National STIC Network Showcase
2023

Category:

Maintenance & Emergency Response

U.S. Department of Transportation
Federal Highway Administration

National STIC Network Showcase

The EDC-7 virtual summit, held in February 2023, included a platform for the State Transportation Innovation Councils (STICs) to showcase homegrown innovations that their members developed and implemented in their state. The purpose of this National STIC Network Showcase was to celebrate and share innovations with a wider audience to expand their potential use and impact. These innovations are saving lives, building sustainable infrastructure, growing an inclusive workforce, saving time, and making our transportation system more efficient. Over 100 innovations were shared by STIC members and are grouped into the following categories.

- Asset Management & Finance
- Maintenance & Emergency Response
- Operations
- Design & Construction
- Technology & Materials
- Planning & Environment
- Safety
- Pavement & Structures
- Civil Rights, Workforce, and Equity

This event also featured short presentations from State and local agencies on some of these homegrown innovations, which are also available on-demand.

Disclaimer

These presentations were created by non-FHWA organizations. The views expressed do not necessarily reflect the official policy of FHWA or the U.S. Department of Transportation (USDOT). The U.S. Government does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this National STIC Network Showcase only because they are considered essential to the objective of the National STIC Network Showcase. They are included for informational purposes only and are not intended to reflect a preference, approval, or endorsement of any one product or entity.

Contents:

NH: Pipe Measuring Tool

NH: Sidewalk Salt Hopper Filler

NJ: Bicycle-Friendly Resurfacing in Mercer County

NJ: Inlet Repair Trailer

NM: Innovations in Crash Investigation Technology

OH: Catch Basin Trailer

OH: Electric/Gas Utility Account Aggregation

OH: LED Highway Lighting Conversion

PA: Backhoe Folding Forks

PA: Fabricated Snow Plow

PA: The Grader Ice Blade

PA: Spreader Chute for Winter Operations

SC: Develop a DOT Specific UAS Simulator and Flight Proficiency Exam

SC: Strategic Deployment of Drone Technology and Software to Support SCDOT Operations

TX: Creating a Resilient Port System in Texas: Assessing and Mitigating Extreme Weather Events

TX: TranStarRoadway Flood Warning System Expansion

TX: Using Crowdsourced Data to Improve Emergency Response to Roadway Incidents in Dallas-Fort Worth (DFW)

UT: Aerial Images Used to Conduct Pavement Inspections

UT: Saddle Lift Tool Makes Sign RepairsSafer and Faster

WA: The Low Voltage Auto Start System: We'll leave the light on for you

WA: Spokane County Design and Fabrication of Grader Boots (Snow and Gravel)

Arizona DOT Crash Barrel Funnel

OVERVIEW OF INNOVATION

The creation of the Crash Barrel Funnel was a result of two incidences where a limited crew (3 people) needed to fill 24 crash barrels immediately. Various methods were employed which led to the creation of the funnel.

First Method – A one-ton pickup truck was pulled up to the crash barrels and sand was shoveled from the truck bed into the barrels. This method worked but was still very labor intensive.

Second Method – A skid steer was used to fill the barrels. While this saved the effort of shoveling, it created a mess in the area which resulted in a bigger cleanup job.

Third Method – A Crash Barrel Funnel was created. The funnel minimized the mess of using the skid steer to fill the barrels. Use of the funnel allowed the crew to fill 24 barrels in approximately 48 minutes.

Since the creation of the Crash Barrel Funnel, the team no longer sees filling crash barrels as a burden. Inspired to look for other ways to create efficiencies, the team also introduced a HydroVac machine which helps reuse sand from broken crash barrels and make site cleanup more efficient.

Source: Shawn Garcia

BENEFITS

Reduces work-related injuries

Fills barrels faster and with less mess

FIND OUT MORE . . .

Arizona DOT Video

Crash Barrel Funnel

Arizona DOT Central District Maintenance

Supervisor: Shawn Garcia- Sgarcia2@azdot.gov

Lead: Peter Verastegui- Pverastegui@azdot.gov

Lead: Chase Cannon- Ccannon@azdot.gov

Safety, Maintenance

Arizona DOT Guardrail Crab

OVERVIEW OF INNOVATION

The old way of repairing guardrail:

- All lifting and leveling of rails is done by hand
- A 25-ft W-Beam weighs approximately 185 lbs
  - When nesting on spillways, rails are doubled increasing weight to 370 lbs
- A minimum of 4 crew members are needed to hold rails 20-30 inches off the ground for 2-7 minutes.

The new way of repairing guardrail:

- The guardrail crab is a metal plate with a 1-ton floor jack bolted to the top and 4 fully-pivoting wheels with brakes bolted to the bottom
- Two 18-in guardrail bolts, each bent into a J shape, are welded to a plate attached to the top of the jack
- A second metal plate with U-clips is welded to the bolts to keep the guardrail from slipping off the crab
- Two crabs used in tandem can easily lift and support 25-ft lengths of W-Beam while they are being bolted to the guardrail posts.

Source: ADOT

BENEFITS

Reduced labor costs
- Fewer employees needed for each repair job
- Repairs are done faster, saving man hours

Increased safety for employees

Easy to make and handle

Inexpensive
- About $300 per unit to produce

FIND OUT MORE . . .

Arizona DOT Video

https://vimeo.com/768775532/bf9a9fbd4d

Arizona DOT

Thomas Threlkeld

Tthrelkeld@azdot.gov

Safety, Maintenance

Road Marking Templates: Reducing Time and Cost of Pavement Preservation Projects

OVERVIEW OF INNOVATION

Road markings typically have a lifespan of 10 years, but ADOT's pavement preservation cycles are every 3 to 4 years. When road markings are not protected during a pavement preservation project, additional time is needed to spray the oil by hand and refresh the markings. If the markings are covered in oil, the additional cost of installing new markings is incurred.

In order to maximize the lifespan of existing road markings, the road marking template was created. This template covers individual road markings so they are preserved when the spray truck passes. The template is removed by maintenance crews and transported around the spray truck to the next road marking.

Use of the road marking template has reduced project time and cost, resulting in more efficient project delivery.

Source: Joe Ferguson

BENEFITS

Cost Savings: Between $700 - $2000 per marking (depending on the marking protected). In multiple cases, this has led to a savings of over $20,000 per project.

Time Savings: Allowed completion of a 155 lane mile project in 16 hours

FIND OUT MORE . . .

Video Links:

Reverse Diamond Stencil-CI on Vimeo

https://www.youtube.com/watch?v=p5jBKu6E-3c

Mark Kilian

(623) 500-5187, mkilian@azdot.gov

Raymundo Baca

(602) 679-0072, rbaca3@azdot.gov

Pavement, Maintenance

Portable and Removable Traffic Control Trailer Module

AZ LTAP Local Technical Assistance Program

OVERVIEW OF INNOVATION

Every time a traffic closure was needed or requested, ADOT Mesa Maintenance Unit would either request a traffic control contractor or unit staff would have to load and offload a truck and trailer with all necessary traffic control devices. This involved collecting barricades, lights, and signs from separate locations within the maintenance yard. Additionally, the unit's traffic control trailer had no storage for type 1,2,3 barricades, legs, bases, and lights.

To improve this process, an all-in-one removable traffic control trailer module was designed and built. The module holds more than 150 barricades and includes a power unit, a control box for switches, lights for deploying devices at night, an arrow board to notify traffic, as well as lights inside the module work area. Mounting arms secured onto the trailer prevent the barricades from falling off and handles provide entry onto the module. Type 1 barricades and bases are stored on both sides of the module and type 2 barricades can be deployed from either side of the traffic control trailer.

