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IOWA STATE UNIVERSITY
Institute for Transportation

AVL systems increase efficiency of Johnson County fleet

The winter season means snow in many areas throughout the country. Johnson County, Iowa, is no exception, but for the past two years Johnson County has saved money and time while being more responsive to its citizens by implementing AVL, automatic vehicle location, systems on its snow plow fleet.

About Johnson County

The Johnson County Secondary Roads Department is in charge of 940 miles of paved, gravel, and dirt roads in the county. The department's year-round maintenance includes plowing snow, laying gravel, grading, and mowing road shoulders along with maintaining the many culverts and bridges in the county and overseeing their replacement when necessary.

The Secondary Roads Department has maintenance shops in various locations around the county, and is headquartered on Melrose Avenue in Iowa City.

How did they do it?

AVL systems are widely used as a way to track where vehicles are in the field. These systems feature two major parts: GPS systems on board

each vehicle that track their real-time location and software that displays their location on a map. AVL is usually accurate to within 30 feet of a vehicles' location.

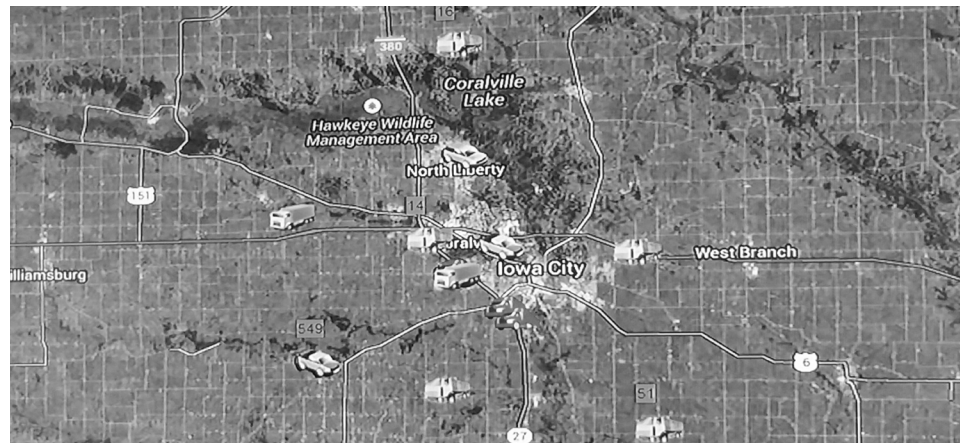
Usually the GPS information is first transmitted up to a satellite and then down to the end user, but Johnson County opted to use a radio tower instead. With a radio tower on site, the Johnson County Secondary Roads Department found this to be the best long-term, cost-effective option.

Johnson County Engineer Greg Parker said that although originally hesitant about implementation, the county felt AVL's benefit far outweighed the initial start-up and future maintenance costs.

He added that with AVL, counties need to weigh cost with accuracy. For Johnson County, the system is nearly 94 percent accurate.

"It really can be a perfect system, but the greater the accuracy means the greater the cost," says Parker. "You really have to strike a balance."

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Example of Johnson County Secondary Roads Department on-screen AVL system

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



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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From the director: Looking back and looking forward

It's that time of year again. Looking back to summarize what's been accomplished, what's changed, and what can be improved upon. Looking forward to define new goals, identify needs, and develop the best approach to serve local transportation agencies. Iowa LTAP has gone through a series of transitions this year and 2015 is shaping up to continue that pattern, but maybe in a less dramatic manner.

In 2014, we updated our Roads Scholar program and already have about 300 people signed up for it. If you want your attendance tracked, signing up is something you'll want to do. LTAP also served more people during the events and workshops we sponsored or co-sponsored than in the previous 10 years.

