Technology NEWS

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Iowa LTAP Local Technical Assistance Program

Providing transportation technology transfer for Iowa's cities and counties

Inside this issue

Iowa Local Technical Assistance Program

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IOWA STATE UNIVERSITY
Institute for Transportation

Low-cost safety measures for high-crash curves

Most lane-departure crashes occur on rural two-lane roadways, with a disproportionate number of them on horizontal curves. A primary factor in curve-related crashes is speeding—or failure to reduce speed to safely negotiate the curve.

Agencies are looking for proven, low-cost safety measures for curves that can be installed quickly and economically. A recent study at Iowa State University, led by Shauna Hallmark, Neal Hawkins, and Omar Smadi, examined two strategies for reducing speeds on curves: on-pavement curve advisory markings (Figure 1) and retroreflective sheeting material on existing chevron posts (Figure 2).

The project was sponsored by the Iowa Highway Research Board (TR-579), the Iowa DOT, and the Midwest Transportation Consortium.

Installations

The research team selected two sites for installation of on-pavement curve signs and four sites for installation of retroreflective post treatments. The locations were culled from several curves with all the following characteristics:

- High-crash locations (i.e., having had at least five crashes within the five-year period 2002 through 2006).
- Demonstrated speeding problems (i.e., having a mean or 85th percentile speed that was at least five mph over the advisory speed).
- Posted speed limit on the preceding tangent road section of 50 mph or higher.
- No features that would make mitigation treatments or speed data collection difficult.

The post treatments consisted of either attaching a 60-in polypropylene tube wrapped in yellow, high-intensity sheeting to the post or affixing retroreflective strips to the front and back of the wood post. These treatments were visible to vehicles from all angles.

The pavement markings consisted of 8-ft tall white letters spelling SLOW and an arrow curving in the direction of the curve, bookended by two white lines perpendicular to traffic flow.

Measures continued on page 3

Figure 1. Pavement markings used in study

Figure 2. Chevron sign enhancement used in study

Acronyms and Abbreviations in *Technology News*

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
FHWA	Federal Highway Administration
IHRB	Iowa Highway Research Board
InTrans	Institute for Transportation (at ISU)
Iowa DOT	Iowa Department of Transportation
ISU	Iowa State University
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NACE	National Association of County Engineers
TRB	Transportation Research Board

U.S. Department of Transportation
Federal Highway Administration

Iowa Department of Transportation

About LTAP

LTAP is a national program of the FHWA. Iowa LTAP, which produces *Technology News*, is financed by the FHWA and the Iowa DOT and administered by the Institute for Transportation at Iowa State University:

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Printed with soy ink

From the director: Spring has sprung—or . . . has it?

In this column we revisit a couple of subjects.

First, Iowa LTAP has been working on a new website for some time and will soon release it. It will have an updated design and may be out before this newsletter goes to print and is mailed. The primary objective with the new website will be to develop a resource for our customers. The resources will be added and the development will be a building process. The plan is that we will keep updating the website with new links, tools, and resources as we find them.

In addition, we are going to have a more accessible event calendar and will work to add events – including those we think may be of interest but may not be done by Iowa LTAP. We'll also be adding electronic resources to the site. These resources might include, but not be limited to, reports, policy examples, technical briefs, video clips, training clips, webinar recordings, websites of interest, etc.

In general, we hope to slowly build a significant and relevant electronic resource library. Some of these online resources may actually be those that had to be "checked out" or purchased in the past. We are more than willing to link to resources from other LTAPs that can help Iowa local agencies, and we hope that at some point Iowa LTAP will be creating and posting these same types of resources. The new website will also provide the opportunity for anybody to suggest or provide resources we should post.

Second, I had noted in my last column that we will be revisiting our Roads Scholar Program and considering some changes. One of the first steps in the "revisit" will be to determine – as best we can – who was recognized for achievements within the program before 2010. We will likely be contacting agencies to compare our records to what recognition has occurred. We might also use this newsletter to serve that purpose.

Then, we will investigate who may have reached a new level of Roads Scholar between 2010 and 2013. After that, we'll determine those professionals who only need one or two specific courses to reach the next level of the Roads Scholars program. We will work to offer those specific courses or a valid alternative. Iowa LTAP knows the Roads Scholar program is important to many people and will do our best to get it back on track and operating effectively again.

The goal after we complete the efforts above will be to evaluate and possibly redesign the program in a manner that lets those within it continue in an effective manner, but also makes it more administratively manageable. Suggested changes, or comments about what you like in the current system, are always appreciated.

