

2010

Annual Report



OPERA

Local Operational Research Assistance Program



2010 Local Operational Research Assistance (OPERA) Program Annual Report

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OPERA

IMPLEMENTING STRATEGIES FOR SUCCESS: 2010 ANNUAL REPORT

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Implementing Strategies for Success: 2010 OPERA Annual Report

Since it began funding projects in 2003, the Local Operational Research Assistance (OPERA) Program has allowed Minnesota counties, cities, and townships to conduct innovative research, evaluate the latest products, and implement new strategies on their local roads.

To date, more than 40 OPERA-funded projects have been completed on a variety of topics from pedestrian safety to deicing materials to gravel road maintenance. Past projects have improved crack sealing on bituminous pavements, used windmill-driven aeration to enhance water quality in stormwater ponds, and increased the safety of snowplow operations with rear-vision cameras.

Throughout the program's history, many OPERA funding recipients have also completed projects aimed at increasing efficiency and saving money. In 2005, for example, the Morrison County Highway Department implemented a new software system for managing construction projects. The system decreased data entry time for engineers by almost half, said Director of Public Works Steven Backowski, and also saved substantial time for support and accounting staff.

The Scott County Department of Public Works used OPERA funds to decrease maintenance costs in 2007 by adding millings from overlay projects to gravel roads. The millings were a sturdy, inexpensive addition to the roadbeds, according to Operations Supervisor Gene Busacker, and the need for grading was subsequently reduced from two or three times per week to once per month.

In 2010, eight OPERA projects were completed by local government transportation organizations on topics ranging from guardrail delineation to snow removal. Other areas of investigation included a unique silt fence used to prevent wetland damage, a front-mounted retriever hitch for gravel road reclamation, and the creation of an automated vehicle location (AVL) system using cell phones.

Several projects completed in 2010 also helped to cut costs. In Kittson County, for example, the application of a magnesium chloride dust coating to a gravel road resulted in an estimated savings of more than \$400 per mile, said County Engineer Kelly Bengtson. The coating also yielded additional benefits, Bengtson noted, including decreased washboarding and an estimated 75% reduction in dust.

The City of Eagan discovered unexpected savings after installing AVL technology in its winter vehicle fleet. The technology was originally intended to monitor plow progress and better allocate resources, but the system's ability to create GPS data points led to many additional applications. Plow operators were able to gather information about parking violations, potholes, summer trail repairs, and trees in need of trimming, said Tom Struve, superintendent of street equipment and central services. "This useful application of technology saved the city many, many staff hours," Struve said.

Struve also noted that OPERA funding rescued Eagan's AVL program, which had previously been cut due to budget shortfalls. According to Struve, data gathered during the project period will help managers secure future funding for the versatile system.

This report is a compilation of the eight projects completed during 2010 by local government transportation organizations receiving OPERA support. Individual fact sheets on each 2010 project, as well as complete project reports as submitted by each agency, are available online at www.mnltap.umn.edu/opera.

Magnesium Chloride Dust Coating Evaluation

Project Title Magnesium Chloride Dust Coating Evaluation

Project Number 2008-02

Project Leader Kelly Bengtson

Agency Kittson County Highway Department
401 Second Street SW
Hallock, MN 56728

Phone 218-843-2686



Problem Kittson County maintains over 800 miles of unpaved county and township roads. Gravel roads are typically maintained by blading with a motor grader approximately every other week and adding additional aggregate when needed, usually every other year. Rising fuel costs and restricted budgets make it difficult to support the reoccurring costs associated with such gravel road maintenance, which can approach an average of nearly \$5,000 per mile per year.

Solution The county applied magnesium chloride to a section of County Road 58 in June 2009 to help reduce material and maintenance costs. The original plan was to use a solution of calcium chloride on the section of road, but the county decided to use magnesium chloride following discussions with other counties and after discovering that magnesium chloride was less costly by 16 cents per gallon.

Procedure In order to achieve the best possible results, the road was bladed and reshaped to an approximate 4% grade. Gravel was then added at a rate of 200 yards per mile and the road bladed two additional times. Dustcoating, Inc. applied a solution of magnesium chloride at a rate of .30 gallons per square yard on a 15,000-foot section of County Road 58.