Three new people were also hired. Paul Albritton, our technical training coordinator, will be taking on more and more workshops. He is an instructor for the Iowa DOT Work Zone Safety workshops each winter and will be the primary contact and coordinator for the Motor Grader Operator (MoGO) training in 2015. Information on these trainings will be advertised soon. Devin Happe, LTAP program assistant, and Tom Stoner, local roads safety liaison, were also hired in September about the time the last newsletter went to print. They are introduced to you in this newsletter. Devin helps with just about everything and comes to LTAP with a wealth of event management knowledge. She will be working to improve our efficiency and effectiveness, and you will start to see her at more and more events (particularly here in Ames). Tom Stoner, as many of you know, was the Harrison County engineer for many years. Tom has taken on the efforts of Bob Sperry and already started on-site visits to discuss potential safety improvements and their funding.

We are also doing road safety assessments once again. In addition, Paul and I will continue to offer the on-call and on-site work zone and flagger training that Iowa LTAP has provided for many years. Just give Paul a call and we'll get it scheduled. Finally, we have also

re-advertised the Safety Circuit Rider position. Once this position is filled, we will have one more person capable of helping out with your training needs. The tasks completed by the person filling the Safety Circuit Rider position will adjust and change in coordination with the capabilities of all our new staff.

During 2015, we'll continue to be involved with some of the same activities we've done for many years. But we'll also start to introduce some other workshops/outreach. Some of the efforts being considered include a MUTCD signing workshop that will be offered throughout the state. In addition, we may offer a new mower safety course, and a number of safety-focused webinars and/or trainings may also be coming your way. These will be efforts that are developed through the national LTAP organization, the National Highway Institute, and/or by Iowa LTAP staff. Finally, math skills will also be offered again. If there are subjects you'd like to see offered, please let us know and we'll add it to the list.

Finally, we are also wrapping up or working on several "research" projects that may be of value to local transportation agencies here in Iowa. We just finished work on a systemic safety analysis and are updating a website on deer-vehicle crash reduction. We are also continuing work on a project focused on pavement marking use on low-volume roadways and will soon start work on a sign installation and removal manual.

Looking back, 2014 was a good year for Iowa LTAP. Looking forward, 2015 is shaping up to be exciting, challenging, and productive.

Thanks for another great year. Have a Happy New Year! ■

Keith

Happe assumes LTAP program assistant position

Devin Happe was appointed to the full-time position of program assistant of the Iowa LTAP on September 2, 2014.

She is dedicated to providing support to the director and overseeing the success of Iowa LTAP events.

Growing up in DeWitt, Iowa, Happe said that Ames's "small-town feel" is exactly what she was looking for while starting her career in event management.

Education

Happe received a Bachelor of Science (B.S.) degree in event management with additional expertise in business from Iowa State University in May 2014. Through the university, she is Cvent certified, which means that she is skilled in web-based event management, venue sourcing, and various strategic meetings management software. She is an expert in understanding the technology used in the hospitality industry.

Background

She said that what helped prepare her for this position was primarily her past work with Iowa State University's Conference Services. Having worked directly with this department for two years, she planned university-sponsored camps and conferences. Handling everything from contract preparation, accommodations,

filing, and billing, Happe was considered an event "point person."

"I did everything you can imagine," says Happe. "And it really translates to what I do here at LTAP."

She said her past experience has really helped in transitioning into her new position, because she already has many useful resources and contacts (like various departments on campus and the Ames Convention and Business Bureau).

"I'm used to working with lots of people and handling a lot of tasks," says Happe. "I worked each event from start to finish."

Responsibilities

A major part of her job as the Iowa LTAP program assistant is planning for events and helping the director as he prepares for presentations. Additionally, Happe is responsible for coordinating events at each step, which includes preparing outreach materials, organizing contracts, maintaining all aspects of the LTAP's billing, and overseeing event success.

A look into the future

Happe admits that she is excited to see how LTAP will continue to grow once it is again fully staffed. Having always wanted to work in this type of environment, she looks forward to learning more about LTAP and how it



Devin Happe, Iowa LTAP program assistant

functions.

"I like the idea of experiencing something completely new—I've never coordinated transportation events before—and it's a great learning opportunity," says Happe. "I like the people here and I am happy to be where I am now."