Spring will soon be here and I hope to see you at one of our events sometime in 2013. Don't forget our Motor Grader Operator training, and we will also offer an Oversize/Overweight Permitting in Iowa webinar (we are testing a new approach with this), Accessible Sidewalks and Curb Ramps: Design to Installation, and tentatively an Excavation Safety workshop.

Keith

Benefits of roundabouts in rural Iowa

Measures continued from page 1

Following the success of modern roundabouts at high-volume intersections on several Iowa municipal streets and state roadways, Iowa counties are beginning to experience the safety advantages of roundabouts at rural intersections with lower traffic volumes.

Background

Intersections are common crash locations because of the many potential conflict points between turning and through traffic. Crashes that occur at rural intersections are generally much more severe than similar incidents at urban locations because of higher traffic speeds on rural roadways.

Traditional options for improving safety at rural intersections, such as increasing visibility and enhancing the level of traffic control, are not always effective. One particular crash cause, "Failure to Yield from a Stop Sign," is especially vexing. Traditional mitigation strategies are generally unreliable for this cause of crashes, which often result in fatalities and/or serious injuries.

Although roundabouts can often be viable safety improvements for problem rural intersections, historically Iowa's counties have not given roundabouts serious consideration. Initial costs are generally high. Often, additional right-of-way must be acquired. And many Iowa motorists have negative perceptions of roundabouts.

During the last decade, however, several Iowa cities and the Iowa DOT have constructed modern roundabouts at appropriate high-traffic intersections to mitigate severe crashes and improve traffic operations. (See a map of modern roundabouts in Iowa, www.iowadot.gov/roundabouts/roundabouts_iowa.htm.) Now a few Iowa counties are beginning to deploy this promising design at rural intersections with lower traffic volumes.

Black Hawk County experience

In October 2008 a new roundabout was opened in Black Hawk County at the intersection of IA 281 and County Road V49. Before and after construction, Iowa's LTAP staff at the Institute for Transportation examined crash records related to the intersection.

The data revealed that in the seven years before the roundabout, eight crashes had occurred at this intersection, and in six of the eight crashes, "broadside" was listed as the manner of collision. Crash severity was generally high, with two major injury crashes, one minor injury crash, and five property damage crashes among the total.

In the four years since the Black Hawk County roundabout was opened to traffic, however, not a single crash has been recorded at the intersection.

While this level of improvement may not be duplicated everywhere, it is an excellent example of how effective a roundabout can be. Currently a roundabout is under construction on a secondary road in Buchanan County. Several others are being considered or are in the planning stages around the state.

For more information

If your agency has an intersection with a record of high-severity crashes and you are considering a roundabout as a potential option, you may contact Tom McDonald, safety circuit rider in the Iowa LTAP office, 515-294-6384, tmcdonal@iastate.edu, for more information. ■

Figure 3. Traffic on rural roundabout in Black Hawk County (Photo courtesy of Catherine Nicholas, Black Hawk County Engineer)

Data results

The researchers collected speed data approximately one month before and one month after installation of treatments at all sites and, at some installations, approximately 12 months after installation. They compared mean and 85th percentile speeds, as well as the percentage of vehicles traveling 5, 10, 15, of 20 mph or more over the advisory or posted speed limits.

For data collected from the retroreflective post sites, allowance was made for traffic during the day when the reflective material would have less impact.

Overall, both treatments were moderately effective in reducing mean and 85th percentile speeds at the selected curves. However, the treatments had the greatest impact in decreasing the percentage of vehicles traveling 5, 10, 15, or 20 mph or more over the advisory or posted speed limits.

While speed is a factor in curve-related crashes, the exact relationship between the reduced speeds (as a result of the two curve treatments) and the potential for reduced crashes is not known. Given the relatively low cost of the treatments, however, they show promise as highly implementable safety measures on curves.

For more information

See the final report and technical summary online, www.intrans.iastate.edu/research/projects/detail/?projectID=-1352703394. Or contact the lead researcher, Shauna Hallmark, 515-294-5249, shallmar@iastate.edu. ■

Rural roads, bridge funding under MAP-21

Wading through the federal highway bill, signed in July 2012, can be challenging. "Moving Ahead for Progress in the 21st Century" (MAP-21) has changed several federal-aid programs. The following two articles describe how the Iowa DOT is implementing two of these changes, with respect to funding for high-risk rural roads and for city and county bridges.