Results The application of magnesium chloride provided many benefits. By eliminating the need to apply a biennial resurfacing aggregate layer and reducing the maintenance blading operations in areas of light traffic, the product provided a long-term cost savings. Additional benefits included an estimated 75% reduction in dust, improving visibility for the traveling public and giving adjacent homeowners a higher level of comfort. The magnesium chloride also provided for an improved gravel road surface, which virtually eliminated washboarding and increased the ride quality index.

Approximate Cost \$15,000 (\$10,000 approved for project)

Implementation The projected savings totaled \$420.20 per mile based on the 2008 and 2009 Kittson County Highway Department annual reports, which included consideration of special work, repairs and replacements, and routine maintenance.

Status Complete

City of Eagan Automated Vehicle Location

Project Title City of Eagan Automated Vehicle Location

Project Number 2008-06

Project Leader Tom Struve

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3501 Coachman Road
Eagan, MN 55123

Phone 651-675-5315



Problem Maintenance managers in the City of Eagan have historically been challenged to allocate and reallocate resources during winter snow and ice control operations. Assigned drivers and snow routes depend upon problem-free operations to ensure that resources are spread evenly and safely throughout the community's streets, sidewalks, and trails. When problems occurred, managers were forced to depend on radio and telephone communication to obtain status information and reallocate workers and equipment.

Solution The city equipped part of the winter vehicle fleet with automated vehicle location (AVL) technology, allowing managers to observe real-time operations from any computer terminal and adjust resources immediately via telephone and radio communications.

Procedure The City of Eagan implemented a prototype AVL program during February of 2008, and 12 permanently mounted units were installed in half of the city's winter vehicle fleet. After the equipment vendor indicated the software could track additional real-time and reportable information, the permanent installations were removed and modified into interchangeable portable units. The equipment vendor then created "button boxes" that drivers could use while in the field. Transmitter/receiver units were used to send a signal to the software program, creating accurate GPS data points at locations where the buttons were pressed.

Results Maintenance operations managers successfully using the AVL equipment to monitor plow progress and allocate resources to maximize efficiency and public safety. Throughout the prototype period, city staff also discovered numerous additional uses for the system, particularly using the button boxes. For example, AVL equipment allowed snow route employees to gather data about potholes and sightline issues instead of sending staffers out in early spring to identify problem areas. The system was also used to identify winter parking violations and map their locations.

Approximate Cost \$8,000

Implementation Due to budget restrictions, the City of Eagan is proposing to continue funding for the year-round use of only four AVL units. If funding is available, the units will be used for many data point collection uses and partial management of snow and ice operations. The system will also be used in the event of emergency response situations, such as wind storms, to gather real-time damage information.

Status Complete

Cushion Release Push Frame and Weight Transfer Kits

Project Title Cushion Release Push Frame and Weight Transfer Kits

Project Number 2009-03

Project Leader David Perryman

Agency City of Glenwood
137 East Minnesota Avenue
Glenwood, MN 56334

Phone 320-634-5433



Problem Operators using tractor-mounted snow blowers to clear city sidewalks often had to make a second pass over the blowing area to clear remaining snow. Driving over cracks in the sidewalk or slight changes in elevation jolted the operator, posing safety concerns, and also left snow behind on the plowed surface. A lack of traction was also an issue for operators, even with chains installed on the equipment.

Solution The City of Glenwood installed one Cushion Release Push Frame and two Weight Transfer Kits on its snow blowing and lawn mowing equipment. The Cushion Release Push Frame assisted the blower in continuously scraping the surface being cleared, and the Weight Transfer Kits permit operators to shift the weight of the equipment to the drive wheels, allowing for more traction.

Procedure The Cushion Release Push Frame was installed on the city's four-wheel-drive 1445 John Deere tractor on October 1, 2009. Weight Transfer Kits were installed on the four-wheel-drive tractor as well as the city's two-wheel-drive 1445 John Deere tractor on January 12, 2010.