Now when the Mesa Unit receives a request for a traffic closure, the traffic control trailer module is always prepped and ready to go!

Source: ADOT Mesa Maintenance Org #5480

BENEFITS

Portable: If the trailer is needed to haul equipment or material, the module can be easily removed
Cost Effective: Eliminates the cost of paying a contractor for closures
Versatile: Used for a variety of closures from lane closures for guardrail repair to shutting down a highway
Efficient: Reduces response time

FIND OUT MORE . . .

AZ LTAP Innovation Spotlight:
https://www.azltap.org/node/1041

ADOT Inside Lane (pg. 3):
https://azdot.gov.pdf

Jendayi Edmeade
AZLTAP
(602) 712-4047
JEdmeade@azdot.gov

Maintenance

Culvert Cleaner

OVERVIEW OF INNOVATION

The Washington County Department of Public Works had an issue with beavers setting up their dirt-filled homes inside culverts. This causes flooding that could impact the roadways. This also created a safety hazard for employees who had to risk getting bit by beavers, snakes, turtles and event leeches to enter the high waters to clear out the culverts.

The solution was a Culvert Cleaner, which was a long, steel tool that could ram inside a culvert with enough force to break up the packed dirt. The Cleaner was developed using scrap materials and Department employees (approximately 40 labor hours).

Source: Washington County Department of Public Works, New York

BENEFITS

- Effective method for clearing culverts quicker using less manpower
- Increases roadway safety from flooding during rain events. Eliminates congestion that may occur during a flood event.
- Improves safety for workers tasked with clearing culverts during a flood event.

FIND OUT MORE . . .

https://www.fhwa.dot.gov/clas/babm/babm_winners.aspx

Michael Newell

Washington County Department of Public Works, NY

518-746-2440

Mipanewell@gmail.com

Keywords: Culvert; Flooding; Roads; New York; Innovation

Extending Centerline Marking Life

OVERVIEW OF INNOVATION

Schweitzer Mountain Road in the Independent Highway District (IHD), Idaho gets anywhere from 100 to 300 inches of snow annually. Maintenance crews plow the road multiple times per day, which results in the scraping away of pavement markings. The reduction in visibility presented a safety hazard for drivers and for snowplow teams trying to get up and down the well-traveled route to the local ski area.

The Independent Highway District developed the Recessed Lane Indicator. The process involves making indentations or divots along the roadway's centerline using metal plates and then covering them with thermoplastic markings that can remain visible for up to 10 years.

Initial cost to implement innovation was $940 for materials and labor.

Source: Independent Highway District, Idaho

BENEFITS

- Increased safety for drivers
- Less spending for road maintenance

FIND OUT MORE . . .

https://www.fhwa.dot.gov/clas/pdfs/2021_mousetrap_entries_booklet.pdf

Julie Bishop

Independent Highway District

202-255-8121

ihdclerk@gmail.com

Keywords: Centerline Markings; Road Maintenance; Pavement; Divots; Snow; Safety

Guardrail Maintainer

OVERVIEW OF INNOVATION

Gravel, debris and vegetation build up around guardrails can be a hazard for drivers if drifted out onto the roadway. The Walsh County Highway Department in North Dakota, routinely clears around the guard rails especially before snowfall but the task could be dangerous for workers, being so close to the roadway and the task required a crew of at least four people, each with a shovel.

The Department's solution to save money, time and increase safety for the workers is the Guardrail Maintainer. The attachment tool was built using scrap materials costing the Department $65 plus 16 hours in labor to build using two employees.

The innovation easily scrapes away debris around the guardrails in less time, using less workers. A one-hour job now takes about 20 minutes using the maintainer.

Source: Walsh County Highway Department, North Dakota

BENEFITS

- Less manpower
- Less time to clear debris from around the guardrails
- Improved safety for drivers and highway workers

FIND OUT MORE . . .

https://www.fhwa.dot.gov/clas/babm/babm_winners.aspx

Stuart Swartz

Walsh County Highway Dept., ND

701-331-0088

shop3@polarcomm.com

Keywords: Guardrails; Roads; Innovation; North Dakota

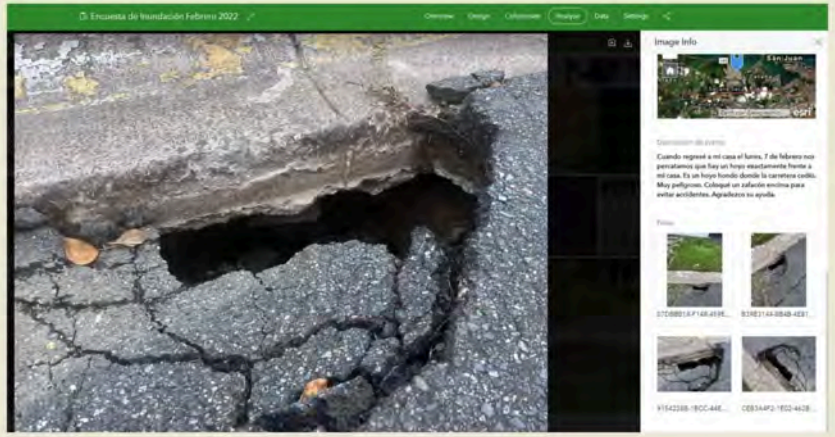
Public Survey Tool for Emergency Events

OVERVIEW OF INNOVATION

The Municipality of Autonomous Toa Baja in Puerto Rico faced a major rain event in early 2022 that caused flooding, landslides, sinkholes and damage to highways, roads, and bridges. Emergency workers needed improved, real-time data to properly respond to the needs of their communities.

The solution was a public survey tool available via social media and email where residents could report damages. This tool allowed them to pinpoint locations of the damage and upload photos. The information from the survey tool allowed emergency workers the ability to know what was happening in real time and then prioritize their response.

The Municipality developed the public survey tool using Survey 123 from ArcGIS. Annual cost for the license is $440.



Ejemplo de dato recolectado

Descripción del evento según ciudadano que subió la foto: *"Cuando regresé a mi casa el lunes, 7 de febrero nos percatamos que hay un hoyo exactamente frente a mi casa. Es un hoyo hondo donde la carretera cedió. Muy peligroso. Coloqué un zafacón encima para evitar accidentes. Agradezco su ayuda."*

Source: Puerto Rico LTAP

BENEFITS

- Increased volume of real time, more accurate data
- Quicker emergency response to more heavily damaged areas during an Event
- Improved communications with residents during emergency events

FIND OUT MORE . . .

https://www.fhwa.dot.gov/clas/babm/

Anilda Fernandez

Autonomous Municipality of Toa Baja, Puerto Rico

787-261-0202

afernandez@toabaja.com

Keywords: Emergency response; Build a Better Mousetrap; Survey123; Data

Unlocking Building Information Modeling (BIM) for Bridges with the BIM Execution Plan

OVERVIEW OF INNOVATION

Federal Highway Administration (FHWA) calls the BIM Execution Plan (BEP) "critical to the success of BIM for infrastructure implementation[1]"

To unlock BIM's powerful digital data structures and visualization capabilities, California Department of Transportation (Caltrans) identified the need for a BEP Template that would align its information modeling requirements and govern its information management. The Caltrans BEP Template is based on the ISO 19650 standard and has established a framework to apply a consistent approach to several different bridge types, while accelerating the organization's understanding of BIM for bridges in pilot projects.

Bridge Design is collaborating with Roadway Design, Construction, Maintenance, and other functional units to enable improvements in the way public bridges and structures in California are planned, designed, constructed, and maintained to benefit California taxpayers and stakeholders.