One of the main things she hopes to accomplish is to bring more ideas and new experience to the Iowa LTAP program.

"It is great to build on an already successful program and see how even small changes can make our program grow and build into something even better," says Happe.

Contact

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dmhappe@iastate.edu ■

AVL continued from page 1

The county currently has 67 of its 110-unit fleet outfitted with AVL technology, which includes not just all their motor graders but dump and service foreman trucks as well.

Benefits

"Although we're only two years out, we have already seen a benefit," says Parker.

He added that AVL systems have made the trucks more efficient by minimizing travel time, increasing response time, and reducing cost to the county.

"It is not a big brother tool," says Parker. "Really, it is a management tool that allows us

to locate any vehicle on the map at any given time."

Parker added that the Secondary Roads Department routinely receives complaints from the traveling public, but with this technology their claims can be verified.

For example, damages can sometimes occur when road materials are being transported.

"Our trucks carry everything you can imagine—rock, gravel—and sometimes things bounce out and do damage to other vehicles. With AVL we have a record of exactly where our vehicles are located,"

says Parker.

He added that AVL systems help to protect the county from liability, especially during the winter season and with increased anxiety over unplowed roads.

"Now we can now confirm if a road has already been plowed or if a plow is en route to a particular location," says Parker. "With this tool—the truth is black and white."

For more information

For additional questions regarding how AVL systems have been implemented successfully in Johnson County, contact Greg Parker at gparker@co.johnson.ia.us. ■

Iowa LTAP Mission

To foster a safe, efficient, and environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, thus improving the quality of life for Iowans.

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Materials from the Stanley L. Ring Memorial Library

DVDs

DVD 375 – Best Practices: Crack Filling/Sealing

This video by the Ohio LTAP is presented as a guideline for the best practices for determining the proper crack seal material and the placement of the material. The ultimate purpose of crack sealing and crack repair is to prevent the intrusion of water to the base.

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. Personal protective equipment (PPE) must be customized to cope with the risks. This video by DuPont-Coastal covers eye, face, hearing, head, hand, and foot protection and other PPE rules.

DVD 396 – Bloodborne Pathogens

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

Publications

P 1499 – Field Guide for Unpaved Rural Roads

This guide developed by the Wyoming LTAP Center provides information to help identify key safety issues for unpaved rural roads. Subjects include traffic control devices, intersections, bridges, and road surface management.

P 1795 – Field Guidelines for Timber Abutment Piling and Backwall Rehabilitation

This booklet developed by Justin Dahlberg at Iowa State University summarizes six best practices for repairing deteriorated timber bridge elements that can be implemented by Iowa county engineers and their maintenance crews.

P 1783 – Developing Safety Plans: A Manual for Local Rural Road Owners

This US DOT-FHWA manual is a guide for development of a Local Road Safety Plan (LRSP). A LSRP defines key emphasis areas and strategies that impact local roads and provides a framework to accomplish safety enhancements at the local level. ■

Three ways to order LTAP library materials

- Use the online catalog, <http://www.iowaltap.iastate.edu/library/stan-ring-library/search/>
- Contact Paul Albritton, paulbritt@iastate.edu, 515-294-1231
- 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.

Boone County Expo research key findings

In the July–September edition of *Technology News*, Center for Earthworks Engineering Research (CEER) Assistant Director Pavana Vennapusa introduced current research in pavement foundation design technologies being conducted at the Central Iowa Expo Site in Boone, Iowa.

The project began in May 2012 and is ongoing for the next three years, with support from the Iowa DOT and the Federal Highway Administration.

The goal of the project was to increase the range of stabilization technologies to be considered for future pavement foundation design. In brief, the project included 16 different 700-foot-long test sections over 4.8 miles of roadway using the following foundation stabilization technologies: woven and non-woven geosynthetics, chemical stabilization of subgrade, portland cement stabilization with fiber reinforcement of subbase, mechanical stabilization, and high-energy impact compaction.

New stiffness based measurement technologies including intelligent compaction and falling weight deflectometer were used in evaluating the freeze-thaw performance of the test sections.