Results The Cushion Release Push Frame eliminated the need for blower operators to go over cleared areas repeatedly to remove excess snow. It improved operator safety as well, absorbing the jolt often felt by operators when driving over an elevation change. Repairs to the blowing equipment were significantly reduced, as the Cushion Release Push Frame eliminated the bent cutting edges and broken pins often experienced prior to its installation.

The Weight Transfer Kits worked effectively on the heavier four-wheel-drive tractor, allowing lawn mower operators to cover most areas without using four-wheel drive. For blower operators, the kits assisted in maintaining traction on icy sidewalks. On the lighter two-wheel-drive tractor, the Weight Transfer Kit was less successful. It adjusted too much weight to the wheels, allowing the mower deck to cut unevenly. Ongoing setting adjustments are being made in an attempt to correct this issue.

Approximate Cost \$7,500 (\$5,000 approved for project)

Implementation Both items remain in use on the 1445 John Deere tractors. The Cushion Release Push Frame is only used during the winter for plowing snow, but the Weight Transfer Kits are used throughout the year.

Status Complete

Brunswick Township Erosion Control Project

Project Title Brunswick Township Erosion Control Project

Project Number 2009-05

Project Leader Paul Kollar

Agency Brunswick Township
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Mora, MN 55051

Phone 320-272-4933



Problem An old corduroy road across a deep swamp in Brunswick Township failed, with logs visibly coming through the road's surface. The township built a lightweight tire fill on the existing road, which was 19 feet wide and had to be raised a minimum of 4 feet. The tire fill had to be placed on a fabric stabilizer, and a silt fence was required between the construction area and the swamp to prevent damaging the wetland. However, it was difficult to properly anchor the silt fence to the ground in the swamp area.

Solution Brunswick Township extended the stabilization fabric to the construction limits, attaching it to two-by-two stakes to form a positive erosion control barrier.

Procedure A working relationship was established between the project consultant and the tire supplier, First State Tire in Isanti, Minnesota. They worked to create the steps needed to place the fence and developed strategies for providing stability to the fence and posts. All procedures were developed to comply with the required storm water permit issued by the Minnesota Pollution Control Agency.

Results The placement and staking of the fence served several purposes during project construction. It established a guideline for tire placement, made the placement of dirt on top of the tires easier to control, and allowed for easier slope reformation when necessary. In addition, any run-off damage done prior to solid establishment of the slope seeding was controlled. After the construction project's completion, the slopes were showing some signs of ditching but no sediment was reaching the wetland area.

Approximate Cost \$67,000 (\$10,000 approved for project)

Implementation The project began in July 2009 and was completed in October 2010. The placement of the fence is remaining stable, despite areas of drainage. The fence was designed to be easily removable in two or three years, once the roadbed and slopes have settled. This solution for erosion protection could be extended to other county and township projects where fabric stabilization is used.

Status Complete

Evaluation of Grader Front-Mounted Retriever Hitch

Project Title Evaluation of Grader Front-Mounted Retriever Hitch

Project Number 2009-06

Project Leader Darin Mielke

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Gaylord, MN 55334

Phone 507-237-4092



Problem The gravel from gravel roads or shoulders is often pushed out and down the slopes of Sibley County roads, causing rough conditions and pavement edge drop-offs. For gravel shoulders on paved bituminous highways, two motor graders were used in reclaiming operations, one with a retriever and the other to blade the gravel back onto the shoulder. This process was expensive in terms of budget and personnel, as it required two graders and operators.

Solution A front-mounted retriever hitch for a Caterpillar 140H Motor Grader was purchased and mounted, allowing the same motor grader to do the reclaiming and blading operation in a single pass.

Procedure The front-mounted retriever was used on gravel roads and bituminous roads with gravel shoulders to bring loose material toward the road surface to fill drop-off areas. On the same pass, the moldboard was positioned to spread out any loose material on gravel roads or direct any material on bituminous road surfaces back to the gravel shoulders. On bituminous roads, a road broom and a rubber-tired roller followed behind the grader to clean off the roadway edge and compact the loose material.