[1]Ref: Federal Highway Administration, Advancing BIM for Infrastructure: National Strategic Roadmap (Washington, DC: 2021) https://doi.org/10.21949/1521637. Page 23

Source: Caltrans BIM for Bridges & Structures Committee

BENEFITS

The BIM Execution Plan (BEP) Template sets-up an information management framework for BIM that is consistent with ISO 19650. An Assessment of 11 UK Case Studies[2] found that "the use of Information Management (IM) could potentially secure … $8.50 in direct cost savings for every $1 invested in IM."
Currently Caltrans is piloting the BEP in ten pilot projects.

[2]KPMG, The value of Information Management in the construction and infrastructure sector (UK: 2021) https://www.cdbb.cam.ac.uk/files/cdbb_econ_value_of_im_report.pdf. Page 5
Values are converted from GBP to USD

FIND OUT MORE . . .

Caltrans Innovation Expo Day 5: November 20, 2020. Unlocking BIM for Bridges & Structures: https://www.youtube.com/watch?v=2jxN4nMNQGE

"Developing a Strategic Roadmap for Caltrans implementation of Virtual Design/Construction/Civil Integrated Management" https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca20-3178-finalreport-a11y.pdf

Caltrans BIM for Bridges & Structures Technical Team

- Mina Pezeshpour
(909) 598-8103, mina.pezeshpour@dot.ca.gov
- Elias Kurani
(916) 227-8070, elias.kurani@dot.ca.gov
- Bin Shen
(909) 598-3219, bin.shen@dot.ca.gov
- Lynn Hiel
(916) 227-8219, lynn.hiel@dot.ca.gov
- Peyman Kaviani
(714) 702-4932, peyman.kaviani@dot.ca.gov

Design, Structures

District 11 Transportation Management Center: Hydrogen Fuel Cell Alternative Emergency Power Pilot for Traffic Signals during PSPS events

OVERVIEW OF INNOVATION

LEAD CLIMATE ACTION WHILE PROVIDING A RELIABLE TRANSPORTATION NETWORK

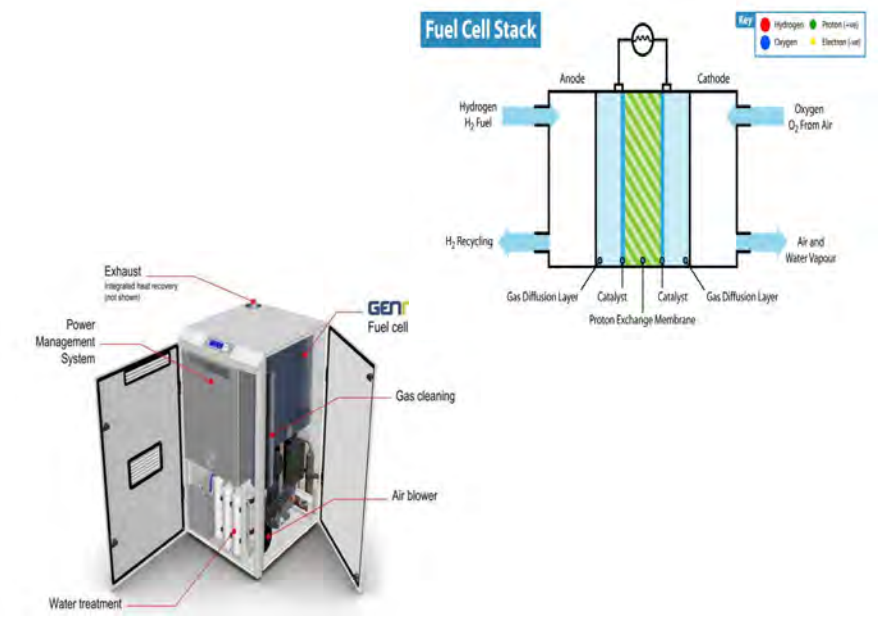
In response to severe weather, a Public Safety Power Shutoff (PSPS) are a preventative measure where regional power utilities may temporarily turn off power to specific areas to reduce the risk of fires caused by electric infrastructure. PSPS events could last from a few hours to several days.

Traditionally, Batteries and generators have been the popular choices for backup power for public services infrastructure such as traffic signals. However, batteries typically cannot provide long performance and require frequent replacement, while generators are noisy, bulky, maintenance intensive, and a product of dirty energy.

Hydrogen fuel cell technology requires less field maintenance than batteries and generators, lessening Caltrans personnel's field maintenance burdens during planned/ unplanned PSPS events.

Hydrogen fuel cell technology works like a battery, the major difference being the chemical material and electrolytic medium. The runtime of hydrogen fuel cell technology is dependent on the amount of hydrogen bottles stored at the field site, which will typically run up to 90 hours. It can have unlimited runtime with hydrogen refueling, provided that the inlet air filter is cleaned or replaced once a year or every 500 hours of operation.

Hydrogen fuel cell technology is the cleanest option compared to its counterparts: batteries and generators. It burns cleanly because it produces water vapor as its emission. It does not produce any carbon-based fuels or contributes to greenhouse gas emissions. It is a clean alternative that is also efficient.



https://www.altergy.com/

BENEFITS

- A major advantage of the hydrogen fuel cell is the zero-carbon emission.
- Hydrogen is 125 times more energy-dense compared to Lithium and there are no heavy metal hazardous waste to dispose at the end of life.

FIND OUT MORE . . .

2021 District 11 Innovation Fair

https://www.youtube.com/watch?v=OigDMS6pKqo

Altenery.com

https://www.altergy.com/wp-content/uploads/2020/08/2020_Altergy_Reformer_Data_sheet_2.pdf

DRISI- Public Safety Power Shutdown

Public Safety Power Shutdown – Hydrogen Fuel Cell Mitigation Pilot (ca.gov)

District 11 Transportation Management Center

Louie La Compte
Electrical Systems Support
Phone: (858) 467-3219
Email: louie.lacompte@dot.ca.gov

Mona Attallah, Supervisor Electrical Systems
Phone: (858) 467-3060
Email:' mona.attallah@dot.ca.gov

Sustainability, Operations, Environment, Technology, Emergency Response / Relief

DISTRICT 11
Wrong Way Driver Offramp Enhancement Package

OVERVIEW OF INNOVATION

District 11 took the lead for the wrong-way prevention pilot project initiated after a series of Wrong Way (WW) collisions in 2015 in the San Diego and Sacramento regions that had resulted in several fatalities.

This pilot focused on three areas of enhancement measures:

- Replace traditional one-way markers on exit ramps with red-clear retroreflective markers on lane & channelizing lines. Install red-yellow retroreflective markers along the left edge line and one-way red retroreflective markers along the sides of Type V (through) arrows. In addition, add dashed yellow extension lines to guide motorists to the entrance ramp when it is adjacent to an exit ramp.
- Place additional retroreflective markers on edge lines. With the left edge line, we decreased the spacing of the red-yellow retroreflective markers in the first 480' from the exit terminus. With the right edge line, we reduced the spacing of the one-way red retroreflective markers for 360' starting 120' from the exit terminus.
- Install Blinking LED bordered Wrong Way signs with a wrong way detection system or 24/7 operation.

The pilot project was successful and is currently part of the Caltrans standard wrong-way package at freeway exit ramps.

District 11

BENEFITS

- Red retroreflective pavement markers (backside) resulted in a 44% to 64% reduction in reported wrong way events.
- Blinking LED wrong way signs resulted in a 60% reduction in reported wrong way events

FIND OUT MORE . . .

