavers

Recipient: Toole Design
Grant: $105,000
Completion: 2023
Project Summary: 32

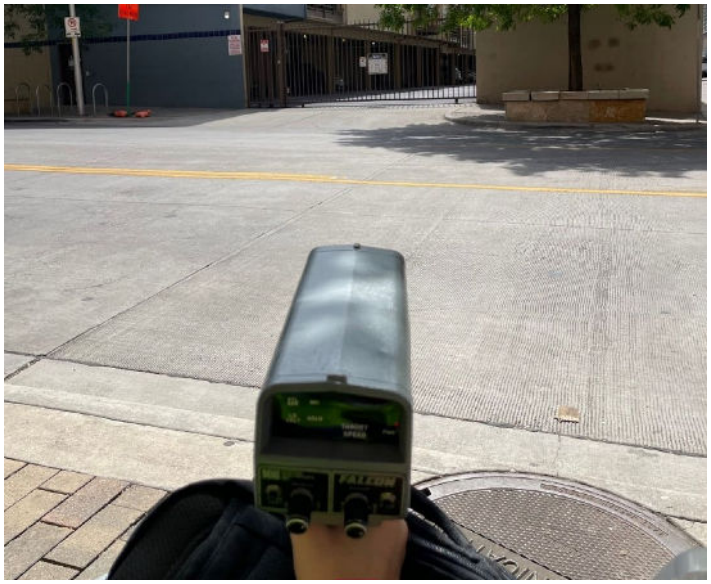
icpi
Foundation for Education and Research

Background and Need

The Insurance Institute for Highway Safety reports 40,000+ fatalities and 2.5 million injury crashes annually in the US. Understanding collision factors is crucial for prevention. Vehicle speed is the main risk, with slower speeds offering safety benefits like better control, shorter stopping distances, and wider fields-of-view. Projects like streetscaping and traffic calming projects aim to create safer environments, utilizing measures such as narrow lane widths, lateral shifts, raised intersections, street trees, and attractive and textured paving materials. This research focused on how concrete pavers affect motor vehicle speeds, amidst various traffic calming efforts. Toole Design's study analyzes field data, controls for other measures, and conducts statistical analyses to quantify speed differences between concrete pavers and asphalt streets.



A Street paved with asphalt (top) and pavers (below) Portland, OR



Speed radar shot on Brazos Street in Austin, Texas

Objectives

While observation and experience indicate that drivers slow when they drive over interlocking and permeable interlocking concrete pavements, the timing and extent of deceleration had not been well documented. This research focused on documenting how concrete pavers affect motor vehicle speeds. Toole Design's study analyzes field data, controls for other measures, and conducts statistical analyses to quantify speed differences between concrete pavers and asphalt streets.

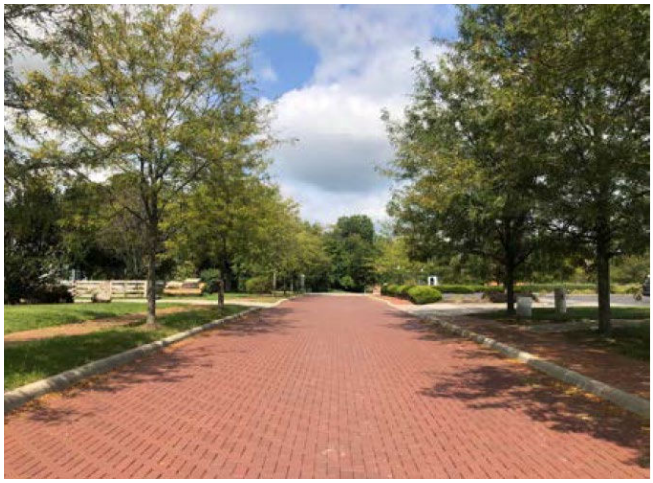
Toole Design studied 13 pairs of similar streets in various US cities, with one street paved with interlocking concrete pavers (ICP) and the other with asphalt, except for one pair where smooth

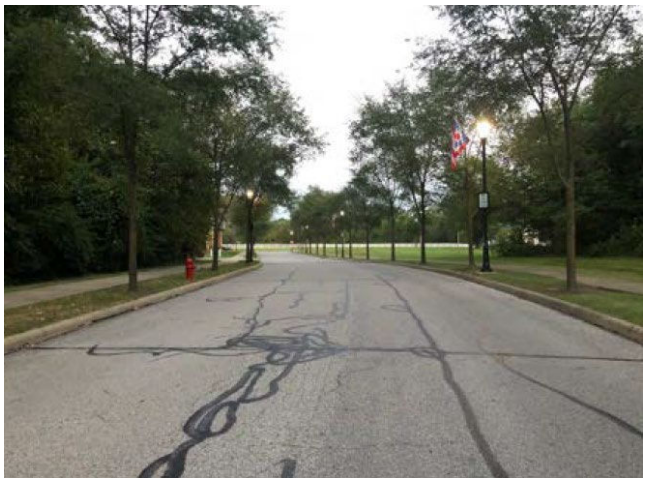
concrete was used. Streets were matched based on block size, number of lanes, land use, travel way widths, and speed limits, isolating paving material as the primary difference. Data collection utilized calibrated radar guns during off-peak hours, focusing on unencumbered vehicles. Over 1650 speed samples were collected, with at least 60 at each site. Statistical analysis employed one-sided t-tests to compare mean speeds within each pair, yielding conclusions from the aggregate results.

Outcomes

In 7 of the 13 street pairs analyzed, it was observed that the mean speed on concrete pavers is consistently lower than that on asphalt surfaces. The overall mean speed across the 13 pairs showed a difference of 1 mph lower on the streets paved with concrete pavers compared to those paved with asphalt. Streets paved with concrete pavers have approximately half the probability of achieving mean speeds of 27 mph or more compared to asphalt-paved streets, a significant factor for safety as higher speeds correlate with increased risk of pedestrian and cyclist fatalities involved in a collision, escalating from 50% at 27 mph to 79% at 30 mph impacts. Additionally, the rate of motorists exceeding 23.5 mph on asphalt streets is twice that of streets paved with concrete pavers, while the rate of drivers traveling at 29 mph or faster on asphalt surfaces is 3.6 times higher than on concrete-paved streets, indicating a substantially greater risk of fatal collisions. Considering the "Vision Zero" strategy, to eliminate all traffic fatalities and severe injuries, this research shows streets paved with concrete pavers encourage slower speeds. Paving streets with concrete pavers is an effective traffic calming measure, particularly in mitigating higher-speed hazards.

The complete research report is available online.





Street Pair #7: New Albany, OH, Third Street (PICP) and Village Hall Road (Asphalt)