Innovative Partnerships Help Inventory Traffic Signs

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(Above) Villanova University students are using a retro-reflectometer to measure sign retroreflectivity and assigning numerical values to recommend whether a sign replacement is necessary. *Pho o: Dr. S. Park, Villano a Uni er i .*

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that standard traffic control signs play in ensuring efficient and safe flow of traffic. "Evaluation of a Low-Cost Program of Road System Traffic Safety Reviews for County Highways" (

. a 8 9) also suggests that perhaps the most cost-effective countermeasure for enhancing traffic safety is to upgrade signs to meet the current standards for retroreflectivity and other features, such as sign height and letter size.

As reported by R. Troutbeck an o n heir 994 "Effect of Restriction of Vision on Driving Performance," published in the , vision provides more han 0 er en he n r tion used in driving tasks. With Americans living longer and continuing to drive later in life, well-maintained traffic control signing is more important than ever for keeping drivers alert and informed.

E ab a E ec e Pa e

Like many academic institutions, Villanova University emphasizes community service through its various engineering activities. One example of this approach is the university's efforts to support nearby local public agencies by conducting transportation service projects. These partnerships not only help prepare students to apply theoretical knowledge in a real-world setting, they also benefit the local agencies by providing engineering services at no cost.

Projects performed in collaboration with the public sector by Villanova University's faculty, who

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public agencies can use a sign inventory database to help manage their risk associated with the potential liability resulting from traffic crashes that occur at locations where signs did not meet retroreflectivity standards. According to the Institute of Transportation Engineers' , results from a highway tort liability study in Pennsylvania showed that sign deficiencies were cited as "the prin- ipal actor n per en] f he sampled tort actions, second only to pavement deformities." Further, he tudy un pe a en n of crashes involving a fatality or serious injury, sign deficiencies were cited as the primary cause.

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coordination and level-of-service analyses, and the development of tools for managing infrastructure assets. To date, these academic service projects have benefitted the Delaware Valley Regional Planning Commission and a handful of municipalities in southeastern Pennsylvania, specifically Radnor, Tredyffrin, Upper Darby, West Bradford, and West Pikeland Townships.

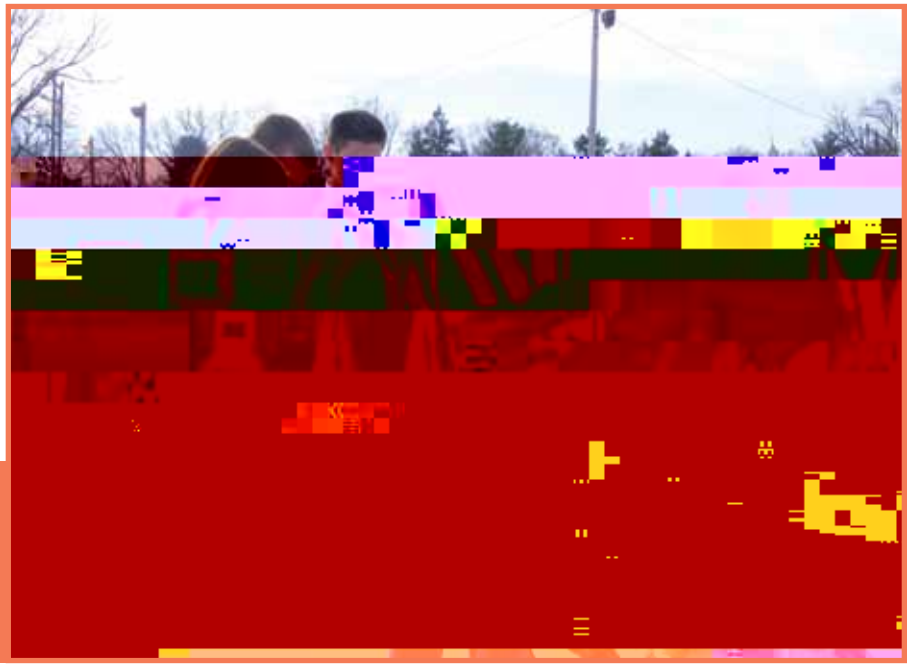
For example, Dylan White, a senior at Villanova University, is developing a comprehensive pavement management database for Upper Darby Township using traditional condition inspection techniques and nondestructive testing with Villanova's spectral analysis surface wave equipment. White states, "Investigating the reliability and accuracy of the nondestructive evaluation equipment is an exciting challenge with the potential to help municipalities reliably, quickly, and economically test their roadways."

Upon completion of the projects, students present their deliverables, which include written final reports describing results along with inventory databases (such as traffic sign inventories and pavement management data) developed in Microsoft® Excel® for easy implementation by the townships. The deliverables also include recommendations to the public agencies and other project stakeholders.