Wrong Way Pilot Projects

Wrong Way Pilot Projects | Caltrans

District 11
Traffic Safety and Operations Division

May Alsheikh
Chief (Acting), Safety Program

Phone: (619) 688-6640
Email: may.z.alsheikh@dot.ca.gov

Safety, Operations, Design, Construction, Maintenance, Planning, Equity

Low-Clearance Bridge and Tunnel Clankers

OVERVIEW OF INNOVATION

In response to over 70 overheight vehicles striking the CSXT bridge along Casho Mill Road over the past decade, DelDOT implemented an overhead deterrent to alert drivers that the bridge is too low to safely pass under. A series of “clankers” were installed in conjunction with dynamic warning systems that include signage and flashing lights. The clankers, which have a devoted local following, are comprised of heavy-duty plastic suspended from steel mast arms that span the roadway. If struck, a vehicle is too tall to pass under the bridge prompting the driver to turn around.

Jokingly referred to as “Crasho Mill” and “Smasho Mill” by locals when conventional devices failed to prevent railroad bridge strikes, the new clankers provide a safe deterrent for overheight vehicles. **Materials used reduce the likelihood of flying projectiles injuring nearby pedestrians, bicyclists, properties, and infrastructure.**

Source: DelDOT

BENEFITS

The clankers were a short-term compromise with CSXT that allowed Casho Mill Road to remain open for residents, commuters, and emergency personnel. When a bridge/tunnel strike occurred in the past, police and public works personnel had to initiate the vehicle extraction process and then a 3 to 4-hour, high-priority structural evaluation needed to be performed via CSXT and DelDOT. There was also a traffic impact to a commuter route serving nearly 15,000 vehicles per day, plus the insurance costs and property damage to affected overheight vehicles/loads and the consequential personal injuries (about one-third of the reported strikes).

FIND OUT MORE . . .

MUTCD Part 1 Clankers Memo

Video evidence of the clankers effectiveness: This boat owner's "catch of the day" was realizing they would not fit under the Casho Mill Road bridge

Mark Luszcz
(302) 760-2356,
mark.luszcz@delaware.gov

Scott Neidert
(302) 659-4075,
scott.neidert@delaware.gov

Safety, Asset Management, Emergency Response / Relief

LED Luminary Glare Shield Improves Visibility for Motorists

OVERVIEW OF INNOVATION

William “Bill” McGhee, the FDOT District 5 Field Maintenance Manager, was presented with the Secretary’s Innovation & Efficiency Award for his display of innovation and commitment to safety. When a concern was identified regarding 149 LED luminaries creating glares for motorists on the U.S. 17-92 bridge over the St. John’s River in Debary, Florida, McGhee went to work and developed a solution. He designed 12 light shields out of sheet metal for the luminaries that light up the multi-use path along the bridge, improving visibility for motorists without sacrificing visibility for pedestrians or bicyclists. McGhee even dipped the shields in liquid rubber to remove any sharp edges to prevent possible injury.

Creating and installing these shields in-house are also a cost savings for FDOT. If the remaining 137 luminaries were contracted, the cost to the agency would be near $50,000.

BENEFITS

Safely light the multi-use path along the bridge, removing glare for motorists.

Near $50,000 savings to the Department by performing in-house.

FIND OUT MORE . . .

FDOT DeLand Operations

Christine Barone
(386) 740-3401,
Christine.barone@dot.state.fl.us

Rick Snow
(386) 740-3414,
Rick.snow@dot.state.fl.us

Luminaries, lighting, maintenance, environment, design, safety

eSTORM – an Innovative Emergency Management Device Operational Status Platform

OVERVIEW OF INNOVATION

The eSTORM web- and phone-based application collects, in one place, the necessary field data, device operational status, generator deployment, cabinet flooding, and downed structures events for ITS and traffic signals devices following a hurricane or thunderstorm. The application works offline, collecting information and pictures even if there is no cellular coverage. This data is uploaded automatically once internet service is available. Collected information is displayed in a dashboard for a quick real-time snapshot of the work that is done by the field staff. This allows for resource planning and allocation to expedite the recovery efforts.

The application, built on ArcGIS, was conceptualized in FDOT District 3 during Hurricane Sally in 2020 and converted into a statewide application in the 2021. Recently, the application was used during Hurricane Ian in September 2022.

The application has been pioneered in the State of Florida and has usability across the nation for any emergency management scenarios when the knowledge of device operational status is critical to safe and efficient traffic movement. The application is portable and scalable and can connect with arterial and freeway management software for a direct connection to extract operational status remotely.

BENEFITS

eSTORM allows FDOT to allocate its resources efficiently and expedite recovery efforts to make Florida roadways safe and traversable again.

FIND OUT MORE . . .

Website link:

eSTORM Article:

https://bit.ly/56934FL578

TIM Website:

www.fdot.gov/emergencymanagement

Contact Info:

Mariano Amicarelli, FDOT Central Office

Mariano.Amicarelli@dot.state.fl.us ; 850-510-5100

Amy DiRusso, FDOT District 3

Amy.dirusso@dot.state.fl.us; 850-330-1241

Hurricane, estorm, situational awareness, emergency management, GIS, planning, freight/goods movement, technology, asset management, emergency response/relief, operations

FDOT's eTRAC – an Innovative Technology Solution for Traffic Incident Management and Stakeholder Coordination

OVERVIEW OF INNOVATION

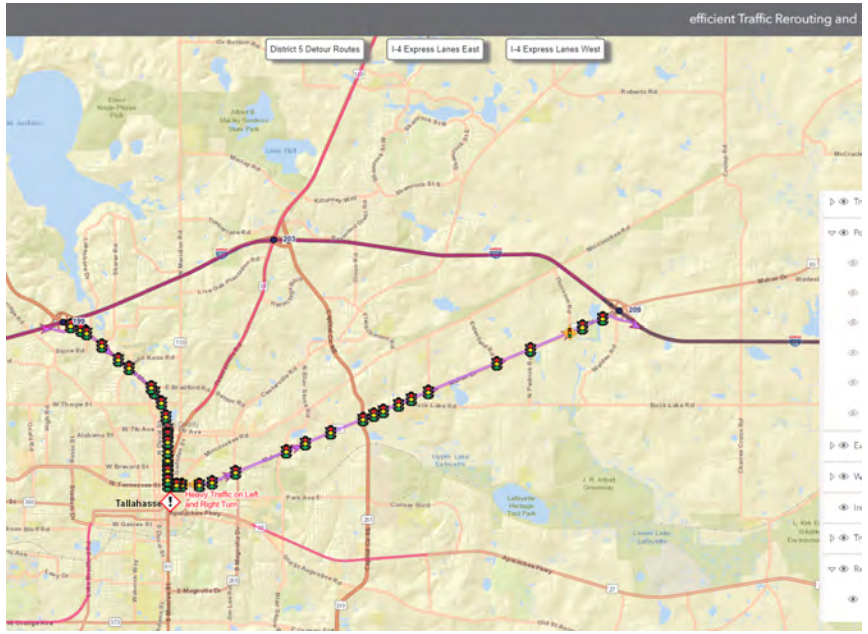
The eTRAC (efficient Traffic Rerouting and Agency Coordination) is a web-based application that allows Law Enforcement Agencies to auto-identify detour/diversion routes with all necessary information on their phones/laptops including – active construction, traffic signals with agency contact information, turn lane restrictions, railroad crossings, bridges, crossovers, rest areas, and live traffic data. This helps the agency save time and make an informed decision efficiently. For long-term detours, the solution also provides PDFs of temporary traffic control plans and resources needed.