Funding changes for high-risk rural roads

The High Risk Rural Roads (HRRR) program has been discontinued. However, MAP-21 added performance measures for roads previously eligible for HRRR funding: If fatal and major injury crashes on these roads increase for two consecutive years, then the state is required to invest a portion of its Highway Safety Improvement Program (HSIP) funds—two times the 2009 HRRR level—on those roads.

To meet these performance measures, the Iowa DOT is taking advantage of its set-aside option and is allocating $2 million of its HSIP funds to provide a systemic safety program for the county road system under a new name: HSIP-Secondary Roads.

Overview of HSIP-Secondary Roads

Because it focuses on low-cost safety improvements, the HSIP-Secondary Roads program will fund more projects than the former HRRR program did. It will emphasize reducing crashes related to rural road lane departures, through projects in the $10,000 per mile cost range. (The discontinued HRRR program focused on $500,000 maximum, spot improvement grants.)

In addition, HSIP-Secondary Roads promotes systemic implementation of safety countermeasures. The systemic approach funds the installation of appropriate low-cost countermeasures along an entire corridor, instead of treating only a single problem location.

For example, a project could be developed to address curve crash issues on roadways of a certain classification or type, as determined by an analysis of crash data. The scope could include many miles over a wide breadth of the county or, if appropriate, could also include the neighboring county or even several counties.

The following systems for selecting and administering projects have been approved by the Iowa DOT and the Iowa County Engineers Association Executive Board.

Funding

The Iowa DOT will allocate $2 million from the HSIP funds for HSIP-Secondary Roads. The HSIP funding will be supplemented by a 10 percent match, which will come from the state-funded Traffic Safety Improvement Program (TSIP).

In this way, all of the funding needed for HSIP-Secondary Roads will be available at the onset, and counties will not have to program funding to participate in the program.

Project selection

Counties interested in participating will need to submit a letter of interest. The Iowa DOT Office of Traffic and Safety (TAS) will identify candidate projects for systemic improvements using crash data and other determining factors.

TAS and an evaluation team will then consult with the counties in each project area to discuss the proposed project concept, including scope and budget.

Under the systemic improvement approach, project scopes are intended to be large. This is where the multi-county approach may be best.

Safety countermeasures must match an identified problem. Counties will have the final discretion on which countermeasures are installed.

Project administration

When TAS and the affected counties agree on the project concept, they will enter into an agreement specifying the scope and budget and stipulating each party's responsibilities. One of the involved counties will

serve as lead agency, and that county engineer will be in charge of the project.

Any needed design services will be provided by an Iowa DOT on-call consultant. Consultant-prepared plans will be reviewed by Iowa DOT and the affected counties. The Iowa DOT will also hire a consultant to perform the required construction inspection services. All consultant services will be paid for with program funds.

After final plans are approved by both the Iowa DOT and the affected counties, the Iowa DOT will provide the plans to the Office of Contracts to let for bids. A construction contract will be awarded by the lead county. (If the low bid comes in more than 10 percent higher than the approved budget, concurrence with TAS will be required prior to award.)

The consultant will provide construction inspection and prepare the necessary construction documentation, including pay vouchers for the contractor. The county engineer in charge will review and approve pay vouchers and forward them to the Iowa DOT Office of Finance for payment through the Contractor Pay System, similar to other county federal aid projects on the farm-to-market system. Construction costs will initially be paid from the lead county's farm-to-market account, but will be fully reimbursed (90 percent HSIP and 10 percent TSIP funds).

Appropriate Iowa DOT District Local Systems staff will oversee the construction activities and perform the project construction and material reviews and audits in the same manner as other county federal aid projects.

For more information

The above information is a summary only; counties interested in participating in the HSIP-Secondary Roads program should contact the Iowa DOT, Office of Traffic and Safety, for specific details:

Terry Ostendorf, terry.ostendorf@dot.iowa.gov, 515-239-1077 or Jan Laaser-Webb, Jan.Laaser-Webb@dot.iowa.gov, 515-239-1349.

Funding changes for local bridges

The new federal highway legislation, Moving Ahead for Progress (MAP-21) repealed the Highway Bridge Program (HBP), as it existed under the Safe, Accountable, Flexible, Efficient Transportation Equity Act, a Legacy for Users (SAFETEA-LU). However, after an extended, collaborative process that involved Iowa's cities, counties, and the general public, the Iowa Transportation Commission has approved a dedicated set-aside of Surface Transportation Program (STP) funds for city and county bridges. This set-aside will continue to be called HBP funds.