Results The front-mounted retriever offered better visibility on both road types than the wing-mount position gravel retriever previously used. The front tire also blocked most of the reclaimed material from being thrown too far onto the roadway surface. On paved roads with gravel shoulders this was beneficial, but it was not ideal if the operator was trying to spread a material over a large area on a gravel roadway.

The operator was able to direct loose material back onto the shoulder of paved roads and strike off the gravel shoulder, but only to the same cross slope as the bituminous driving lane. If the shoulder drop-off was more than three inches, an additional pass may have been necessary since the rubber-tired roller compacted the material and left a small depression.

Approximate Cost \$9,234 (\$5,000 approved for project)

Implementation The front-mounted retriever hitch remains in use on the motor grader, and evaluations were planned to determine if a second unit would be purchased.

Status Complete

U.S. National Grid Field Marker Prototyping

Project Title U.S. National Grid Field Marker Prototyping

Project Number 2009-07

Project Leader Bob Basques

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1000 CHA, Technical Services, GIS
25 West Fourth Street
St. Paul, MN 55102



Phone 612-598-9210

Problem A tremendous amount of public infrastructure is devoted to providing location information, but individual agencies often use different reference systems to locate the same object. It is difficult to translate from one system to another, such as from a street address system to one using X-Y coordinates, particularly in emergency response situations. To provide an interoperable location system for first responders, the federal government established the U.S. National Grid (USNG) system as a standard. USNG locations can be determined from GPS receivers or paper maps, but there are virtually no field markers referencing USNG locations.

Solution The City of St. Paul investigated the methodology and equipment necessary to inexpensively mark infrastructure in the field with USNG location and other data.

Procedure A system for generating portable markers in the field and a marker-reading application for end users were developed. Smart phones were used to obtain USNG locations and drive a printer to create a field marker. The markers were created using QR code, or 2D bar coding readable by almost any cellular phone handset with an embedded camera. QR technology allowed for encoding USNG locations as well as other data, such as a URL, text, or a phone number to refer users to additional information, in each marker.

Results The equipment and software were used at a variety of field locations to view a current GPS-derived location on a map, record the location in a database, and generate a QR-coded field marker containing the USNG location. The markers were printed using a mobile printer connected wirelessly to the smart phone, and the smart phone successfully read the field-produced markers and their encoded data. Marker specification details developed throughout the course of the project were incorporated into the Minnesota "Best Practices" USNG location marker proposal.

Approximate Cost \$10,000 (\$5,000 approved for project)

Implementation Research into appropriate, weatherproof print media for the markers is in progress. Testing is also under way to streamline the syncing process in order to make the systems as easy to use in the field as possible.

Status Complete

GPS/AVL Tracking and Mapping

Project Title GPS/AVL Tracking and Mapping

Project Number 2009-08

Project Leader Bob Basques

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Problem The ability to track mobile assets is becoming a general best practice in fleet management. However, the cost of implementing a GPS-enabled Automated Vehicle Location (AVL) system is often prohibitively high for most medium or small communities. Even off-the-shelf systems have expenses associated with implementation and upkeep that in many cases are not cost-effective. There are also no options for building out a GPS/AVL tracking system for medium- or lower-level developers that allow for user customization while remaining stable and easy to use.

Solution The City of St. Paul developed a low-cost, flexible alternative to traditional AVL systems using Nokia N900 cellular phones, off-the-shelf Linux-based hardware, and open source tools. The Nokia N900s have a lower base price than traditional AVL systems and do not need to be hardwired into the vehicles.

Procedure Design criteria included using Linux-based smart phones as the AVL recorder as well as the end user mapping/tracking visualizer. The Nokia N900 was chosen for its portability as well as its many pre-integrated devices, including GPS and an accelerometer. A central Internet-based service, which uses the same software stack as the field devices, was used for syncing the captured AVL tracking data.

Results The mapping display on the field devices appeared clearly, and the operation of the mapping interface in standalone mode functioned well. The hardware worked out of the box, with tools readily available for developing and installing custom software on the Nokia N900s for reading and processing GPS data. Extra effort was required, however, in making the open source mapping interface work in a handheld form. The interface was made simpler by removing some of the software's capability options.