Following are key findings for two of the foundation stabilization technologies.

Subgrade stabilization using geosynthetics

This project included four different geosynthetics for subgrade improvement: woven and non-woven geotextiles at subgrade/subbase interfaces to serve as separation layer, and triaxial and biaxial geogrids at subgrade/subbase interfaces for reinforcement of subgrade. The subgrade material consisted of wet clays classified as A-6(5) or CL material and the base material consisted of 6 inches of crushed limestone modified subbase material classified as A-1-a or GP-GM with 7 percent fines content.

In situ engineering properties (i.e., strength and stiffness) are being monitored over time, which included three months after construc-

tion (May 2012), about three months after construction (October 2012), during frozen state (February 2013), and immediately after the spring thaw (April 2013). Additional testing is underway at several times from 2014 to 2016.

Dynamic cone penetrometer (DCP) tests were conducted to determine California bearing ratio (CBR) values of the base and subgrade layers. It was found that the average CBR of the subbase layers in the woven and non-woven geotextile sections were lower than in the triaxial/biaxial geogrid sections. During October 2012 testing, the triaxial geogrid section showed the highest average CBR (234) and the woven geotextile (89) showed the lowest average CBR in the subbase layer. During April 2013 testing (spring thaw), the average subbase CBR values in the test sections were lower compared to October 2012 testing and varied from about 33 to 46.

High-energy impact compaction

Application of high-energy impact roller (IR) compaction technology in Iowa has been limited primarily to concrete pavement recycling projects, but is recently seeing increased interest for use in foundation layer stabilization. Previous studies have shown that this method can densify material to depths greater than 6 feet, which is significantly deeper than conventional static or vibratory rollers.

One disadvantage of this technology is that the high-impact forces disturb (i.e., loosen) the top 0.25 to 1.5 ft of the surface so the top layer needs additional compaction with conventional rollers. The vibrations caused by the impact rollers and their effect on nearby structures (e.g., underground utilities/pipe lines or nearby building structures) are important to consider with this technology.

In this study, a non-circular-shaped, tow-behind solid steel impact roller weighing about 19,000 pounds was used to rubblize and push down the existing chip seal coat and the granular subbase on a test section. The roller was pulled using a tractor at a nominal



High energy impact roller compaction

speed of about 7 mph to generate a high-impact force.

In situ dynamic cone penetrometer (DCP) tests were conducted at 10 locations along the test section prior to IR passes, after 12 and 20 IR passes, and after vibratory smooth drum roller passes.

Results and field observations indicated that the chip seal coat surface was rubblized as expected. DCP test results at some locations indicated improvement in DCP-CBR with depth, while at other locations showed decompaction at shallow depths. Improvement of the underlying subgrade was not expected, as it is not possible under saturated conditions.

These results and observations indicated an overall effective application of high-energy IR to rubblize the surface chip seal coat.

However, due to the limited scope on this project, potential advantages of the high energy IR for earthwork compaction warrant additional demonstration.

For more information

An overview of the project is available on YouTube <https://www.youtube.com/watch?v=qnq4fmRs6so>.

For questions regarding this project, contact Pavana Vennapusa, 515-294-2395, pavanv@iastate.edu or David White, 515-294-1463, djwhite@iastate.edu.

Look for more key findings regarding the Boone County Expo Research Project in the next issue of *Technology News*. ■

InTrans welcomes local roads safety liaison

Tom Stoner was appointed on September 15, 2014, to the position of local roads safety liaison of the Iowa LTAP, which was previously held by Bob Sperry.

In this position, Stoner coordinates with county and city officials and provides information on safety programs currently available from LTAP, the Iowa DOT, and FHWA. By providing training-on-demand, he helps coordinate safety training activities for county engineers.

“My job is to help address their needs and provide additional support,” says Stoner.