Traffic incidents are a major cause of traffic congestion on the freeway system and every second counts to prevent secondary crashes and conform to the FDOT's Open Roads Policy. The policy requires the incident to clear within 90 minutes.

This solution was started by FDOT District 3 and is now being adopted statewide to carry out integrated corridor management services and post information on FL511 and third-party applications such as Google and Waze.

The picture of the web-based application shows a selected detour route between two sets of exits. If there is more than one route available, longer detour routes can be selected. Therefore, depending on the congestion, traffic could be diverted to the alternate route. The application has several different layers and points of interest along the detour routes to aid in decision-making.

The application is easily portable and scalable for any state in the country.



Source: FDOT eTRAC

BENEFITS

The benefits of using eTRAC includes congestion reduction, incident clearance, time savings in opening the detour route(s), efficient agency coordination, and informed decision-making. The application provides a platform for integrated corridor management and improved agency coordination.

FIND OUT MORE . . .

Website link:

eTRAC website:

https://etrac.fdot.gov/

Florida TIM Website:

www.FloridaTIM.com

Contact Info:

Amy DiRusso, FDOT District 3

Amy.dirusso@dot.state.fl.us

850-330-1241

Traffic incident management, TIM, etrac, integrated corridor management, ICM, technology, operations, freight/goods movement, emergency response/relief

Barricade Trailer

OVERVIEW OF INNOVATION

A smarter trailer design makes placing, removing, and transporting traffic safety equipment and accessories safer and more efficient.

When barricades, cones, sandbags, and other traffic safety equipment are needed, quick and efficient placement is critical. Not only do these devices protect drivers by alerting them to potential hazards in the roadway, but extended exposure to traffic can put workers and all road users at greater risk.

Cherokee County's previous transport system carried barricades upside-down, requiring two workers to physically flip the devices to place them on the roadway. Space for other necessities, such as barricade legs, fence posts, and signs, was also limited and increased the amount of time and trips required to complete the work.

To make the process faster and more efficient, agency staff designed and built a trailer with a better configuration. The trailer transports barricades upright, making it less strenuous for workers to load and unload. It can also accommodate more of the other essentials that are often needed at a site, including fencing, posts, cones, and approximately 80 filled sandbags.

Source: Cherokee County Secondary Roads

BENEFITS

This trailer design is more efficient, decreasing the amount of time required to place or removed traffic safety equipment. This reduces workers' exposure to traffic and ensures the traveling public are alerted to roadway hazards more quickly.

The new design also accommodates more equipment, reducing the amount of time required to set up or remove a closure.

FIND OUT MORE . . .

Innovation Video
https://youtu.be/COUva7i10QE

Cherokee County Secondary Roads Website
https://www.cherokeecounty.iowa.gov/departments/offices_a_-_e/engineer/index.php

Iowa Local Technical Assistance Program
https://iowaltap.iastate.edu/

Cherokee County Secondary Roads

Kelly Puhrmann
712-225-6712,
kpuhrmann@co.Cherokee.ia.us

Safety, Construction, Maintenance, Emergency Response, Emergency Relief

Cold-Mix Placer

OVERVIEW OF INNOVATION

Filling pavement cracks and potholes is faster, easier, and more precise with a portable hopper.

Traditional methods for filling pavement potholes and other deteriorated areas of pavement have required maintenance crews to shovel the cold-mix asphalt into place by hand or rely on dump trucks that often deposit too much material or miss the target.

To ensure the right amount of cold-mix asphalt is placed exactly where it's needed on the road, workers developed a portable device that can quickly be installed onto the bed of a standard maintenance vehicle. Designed to accommodate the width of a loader bucket and hold 2,000 pounds of material, the unit also includes a hydraulic power unit and an auger that simultaneously grinds larger aggregates for a more uniform fill and places the material with precision.

The unit was produced in 25 hours using locally purchased materials and components for approximately $7,250.

Source: Jones County Secondary Roads

BENEFITS

This innovation places cold mix where it's needed, allowing maintenance workers to fill potholes more quickly and efficiently with less material waste.

The automated process is faster, less physically demanding and more cost-effective because less material is wasted at each site.

FIND OUT MORE . . .

Innovation Video
https://www.dropbox.com/sh/l7kowljf353sg4f/AABRCltADaFw7NfDnKdyk5Lka?dl=0

Jones County Secondary Roads Website
https://www.jonescountyiowa.gov/secondary_roads/

Iowa Local Technical Assistance Program
https://iowaltap.iastate.edu/

Jones County Secondary Roads

Todd Postel
319-462-3785,
todd.postel@jonescountyiowa.gov

Maintenance, Materials

Flood Resiliency Analysis Tool

OVERVIEW OF INNOVATION

A methodological framework helps Iowa DOT identify the roads most vulnerable to extreme flood events and prioritize the state's investments.

As severe floods in Iowa become more frequent, catastrophic, and costly, understanding the risks to the state's infrastructure and preparing for changing conditions can make a big difference in how quickly the state recovers from potential disruptions.

In 2021, the Iowa DOT asked its Resiliency Working Group to develop a flood resiliency methodology that could be integrated into the agency's decision-making process and long-range planning activities. The group conducted a review of the state's primary highway system, identifying the corridors at greatest risk of extreme flooding and developing a methodology to objectively determine where mitigation efforts and investments would be most beneficial.

By considering seven weighted factors, Iowa DOT engineers can give each of the state's key highway segments a composite score up to 100. The higher the score, the greater the corridor's resiliency in the event of a 100-year flood.

Source: Iowa DOT

BENEFITS

Understanding the risks to the state's highways can help Iowa DOT plan for and invest in appropriate mitigation measures that minimize transportation-related disruptions in the event of a severe flood.

The metrics and framework used in Iowa's resiliency analysis tool can be easily replicated or adapted by other transportation agencies.

FIND OUT MORE . . .

Iowa DOT Resiliency Working Group
https://iowadot.gov/sustainabilityandresiliency/Up-Close-Resiliency-Working-Group#53947672-i-classfa-fa-map-aria-hiddentruei-our-strategies

Iowa DOT Resiliency Working Group

Craig Markley
515-239-1027, Craig.Markley@iowadot.us

Samuel Sturtz
515-239-1788, Samuel.Sturtz@iowadot.us

Planning, Structures, Asset Management, Emergency Response, Emergency Relief, Stormwater Management

Shop Clean-Up Squeegee

OVERVIEW OF INNOVATION

A skid-steer attachment constructed with repurposed materials helps maintenance shop workers wash floors in less time.

Keeping a transportation agency's plows, trucks, and other vehicles in good working condition can be messy as these equipment often leave behind mud, deicing chemicals, and debris on a maintenance shop's floor. Routinely cleaning the shop is important for keeping surfaces clear and workers safe, but washing the entire floor with traditional tools can take hours and considerably strain a small agency's staff resources.

To get the job done in less time, workers in Iowa's Madison County Secondary Roads maintenance shop created a custom attachment for a standard skid-steer. Made with materials found in the shop, including steel components and machinery belting, the attachment serves as a large squeegee that can be quickly installed to clean the entire shop in just 15 minutes.

The attachment, including labor and materials, cost less than $500 to make.

Source: Madison County Secondary Roads

BENEFITS

This skid-steer attachment works like a giant squeegee to clear dirt and potentially hazardous materials from a concrete floor.

Cleaning the maintenance shop's floor had been a two-hour manual cleaning task but can now be done in 15 minutes. This innovation allows for more efficient allocation of staff resources and a safer and healthier work environment.

FIND OUT MORE . . .