P ed S I e

In the case of the collaboration to develop a sign inventory system, the goals were threefold. First, the partnership would result in the development of a database that would provide the municipalities with an inventory of their regulatory signs and retroreflectivity values. Second, the faculty at Villanova University would accomplish their mission of providing an opportunity for students to conduct state-of-the-art, real-world research. Third, the students would gain first-hand experience working on a timely topic in the field of transportation engineering in collaboration with partners in the public sector.

The objective was to develop a sign inventory system while also integrating traffic operational parameters, such as crash and exposure data, to explore criteria for prioritizing sign inspections when agencies are unable to collect data from the entire population of signs. In general, the process included three major steps: (1) assessing available resources, (2) establishing a tiered ranking system and identifying signs that play

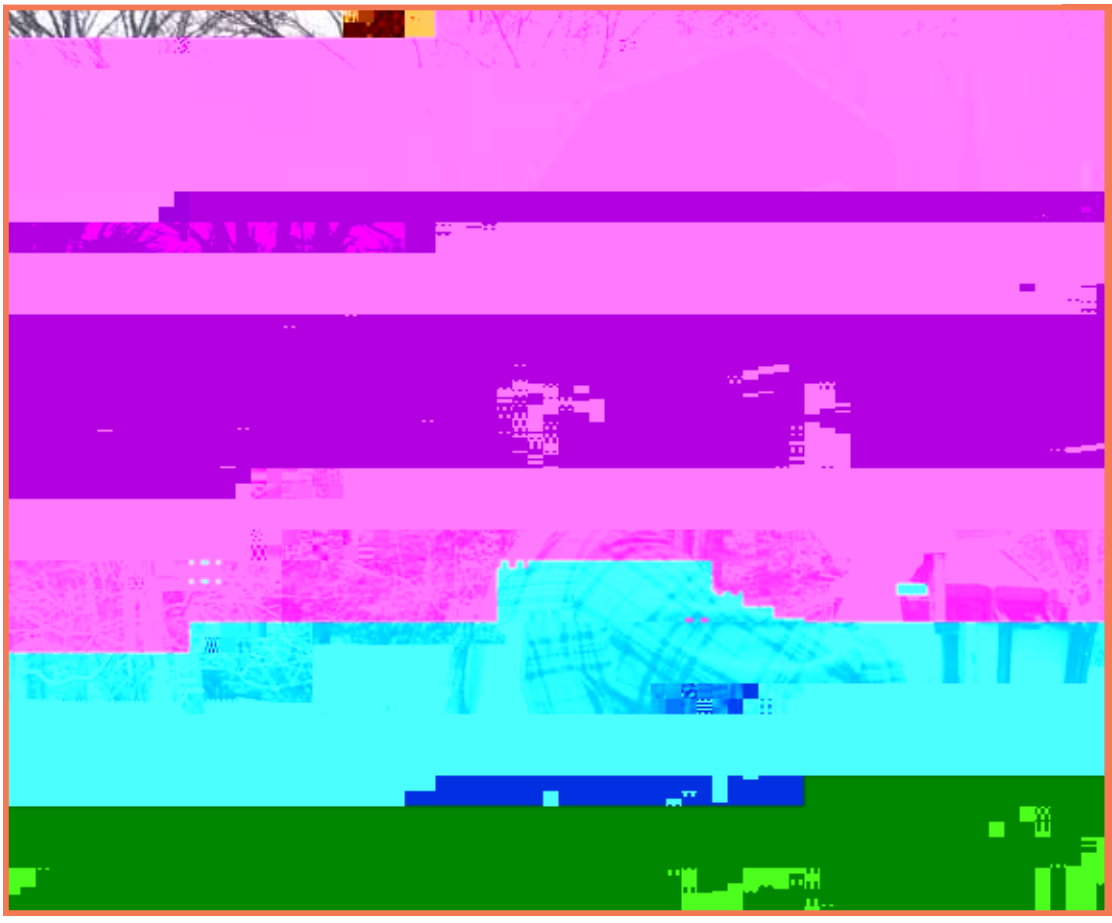


These students are conducting traffic counts at an intersection as part of a traffic impact analysis for Radnor Township, PA.

categorization based on a comprehensive screening of the data. They assigned a crash frequency threshold for each tier-level assignment specific to each jurisdiction, which was determined in conjunction with each agency through analyzing the number of locations that produced different crash values.

Using this approach, tier I represents the locations where signs are the primary source of traffic control and where the localized history of crashes exceeds a frequency threshold selected by the agency. Thus, tier I assignments include regulatory signs at nonsignalized intersections. With this approach, public agencies can focus on signs sequentially, ensuring that they inventory at the highest priority locations first.

The numbers and types of traffic control devices, along with the roadway functional classifications (local, collector, or arterial roadways), contributed to determining a sign's tier assignment. Thus, the agencies classified the signs as tier II or III



A student is using a retroreflectometer to conduct field measurements on this