Approximate Cost \$10,000 (\$5,000 approved for project)

Implementation Test units are currently being evaluated by city staff in various Public Works divisions. Tracking methods are being implemented and the process is undergoing continual revision and evaluation for speed, efficiency, and automation. Long-term analysis will be applied closer to the end of the testing phase.

Status Complete

Ultra Guard Cart Test

Project Title Ultra Guard Cart Test

Project Number 2009-10

Project Leader Adam Bruening

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Stillwater, MN 55082

Phone 651-430-4398



Problem Agencies frequently look to provide better delineation to guardrails, jersey barriers, and concrete bridges. Standard forms of delineation need regular maintenance and replacement and provide only partial delineation.

Solution Washington County used an Ultra Guard Cart to delineate horizontal curves at locations that had experienced automotive collisions with roadway barriers. The cart is a handheld device that can paint a 6-inch retro-reflective stripe on vertical surfaces. The added reflectivity provided by the delineation can assist drivers through the curves and help prevent crashes.

Procedure The Ultra Guard Cart was attached to Washington County's pavement message unit, which had the paint, beads, and compressed air needed to operate the cart. Guardrails on several types of curves were painted— including locations with different speeds, approach angles, and ambient lighting—to determine where the type of delineation offered by the cart would work best. Two people were required to operate the cart, with one person positioning it on the guardrail and walking forward while triggering the paint and bead gun. Paint thickness was controlled by the walking speed of the operator. A second person was needed to move the paint equipment.

Results The cart was easy to use and adjust for different types of barriers, but it worked best on guardrails in good condition. Paint stripes applied by the cart were continuous, and they have shown less vulnerability to snow plow damage than traditional road paint. However, the cart had difficulty traveling evenly on barriers with bends or other defects, leading to uneven paint lines and a slower application process. Paint applied to guardrails using the Ultra Guard Cart did not reflect as brightly as other delineators, and stripes applied to locations with gradual curves were found to be less noticeable than locations with sharper turns.

Approximate Cost \$8,216 (\$5,000 approved for project)

Implementation Painting was completed in August 2010, and no crashes have occurred at any of the Ultra Guard Cart paint sites. Evaluation of the stripes' susceptibility to snow plow damage and cold weather will continue until the spring of 2011.

Status Complete

Past OPERA Projects

2009

Hot-Applied Asphalt as an Adhesive on Cold Longitudinal Asphalt Joints

An asphalt joint adhesive was used as a sealant on cold longitudinal asphalt joints and at the interface of asphalt pavement and concrete curb and gutter. The joint adhesive is pliable and will allow movement to occur without breaking, unlike the more rigid tack material formerly used to seal these areas.

Asphalt Emulsion Full-Depth Reclamation and Granular-Base Stabilization on Urban Streets

Several 7-ton streets scheduled for rehabilitation had their reclaimed road base stabilized with an asphalt emulsion to a depth of 4 inches. The emulsion provided added stiffness to the base section and allowed the depth of the new asphalt to be reduced from 3 ½ inches to 2 inches.

Blind Lake Chloride Research Project

High concentrations of chlorides were identified in the Blind Lake basin in part due to pre-treated road salt leeching into the lake. To lessen the impacts of the chloride, the city used a “liquids only” anti-icing/deicing program in the area.

Blue Light Use for Traffic Enforcement

Enforcement lights, which turn blue as traffic lights turn red, were installed at a number of intersections to help police officers observe violators more effectively and reduce right-angle intersection crashes caused by drivers running red lights.

Crack Sealing on Cupped Joints on Bituminous Pavements

Extensive cupping at transverse cracks in bituminous pavements allows water intrusion and accelerates pavement deterioration. By using Bergman Companies Inc. Flex-Patch material and a fine aggregate cover to seal cupped transverse cracks and improve ride, the serviceable pavement life was extended without the more expensive mill and overlay.