Madison County Secondary Roads Website
https://madisoncounty.iowa.gov/offices/engineer-secondary-roads/

Iowa Local Technical Assistance Program
https://iowaltap.iastate.edu/

Madison County Secondary Roads

Joe Wood
515-462-1136,
jwood@madisoncounty.iowa.gov

Safety, Maintenance

Salt/Sand Spreader Lifting Jig

OVERVIEW OF INNOVATION

A custom-made lifting device reduces the risk of injury for maintenance shop workers.

Before a salt or sand spreader—also known as a sander—can be serviced or repaired, it must first be removed from its place in the bed of the dump truck. Traditionally this has been a physically demanding task, requiring a maintenance staff member to climb over the side of the truck and into the sander to attach a chain to each of the four corners before the sander can be hydraulically pulled out.

Using materials found in the weld shop, mechanics in Linn County, Iowa designed and constructed a steel lifting jig that can be attached to the spreader from the outside of the truck. This lifter increases safety by eliminating the need for a worker to climb into the sander and risk potential injury.

The lifting jig is also cost-effective – it was made for less than $300 but is expected to perform well for years thanks to its steel components.

Source: Linn County Secondary Roads

BENEFITS

By eliminating the need for an employee to climb inside the sander to prepare it for lifting, this innovation significantly increases worker safety and efficiency.

FIND OUT MORE . . .

Innovation Video
https://drive.google.com/file/d/1J1BAbrltEt0DR2gazg1LsPz9TQLOc3sU/view?usp=sharing

Linn County Secondary Roads Website
https://www.cherokeecounty.iowa.gov/departments/offices_a_-_e/engineer/index.php

Iowa Local Technical Assistance Program
https://iowaltap.iastate.edu/

Linn County Secondary Roads

Thad Alexander
515-294-8817,
thad.alexander@linncountyiowa.gov

Safety, Maintenance

Tailgate Mounted Spreader Box

OVERVIEW OF INNOVATION

A custom-built chute mounted to the rear of a box spreader makes applying replacement gravel to rutted highway shoulders easier, safer, and more cost-effective.

Replacing aggregates and smoothing highway shoulders is routine work for Iowa's highway maintenance crews. The job has typically required multiple vehicles in tandem: one dedicated to depositing the rock, another close behind to spread and grade the material in place and a third to sweep the pavement. The process can be slow-moving and labor-intensive.

A box spreader modified with a tailgate chute places a consistent quantity of aggregate in a targeted location along a road's shoulder without the need for a separate motor grader and broom. As a result, ruts can be filled in a single pass to save time and money and increase safety for workers and travelers alike.

Each tailgate spreader box costs $310 in materials and can be installed in 30 minutes.

Source: Washington County Secondary Roads Department

BENEFITS

This innovation makes it possible for one person to perform a task that had previously required multiple people and a variety of equipment to accomplish.

The spreaders directly apply a consistent amount of gravel to the shoulder, ensuring ruts can be addressed in a single pass.

Filling ruts quickly saves time and labor costs and improves safety by reducing workers' exposure to traffic.

FIND OUT MORE . . .

Washington County Road Maintenance
https://washingtoncounty.iowa.gov/184/Road-Maintenance

Washington County Secondary Roads Department

Jacob Thorius
319-653-7731,
Engineer@co.washington.ia.us

Maintenance, Safety, Asset Management

Federal Grant Notification Newsletter

OVERVIEW OF INNOVATION

Every day, there are hundreds of federal grant opportunities that become available through grants.gov and other websites. It can be difficult and time-consuming for ITD employees to keep track of all the available grant opportunities.

To address this issue, ITD employees created a weekly newsletter that outlines information on currently available federal grant opportunities. For each available grant, the newsletter outlines who is eligible for the grant, the grant's deadline, the grant's amount, and where to find additional information on the grant.

The Federal Grant Notification Newsletter is sent to over 150 employees across ITD on a weekly basis and has helped increase awareness and access to potential funding opportunities from federal grants.

Source: The Idaho Transportation Department

BENEFITS

By compiling all information on Federal Grants into one newsletter, ITD is able to increase awareness and access to potential funding opportunities from federal grants.

FIND OUT MORE . . .

[Grant Newsletter 9.14.22]

[Grant Newsletter 9.21.22]

[Grant Newsletter 9.27.22]

Sonna Lynn Fernandez
(208) 334-8209,
sonnalynn.fernandez@itd.idaho.gov

Scott Luekenga
(208) 334-8057,
scott.luekenga@itd.idaho.gov

Grants, Notification, Newsletter, Funding, Information

Mobile Eyewash Station Attachable to Striping Trucks

OVERVIEW OF INNOVATION

After witnessing a pavement-marking contractor get splashed in the face with striping paint, three ITD employees decided to take it upon themselves to engineer a mobile eye washing station that is mountable to existing striping trucks.

Prior to this innovation, contractors would splash water in their face to wash off paint. Aside from sanitation concerns, water was not always available to contractors to use.

This innovation addressed both of those issues by being mountable to existing striping trucks. Furthermore, to reduce the eye washing station's install time, the station utilizes the water supply and pump already onboard the striping trucks.

Source: The Idaho Transportation Department

BENEFITS

The primary benefit of this innovation is increased access to critical safety equipment used to wash potentially harmful substances out of worker's eyes.

FIND OUT MORE . . .

N/A

Preston Elliott
(208) 781-5225,
preston.elliott@itd.idaho.gov

Tyler Carrico
(208) 556-2711,
tyler.carrico@itd.idaho.gov

Noah Hoven
(208) 744-1276,
noah.hoven@itd.idaho.gov

Safety, Eyewash, Striping, Trucks

Snowplow Latch Extension

Illinois Department of Transportation

OVERVIEW OF INNOVATION

When a salt load freezes, it can be difficult to open tailgates secured by chains to remove the salt. This is a dangerous inconvenience that causes unwanted downtime and potential injury to staff. A frozen salt load puts tremendous pressure on the tailgate, and getting it open often requires more than one maintainer using hammers and prybars to release the chains. What's more, this happens most when the weather is at its worst and trucks should be out on the road clearing snow.

New tailgate latch extensions alleviate the potential downtime and injury risk posed by frozen salt loads. The extensions allow the tailgate to be locked in the partially open position using the truck's normal tailgate latches with chains set loosely as backup only. The extensions make it much easier to unload frozen salt, because there is no longer pressure on the tailgate chains. Now, instead of having to beat chains loose because they are under immense pressure from the frozen salt load, the operator can simply trip the tailgate latch and release the frozen load from the bed of the truck.

Illinois Department of Transportation

BENEFITS

Tailgate latch extensions enable a single person to release frozen loads safely, quickly and easily. Carthage Team Section created plans to enable others to replicate the latch extensions for use throughout the state. The extensions can be made easily and at minimal cost.

FIND OUT MORE . . .

