Single-Measure Traffic Calming in Dexter, Iowa

tech transfer summary

Entrance treatments were installed and evaluated for their effectiveness in calming traffic in Dexter, Iowa.

Objective

The purpose of the project was to evaluate traffic-calming treatments on major roads through small Iowa communities using either single-measure, low-cost or gateway treatments. For this portion of the project, entrance treatments were evaluated in Dexter, Iowa.

Problem Statement

The main street through many small rural Iowa communities is a state or county highway with high speeds outside the city limits and a reduced speed section through the rural community. Consequently, drivers passing through the community often enter at high speeds and then maintain those speeds throughout. When speeds in rural communities are problematic, traffic calming provides a potential solution. However, traffic-calming measures are generally used in larger urban areas; their effectiveness in small communities is unknown. The Center for Transportation Research and Education (CTRE) at Iowa State University teamed up with the Iowa DOT to evaluate traffic-calming treatments in Dexter, Iowa.

Community Description

Dexter is located approximately 30 miles west of Des Moines and has a population of 689. The main road thru Dexter is county road F-65, which is an asphalt-paved two-lane roadway. Some sensitive areas near F-65 include an elementary school, a park, and a metal fabrication plant just outside the western city entrance. Trucks entering the fabrication plant are required to back into the plant from the highway. The city saw this as a safety concern because vehicles were traveling at high speeds when they entered the western city limits.

Layout of Dexter, Iowa

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RESEARCH PROJECT TITLE
Evaluation of Gateway and Low-Cost Traffic-Calming Treatments for Major Routes in Small Rural Communities

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The mission of the Center for Transportation Research and Education (CTRE) at Iowa State University is to develop and implement innovative methods, materials, and technologies for improving transportation efficiency, safety, and reliability while improving the learning environment of students, faculty, and staff in transportation-related fields.

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Research Description

Initial speed studies indicated high vehicle speeds were prevalent entering the communities from both the east and the west. Therefore, Dexter was selected for a single-measure entrance treatment.

The entrance treatment for Dexter was modeled after typical European entrance treatments, using red pavement markings with white text that displayed the speed limit. The surface treatments were selected after confirming that the measures did not violate guidelines set forth by the Manual on Uniform Traffic Control Devices (MUTCD). In addition to red markings with "35 mph," an eight-inch edgeline was painted along the sets of treatments.

To evaluate the effectiveness of the entrance treatments, data were collected using pneumatic road tubes placed at locations surrounding the entrance treatments. Speed and volume data were collected before the treatments was installed and at one months, three months, nine months, and twelve months after the treatments were installed.

East entrance before treatments were installed

East entrance after treatments were installed

Key Findings

The treatments were effective in reducing speeds at all three of the locations where they were tested. The effectiveness varied over time. Data could not be collected at six months after installation due to a period of unusually cold temperatures and blizzard-like conditions.

Nine months after installation, the effectiveness of the treatments appeared to decrease, most likely due to the fact that the markings had faded over time. The treatments were re-painted and the effectiveness increased again at the twelve-month data collection period.

Implementation Benefits

Lower vehicle speeds produce several safety benefits. For drivers, the area of focus is significantly increased at lower speeds, giving them a greater awareness of their surroundings and more time to react to potential problems.

Lower speeds also reduce the likelihood and severity of vehicle crashes. The Oregon DOT, in a handbook created for rural communities, reported speed statistics indicating that there is an 85% likelihood of death for a pedestrian struck at 40 mph. One struck at 30 mph has a 45% chance of being killed and the risk drops to 15% if the pedestrian is struck at 20 mph.

Implementation Readiness

Many rural communities do not have the resources to implement high-cost, elaborate traffic-calming measures. The on-pavement entrance treatments used in Dexter were low cost and easy to implement. The biggest expense associated with these treatments would be re-painting the markings as they fade over time.

West entrance treatment, illustrating fading of pavement markings at nine-month data collection period