Culvert Sediment Elimination

Three culverts installed at the same elevation often became plugged during periods of low and normal water flow. The construction of a rock weir near the inlets of two of the culverts forced the water to pass through only one pipe during low- and normal-flow periods. This kept velocities high enough to minimize the collection of sediment.

Road Reclamation With and Without Emulsion

Counties run into a dilemma when the bituminous surface of older roads reaches failure but there are not sufficient funds to rebuild the road. Goodhue County split a 6-mile road project with poor surface conditions into two segments to determine if using an emulsion to build strength down into the existing structure was a viable alternative to the existing rehabilitation procedure.

Evaluation of Rear-Vision Systems for Snowplows

With a tandem snowplow, vision is very limited and several blind spots occur, particularly when the snowplow is backing up. Rear-vision cameras and LCD monitors were installed on snowplow trucks to determine if they would improve drivers' ability to see directly behind the plows during snow or ice events.

2008

Evaluation of Paving Fabrics for Isolation of Bituminous Cracking

Existing bituminous pavements require major seasonal maintenance for both thermal and distress crack repairs. Spun-glass paving fabric was used to preserve existing bituminous pavements by isolating the effects of heavy crack sealants and reflective cracking.

Low-Cost Base Stabilization

To stretch limited road funds, county officials turned to full-depth reclamation to use the existing bituminous surface as additional base material. An insufficient amount of bituminous and base material, as well as limited road width for additional material, led to the use of a low-cost base stabilizer to strengthen the existing material.

Improvement of Water Quality in Storm Ponds

The Minnesota Pollution Control Agency requires public road authorities and others to construct storm-water ponds as part of its National Pollutant Discharge Elimination System. Two windmills were installed on a berm adjacent to the pond in order to use wind energy at no cost and a direct drive compressor to provide the air flow and oxygen necessary to aerate the pond.

Seal Coating of a Gravel Road Hill

The grade and curves on the Muhle Coulee Hill create a problem for keeping the surface smooth, so a seal coating was applied to the top half mile of the hill. Gravel was applied and then graded, and hot oil and chips were put down and rolled to a smooth surface.

QuickView Storm Sewer Camera

The implementation of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit requires that owners of MS4 storm sewer systems inspect the systems for maintenance needs. The QuickView camera system allows a single person to view and examine the sewer system as well as record video and audio.

Road Material Recovery

A loss of gravel and crushed rock from road surfaces and shoulders required the installation of a wing-mount retriever on the township road grader, which created smoother transactions and a safer roadway.

Mini Paver

Longitudinal cracks along curb lines and centerline streams required crews to hand-patch certain areas in order to preserve the integrity of the bituminous surface. Using the Mini Paver more than doubles the amount of patching that can be completed in a day, and roads will remain in better condition longer.

Evaluation of Hot Beam Wiper Blades

Windshield wipers become coated with ice during snowplow operations, causing poor visibility out of the windshield. Hot Beam wiper blades were installed on the front of snowplow trucks to keep ice from forming.

2007

Extending the Life of Bituminous Overlays

Fiberglass mat TruPave was used prior to overlaying with new bituminous in order to prevent reflective cracking and provide a moisture barrier. A June 2006 inspection found that roadway sealed with TruPave averaged 36 cracks per 100 feet, while the control section averaged 79 cracks per 100 feet.

Recycled Tear-off Shingles Road Construction Demonstration

The use of post-industrial recycled asphalt shingles (RAS) as a partial asphalt and aggregate supplement in hot-mix asphalt (HMA) has been specified by Mn/DOT, but more field experience was required to demonstrate the use of post-consumer RAS. Several HMA blends containing RAS scraps were tested near the Town of Hassan.

Millings for Gravel Road Stabilization

Millings were added to Scott County roads that required expensive maintenance because of heavy traffic. The millings were a cheaper alternative that kept roadbeds sturdier as well as less dusty in dry weather and less slick in wet weather.

Pick Cutting Edges

Straight cutting edges on washboard roads disturb more gravel than necessary. Pick cutting edges were used to comb the road top instead. Picked blades also helped remove snow in the winter and helped evenly spread caught-up vegetation on the roadside.