Illinois Department of Transportation

Daren Moore
(217) 357-3323, Daren.Moore@illinois.gov

Keywords – snowplow, tailgate release, salt spreading

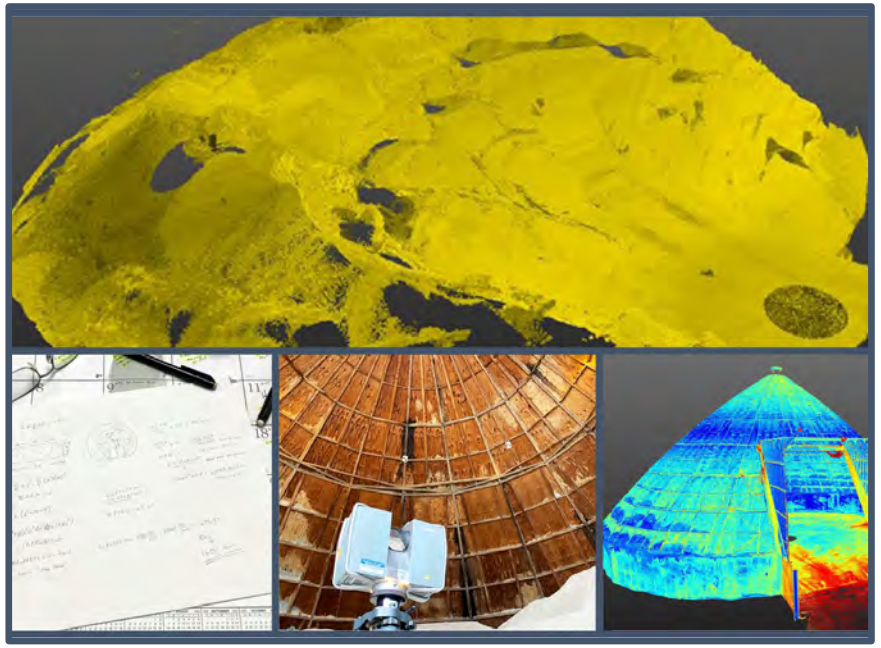
Salt Scan

Illinois Department of Transportation

OVERVIEW OF INNOVATION

Accurately measuring salt in a salt dome has traditionally involved climbing the salt pile to measure dimensions. This process typically involves a lot of estimation, which prevents accurate measuring. Volume is then figured by hand with the help of a calculator.

A new process was developed using 3-D scanning technology to more accurately measure the volume of salt using the district survey crew's existing software and equipment. First, the empty dome is outfitted with survey "targets" and scanned to provide baseline measurements. Next, salt piles are scanned. The data collected via scanning is then downloaded to Trimble Realworks software to determine salt pile volume. This method has been used successfully for salt domes in LaSalle, Princeton, Langley and Ottawa.



Illinois Department of Transportation

BENEFITS

Previous methods involved estimation and extensive calculations. The new scanning process provides accurate volumes and reduces the potential of injury by eliminating the need to climb on piles to retrieve measurements.

FIND OUT MORE . . .

Illinois Department of Transportation

David W. Rennels
(815) 224-1800, David.Rennels@illinois.gov

Keywords – 3-D scan, salt measurement

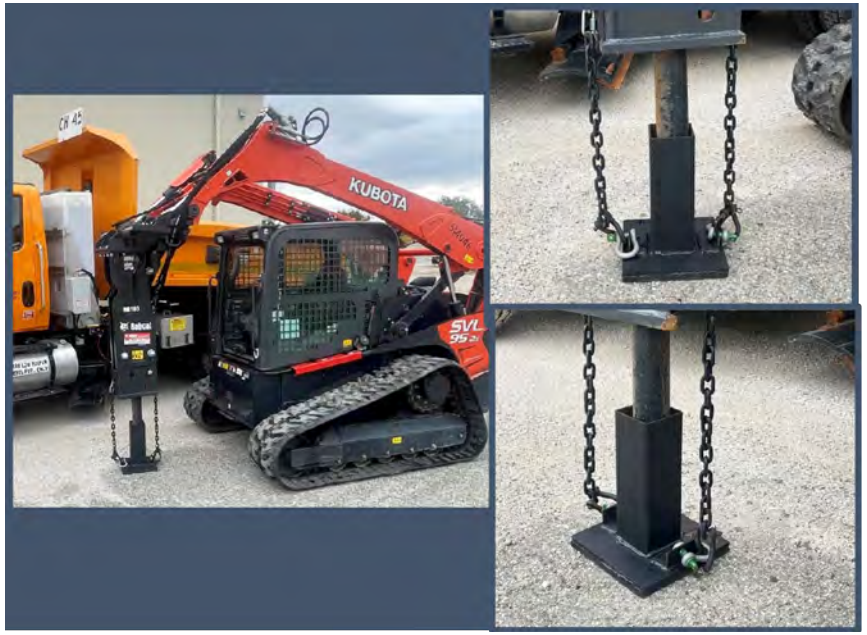
Tamp Plate

Illinois Department of Transportation

OVERVIEW OF INNOVATION

After disturbing road underlayment for a full-depth patch, achieving optimal compaction may be difficult. The width of the patch is often too narrow to allow the rolling compactor to be useful, and jumping jack tamps provide just 325 foot-pounds of force, making them less than ideal for the job at hand. When compaction is insufficient, the patch may sink and require further repairs.

A new tamp was developed that freely and safely attaches to the end of the skid steer breaker, transforming it into a 12-inch by 12-inch plate compactor. Harnessing up to 1,500 foot-pounds of force, the tamp plate was created by combining two plates with nuts, bolts, welded D rings, chains and a locking chain link. With the chains cut to length and connected via the locking link, the compactor safely attaches to the machine and moves up and down without restriction. The breaker tip compresses as if it were going through concrete, but the plate absorbs the force and distributes it evenly to the ground, causing more than enough compaction to ensure proper ground preparation for repairs.



Illinois Department of Transportation

BENEFITS

The compaction provided by the new tamp plate improves performance of a patch. The tamp plate quickly and easily attaches to the skid steer through chains with locking links. Building the tamp plate takes less than one day and can be easily replicated by other yards with minimal expense.

FIND OUT MORE . . .

Illinois Department of Transportation

Zachary A. Miller
(309) 728-2646, Zachary.Miller@illinois.gov

Keywords – tamp plate, patching, compaction

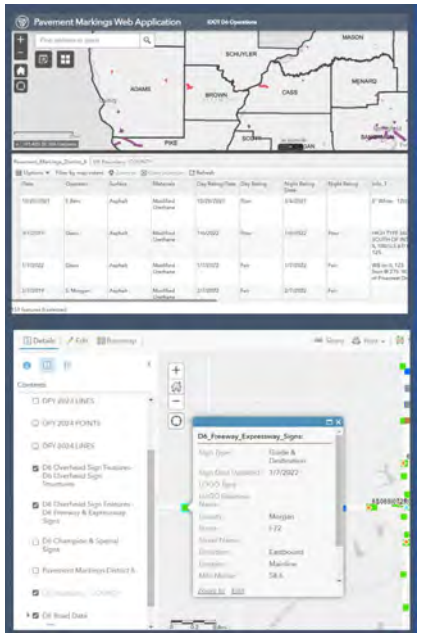
Tracking and Programming Maps

Illinois Department of Transportation

OVERVIEW OF INNOVATION

Decisions regarding when or where high-type pavement marking required restriping relied on past plan sets and technician memory, while hard-copy binders were used to track interstate, overhead, championship and special town name signs. Neither of these systems was reliable or efficient, and pavement markings became unnecessarily deficient throughout the district as a result.

A new system was developed using GIS technology to create a complete inventory of all high-type pavement markings maintained throughout the district, along with an up-to-date evaluation of each. The inventory can be easily filtered to provide a list of all road sections in need of restriping throughout the district. The system also provides a mapped inventory of all interstate and specialty signs, allowing for mobile access while decreasing time and manpower used to approve installation and repairs.



Illinois Department of Transportation

BENEFITS

The new system uses GIS to show striping sections throughout the district. Colors are used to indicate striping conditions. Sign information is filterable by type of sign, and colors and shapes indicate specifics of sign build and purpose. System information is clear, concise and readily accessible.

FIND OUT MORE . . .