Education

Stoner received his Bachelor of Science (B.S.) degree in civil engineering from Iowa State University in 1972. He then became a licensed civil engineer in 1976. Stoner is the recipient of the ICEA Special Service Award for his work with the Iowa legislature as well as the ICEA Engineering Achievement Award (i.e., County Engineer of the Year), which he received in 2005. Later, in 2014, he received the National Rural County Engineer of the Year Award from the National Association of County Engineers.

Background

With over 30 years of transportation safety experience, he said that his past experience as the county engineer in Harrison County as well as his work at the Iowa DOT have prepared him to take on the responsibilities of local roads safety liaison at Iowa LTAP.

“It is pretty hard to identify, at least in the

field that I’m in, where safety isn’t a major component,” says Stoner.

While working at the Iowa DOT, one of his first jobs was the evaluation of accidents in wet-weather conditions (i.e., slippery pavements). He would try to determine if there was a relationship between the slipperiness and the accidents and mitigate the problem by finding a way to reduce those accidents.

After leaving the Iowa DOT, he worked for Burns McDonnell, a consulting engineering company. As its resident representative, Stoner was in charge of construction and safety.

As the county engineer in Harrison County, he worked directly with local crews and contractors on everything transportation-wise in the county, which didn’t just include bridges and highways, but safety as well.

“There is a lot of mitigation—you are the first line of defense when you have a series of accidents. You have to figure out why they happened and resolve those problems. Or, better yet, prevent them from happening in the first place.”

A look into the future

Stoner said that after decades of working in the transportation industry, he decided he wasn’t ready to quit just yet.

In talking with the previous Local Roads Safety Liaison, Bob Sperry, Stoner says, “Bob was ready to leave and I was ready to try something



Tom Stoner, Iowa LTAP local roads safety liaison

different. And the idea really fascinated me. I think I still can offer something of value.”

He added that it is tough to follow in Bob Sperry’s footsteps.

“Our backgrounds were very similar. We both spent many years in county engineering, so we bring a similar focus. Bob was associated with more urban counties, but I bring a little more rural perspective to the local roads safety liaison position. It is difficult to follow a legend, but I will do my best.”

Stoner says he is very excited about having the opportunity to take his 30 years of experience and provide that knowledge to the young engineers throughout the state.

“Like Bob did before me, I hope I can be a great mentor.”

Contact

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11th International Conference on Low-Volume Roads

The Transportation Research Board is sponsoring the 11th International Conference on Low-Volume Roads from July 12–15, 2015, in Pittsburgh, Pennsylvania.

The conference, held every four years, will examine new technologies and new techniques in the planning, design, construction, operation, maintenance, and administration of low-volume roads.

At this conference, those who administer, plan, design, build, or maintain low-volume roads will learn innovative ways to managing low-volume road systems. The conference is organized for practitioners worldwide in local, state, and federal agencies; universities; private firms; and international organizations. Previous conferences typically have attracted 250–300 transportation professionals from all continents.

Program and registration information is now available. Early Bird registration will expire February 6, 2015.

Conference calendar

Date	Event Name	Location	Contact
January 2014			
29	County Engineers Research Focus Group	Ames	Keith Knapp
February 2014			
3	Work Zone Safety Workshop	Ames	Keith Knapp
12	Work Zone Safety Workshop	Cedar Rapids	Keith Knapp
13	Work Zone Safety Workshop	Ottumwa	Keith Knapp
March 2014			
12	Work Zone Safety Workshop	Waterloo	Keith Knapp
24	Work Zone Safety Workshop	Council Bluffs	Keith Knapp
25	Work Zone Safety Workshop	Sioux City	Keith Knapp
26	Work Zone Safety Workshop	Storm Lake	Keith Knapp
30	Work Zone Safety Workshop	Ames	Keith Knapp
31	Work Zone Safety Workshop	Ames	Keith Knapp
Coming Soon			
TBD	Motor Grader Operator Training		Paul Albritton
TBD	MUTCD Signing Workshop		Keith Knapp

Contact information

Paul Albritton, 515-294-1231, palbritt@iastate.edu
 Keith Knapp, 515-294-8817, kknapp@iastate.edu ■

Event details and online registration

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

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