Frost Boil Correction

Geo-Tec fabric was used to seal the road bed instead of rock or gravel in order to prevent frost boiling and other road defects. The material will be used in future road repairs.

2006

Windshield Wiper Deicer

A pneumatic system was installed to remove ice and snow on plow windshield wipers from inside the cab, keeping drivers safe and warm. The system has since been implemented by several agencies and counties.

Concrete Pipe Tie Bars

A tie-bar system on the exterior of concrete pipes allowed crews to positively tie sections of pipe together without having to go inside the pipes and also prevents debris from being snagged inside the pipes.

Increasing the Capacity of Slab-Span Timber Bridges

University of Minnesota research showed that increasing the number and size of spreader beams increased the capacity and performance of a slab-span timber bridge over Buffalo Creek to accommodate increased traffic and loads.

Pedestrian-Activated Solar Warning Flasher

Flashing lights activated by pedestrians drew attention to a crosswalk in St. Paul and initially re-

duced conflict points at the intersection, but traffic behavior reverted after about three months, showing the devices have short-term effects on vehicle stopping actions.

DuraTherm Pavement Markings

Ramsey County tested DuraTherm pavement markings at a highway intersection for durability, ease of installation, retroreflectivity, and cost. Testing continues to determine if the markings outlast traditional epoxy treatments.

2005

Improved Effectiveness of Salt Brine as an Anti-icing and Prewetting Agent

Mankato found that liquid corn salt as an additive to the salt brine solution applied to winter roads resulted in longer-lasting road treatments and reduced need for salting trucks during snow events.

Advanced Warning with Solar-Powered Flashers

Kanabec County tested three different light-emitting diode (LED) flashers to alert drivers to controlled intersections down the road that they might otherwise not notice, especially at night or in inclement weather.

Dust Reduction and Stabilization of Gravel Roads

Gravel roads under heavy use in Kanabec County were treated with a soil stabilization product that increased load capacity and durability while reducing dust.

Construction Project Process Automation

Software and tablet personal computers used by Morrison County construction crews eliminated many duplications of information in the office and field, saving substantial time—in the case of engineering staff, reducing hours worked by almost half.

Cameras for Striping Truck

The cameras on a Washington County striping truck were inadequate for outdoor use. Operators couldn't view monitors over the glare of sun and the system was susceptible to water leaks. Upgrading to cameras used on large agricultural equipment solved the problem, reducing operator strain and eliminating the retracing of lines.

Blower Attachment to Remove Grass Clippings From Gravel Roads

A blower mounted to the front end of a Marshall County motor grader cleared gravel roads of grass clippings, which not only maintained the safety of the roads but also reduced the cost of replacing gravel that previously would have been discarded.

Rockville X-hesion Testing

A dust-control product was used on Rockville roads to increase the load capacity and minimize dust, but failed to meet standards of success when tested on three roads.

New Road Preparation Technology Prior to Overlay

A flexible slurry system tested on a one-mile section of road in McLeod County improved smoothness, durability, and cost-effectiveness, though the procedure was more expensive than traditional methods.

About OPERA

The Minnesota Local Road Research Board's Local Operational Research Assistance Program, or the Local OPERA Program, helps to develop innovations in the construction and maintenance operations of local government transportation organizations.

The Local OPERA Program encourages maintenance employees from all cities and counties to get involved in operational or hands-on research. In particular, OPERA helps to develop your great ideas locally and share those ideas statewide.

The Local OPERA Program funds projects up to \$10,000. OPERA project selections are made as projects are submitted. OPERA-funded projects also may receive support from other sources, including cities, counties, suppliers, or manufacturers.

Projects are funded in two parts. The local agency is eligible for 80 percent of the total approved project cost when initial results are submitted. The remaining 20 percent will be paid upon submission of a final report.

Apply for OPERA funding

To apply for OPERA funding or to hear more about the Local OPERA Program, please contact Mindy Carlson or Jim Grothaus with Minnesota LTAP, or visit us online at www.mnltap.umn.edu/opera.

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