Funding distribution

HBP funds will be allocated 79 percent to counties and 21 percent to cities. These percentages are based on the counties' and cities' relative share of square footage of deficient bridges (Sufficiency Rating of 80 or less, and listed as Structurally Deficient or Functionally Obsolete, according to the National Bridge Inspection Standards). They also correspond closely to the historical average of the split between cities and counties for the last three federal highway bills.

The division of HBP funds between counties and cities was recommended by representatives of the Iowa County Engineers Association (ICEA) and the American Public Works Association (APWA), Iowa Chapter, and subsequently approved by formal action of each organization's executive board/committee. This distribution method will be used to calculate the HBP programming targets for the next two fiscal years. Near the end of federal fiscal year 2014, the distribution will be re-evaluated and revised.

Funding

Under the new HBP, counties and cities will have slightly higher funding for bridges. For counties, the FFY 2014 programming target will be approximately $32.0 million; for cities, the target will be approximately $8.5 million.

County HBP funds will be allocated among all 99 counties using the existing allocation formula, as currently specified in I.M. 2.020. City HBP funds will be awarded based on the "City Bridge Priority Points" formula, as currently specified in Attachment A of I.M. 2.020.

New requirements

MAP-21 requires that at least 15 percent of the 2009 HBP allocation—in Iowa, about $9.3 million—be spent on off-system bridges. Iowa's cities and counties typically obligate well in excess of this amount.

The structure, eligibility, and procedures associated with the HBP will remain essentially the same. One minor change has been made to the HBP eligibility requirements. Previously, replacement projects needed to have a sufficiency rating less than 50, unless an exception was granted. In the future, that threshold will be raised to 60 or less.

Transition

Projects for which old HBP funds have already been obligated or will be obligated must continue to follow the old HBP eligibility rules. After all of the old HBP funds have been obligated, estimated to be sometime near the end of FFY 2013, HBP projects will be processed according to the new eligibility requirements. I.M. 2.020 will be updated then as well.

More information

If you have questions, contact M. J. "Charlie" Purcell, director of the Iowa DOT's Office of Local Systems, 515-239-1532, charlie.purcell@dot.iowa.gov. ■

Stanley L. Ring Memorial Library: New materials

Publications

P-1782 Urban Street Geometric Design Handbook

This handbook provides a comprehensive practice-oriented text that addresses the fundamental operational and safety aspects of geometric design of roads and streets in urban and suburban areas.

P-1783 Developing Safety Plans: A Manual for Local (rural) Road Owners

This is a guide for developing a Local Road Safety Plan (LRSP). An LSRP defines key emphasis areas and strategies that impact local roads and provides a framework to accomplish safety enhancements at the local level.

P-1784 Guide for In-Place Treatment of Wood in Historic Covered and Modern Bridges

This guide describes procedures for selecting and applying chemical treatments to prevent or arrest bio-deterioration and minimize fire damage for timber bridges. It is intended for use by inspectors, maintenance personal, and preservation staff.

P-1785 Asset Management and Safety Peer Exchange, Beyond Pavements and Bridges: Transportation Asset Management with a Focus on Safety

This document summarizes the proceedings of a safety peer exchange. It describes how to improve safety performance through better asset management, effective ways to manage safety assets, and planning, prioritizing, and budgeting safety asset needs.

P-1786 FHWA Freight and Land Use Handbook

This handbook provides practitioners in the public and private sectors with the tools and resources to properly assess the impacts of land use decisions on freight movements as well as the impacts of freight development on land use planning goals.

P-1787 Risk-Based Transportation Management: Evaluating Threats, Capitalizing on Opportunities

This is the first in a series of five reports that explore what risk management is and how it can be applied to transportation asset management. These reports delineate how risk management differs from, but also complements, performance and asset management. They also provide a brief step-by-step outline to begin managing risks; elaborate on how risk management is being used by transportation professionals; illustrate how risk management can improve programs; and discuss how it helps prepare for natural and manmade disasters.

DVDs

DVD-386 Chemical Handling Safety: The Basics

This video teaches employees how to identify, handle, and store dangerous chemicals safely and properly and how to respond effectively in case of an emergency. The video illustrates hazard identification, personal protection, and emergency response.

DVD-387 Medical Emergencies: Citizen Responder

This video illustrates how to respond to a life-threatening medical emergency. It includes correct procedures for dealing with heart attacks, choking, stroke, asthma, diabetes, seizures, and epilepsy.

DVD-388 Personal Protective Equipment: Don't Start Work Without It

Every part of the body is vulnerable to accidents, and it is important to be well-protected. PPE must be customized to cope with the risks. This video covers eye, face, hearing, head, hand and foot protection, and other PPE rules.

DVD-389 Heat Stress for Public Employees: Seeing Red

Heat stress, heat stroke, heat rashes, and heat cramps are dangerous. This video provides the knowledge needed to avoid the dangers of working in hot, humid conditions. It covers acclimatization, hydration, proper clothing, and signs of heat fatigue.

DVD-390 Defensive Driving: A Crash Course

Motor vehicle crashes consistently account for a huge number of injuries and lost work days. Keep employees safe behind the wheel, on the job and off. This video provides tips to become defensive drivers and avoid costly accidents. It covers plan and prepare, a defensive attitude, distractions, city driving, freeways, and rural roads.

DVD-391 Groundskeeping Safety: Be a Pro

Maintaining lawns, trees, and shrubs requires potentially dangerous equipment and chemicals. This video explains how to avoid unnecessary accidents. It covers a general checklist for safety, tractors, riding mowers, push mowers, and trim and brush-cutting equipment/blowers and a checklist for hazardous materials.

DVD-392 Back Care in Construction

This video increases awareness of potential hazards in construction-related activities and shows how to avoid injury. It covers safe lifting, leg power, power zone, 10:1 ratio, back structure and function, shoveling safety, and equipment/material handling: picks, breakers, cement sacks, piping, and sledgehammers.

DVD-393 Fall Protection in Construction Environments

Falls are the second leading cause of death each year in the United States (after traffic accidents)! Over 10,000 people are killed every year as a result of falls, and 200,000 to 300,000 people are disabled. Eighty-five percent of all falls that occur on the job result in lost work time. This video provides the information employees need to work safely when they are "off the ground" and assists in satisfying the major training requirements in the OSHA Standard

Three ways to order LTAP library materials

- Use the online catalog, www.intrans.iastate.edu/ltap/library/search.cfm.
- Contact Jim Hogan, library coordinator, 515-294-9481, hoganj@iastate.edu, fax 515-294-0467.
- Mail or fax the order form on the back cover of this *Technology News*.

Note about delivery of materials: The library sends orders through the U.S. Postal Service. If you have an urgent need for library materials, let us know when you place your order and we will arrange faster delivery.

on Fall Protection. Topics covered include the consequences of falls in the workplace, hazardous work environments, the safety "mindset," designing fall hazards out of the workplace, proper housekeeping techniques, protective measures, and protective equipment.

DVD-394 Winter Driving Safety

This video covers procedures for being stuck in snow/ice, stopping distances in winter weather, proper use of conventional versus ABS brakes, and correcting/eliminating skids.

DVD-395 Safety Procedures for Lawn Mower Operators

This video covers important safety procedures for both the walk behind and the ride on style mowers. Topics covered include proper fueling method, maintenance, personal protective equipment, mowing on slopes, and protecting the public.

DVD-396 Bloodborne Pathogens: Protect and Defend

Bloodbourne pathogens are infections materials found in blood and other bodily fluids that cause disease in humans. This video will keep workers informed about situations where infections from blood and other body fluids are a risk factor. Key topics covered are what bloodbourne pathogens are, diseases that could be transmitted, potential exposure routes, and how to protect yourself from exposure.

DVD-397 Best Practices: Culvert Replacement

This video shows the best practices for replacing a roadway pipe culvert. ■

Conference calendar

April 2013			
18	Constructing and Specifying Longitudinal Joints Workshop	Ames	Vanessa Goetz
21–25	National Association of County Engineers NACE 2013: Annual Conference	Des Moines	Rebecca Page
May 2013			
7	Motor Grader Operator Training	Ames	Jennifer Serra
14	Motor Grader Operator Training	Tripoli	Jennifer Serra
12-15	5th North American Conference on the Design and Use of Self-Consolidating Concrete	Chicago	Kejin Wang
21	Motor Grader Operator Training	Cherokee	Jennifer Serra
28	Motor Grader Operator Training	Atlantic	Jennifer Serra
June 2013			
4	Motor Grader Operator Training	Washington	Jennifer Serra
August 2013			
15–16	2013 Mid-Continent Transportation Research Symposium	Ames	Judy Thomas

Conference contact information

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Event details and online registration

Watch for details and online registration information, by specific dates/events, on the online calendar, www.intrans.iastate.edu/mors/calendar/.. ■

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