Illinois Department of Transportation

Jason R. Jones
(217) 785-5306, Jason.R.Jones@illinois.gov

Keywords – pavement marking, asset inventory, asset mapping

Development of a Rural Primary Road System (RPRS)

OVERVIEW OF INNOVATION

THE PROBLEM:

The disparity between identified capital improvement needs and available financial resources was and is a significant issue. Transportation infrastructure was stretching a limited budget beyond its capacity to do most things well. Due to changes in the agriculture industry, many of our structures had become obsolete. We needed to document a method to prioritize expenditures.

THE SOLUTION:

"We developed a road system inside the current system called the Rural Primary Road System that identified areas of high traffic and agricultural use to focus available funding. Road upgrades are based primarily on traffic volumes and correlations between maintainability and soil conditions. "

SALINE COUNTY
ESTABLISHED 1860

BENEFITS

The identified Rural Primary Roads will receive higher priority when it comes to investing the County's limited available funds to upgrade road surfaces and drainage structures and repair/rehabilitate/replace facilities and still allow adequate access to property.

FIND OUT MORE . . .

KUTC BABM Winner, YouTube
https://www.youtube.com/watch?v=ObIh8zV9tHk

KUTC 2022 Autumn LTAP Newsletter

https://kutc.ku.edu/sites/kutc/files/documents/2022%20Autumn%20LTAP%20Newsletter.pdf

Saline County Road & Bridge

Darren Fishel
(785) 826-6327, Darren.fishel@saline.org

Planning, Maintenance, Asset Management, Finance/Funding

Angled Plow Blade Holder

OVERVIEW OF INNOVATION

One day during a storm Levi Violette found himself alone in need of changing a plow blade so developed this nifty holder.

This 30” long, angled U-shaped steel holder mounted on a used plow pin fits into the hole in a 3-ton floor jack if the cover is removable. The back angle is designed to align a Polar Flex plow blade to match the dustpan angle. This holder enables the installer to wheel the blade to the dustpan, adjust the height as necessary, align the holes and have the jack hold the weight while bolts or pins are inserted.

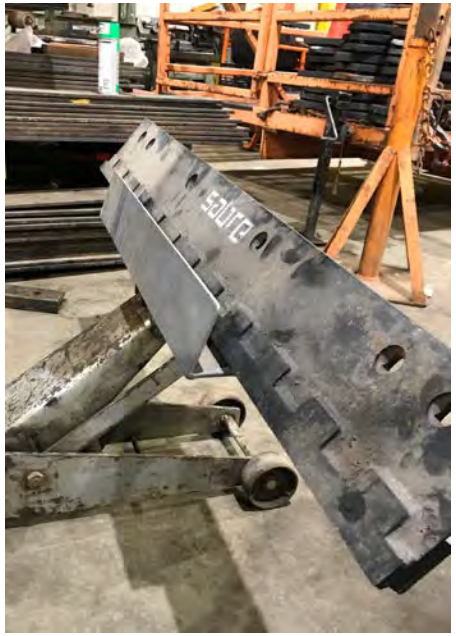


Photo by MaineDOT

BENEFITS

Saves both lifting and finger pinching injuries. Enables one person to install a plow blade alone if necessary.

FIND OUT MORE . . .

Engineered plan to replicate on MaineDOT Sharepoint site. Contact MaineDOTInnovates@maine.gov for access credentials to view or have file e-mailed.

Levi Violette

Region 2 Mechanic

207-441-4640

levi.violette@maine.gov

Maintenance, Safety

Asphalt Smoothing Rake

OVERVIEW OF INNOVATION

The Athens crew fashioned this asphalt smoothing rake out of used plow blades bolted together. It connects to the sides of an excavator bucket and does a great job smoothing asphalt over jobs like culvert replacements with 16-20’ openings. Two people can lift the rake onto a truck for transport to the job site.

The crew notes that the brackets should be installed at the width to match the excavator bucket to which it will be attached. Also, chains could be added to the bracket sides for stability if the rake were to be used for back-dragging material.

Photo by MaineDOT

BENEFITS

This tool utilizes repurposed plow blades to make fast and painless work of smoothing asphalt compared with raking by hand.

FIND OUT MORE . . .

Gary Ritter

Athens Crew Supervisor

207-592-2245

gary.a.ritter@maine.gov

Maintenance, Construction, Safety

Culvert Banding Tool

OVERVIEW OF INNOVATION

This banding tool is designed to join culvert collars when the coupler bolts are too short to reach. This tool saves time over the traditional method of winding nuts on threaded rod to reach the coupler bolts. Multiple tools recommended for easiest banding.

Photo by MaineDOT

BENEFITS

This tool makes fast work of banding two culvert sections together in the field, saving both time and physical muscling of sections to join.

FIND OUT MORE . . .

Measurement drawing and additional photos available to facilitate replication. Contact MaineDOTInnovates@maine.gov.

Robert Wellington

Oakfield Crew Supervisor

207-757-8390

robert.wellington@maine.gov

Maintenance, Construction

Cutting Edge Blade Holder

OVERVIEW OF INNOVATION

This simple but elegant 14” long holder mounted on a used plow pin fits into the hole of floor jacks with removable plates.

The holder securely supports up to a 4-foot plow blade or cutting edge enabling the installer to wheel the edge or blade to the bucket or dustpan, adjust the height as necessary, and have the jack hold the weight while bolts or pins are inserted.

Photo by MaineDOT

BENEFITS

Saves both lifting and finger pinching injuries.

FIND OUT MORE . . .

Engineered plan to replicate on MaineDOT Sharepoint site. Contact MaineDOTInnovates@maine.gov for access credentials to view or have file emailed.

Ray Holman

Region 1 Mechanic, Topsham

207-215-4679

raymond.d.holman@maine.gov

Maintenance, Safety

Harris Inspection Tool (aka HIT Rod)

OVERVIEW OF INNOVATION

MaineDOT Bridge Inspection team leaders and twin brothers Scott and Steve Harris have invented a variation of a selfie stick to enable a phone camera to visually inspect bridge elements that otherwise would require expensive equipment and often traffic control.

The telescoping HIT Rod consists of a 20' telescoping pole with an attached adjustable phone cradle on top. The iPhone's camera is remotely controlled by an Apple watch. MaineDOT Inspection Teams use iPhones and Apple watches, but other phone brands and compatible pairings may work.

The iPhone's camera is activated from the Apple watch via Bluetooth and the preview is actively cloned to the watch display. The iPhone is then moved into position via the HIT rod and the iPhone's picture is snapped remotely from a button on the watch. The Apple watch can also remotely adjust the iPhone Zoom, Flash, Timer, and other functions.

All MaineDOT Team Leaders are issued iPhones by MaineDOT. The additional cost of the HIT Rod for each inspection team is approximately $800 – the cost of the Apple watch, telescoping pole and phone holder.

The HIT Rod is only used in areas where visual inspections are deemed appropriate by MaineDOT. The use of the HIT Rod often identifies areas requiring advanced inspection techniques.

Photo by MaineDOT

BENEFITS

Up to $5000/inspection is saved by using the HIT Rod rather than paying for heavy equipment and/or traffic control. Few innovations have this strong a return on investment.

FIND OUT MORE . . .

Demonstration video is posted on MaineDOT Sharepoint site. Contact MaineDOTInnovates@maine.gov for access credentials to view.

Steve Harris

Bridge Inspection Team Leader

steve.harris@maine.gov

Maintenance, Technology, Safety, Structures

Push Arm Stand

OVERVIEW OF INNOVATION

This stand made of used plow blades holds push arms off the floor when detached from trucks, both during the winter and for summer storage. The crew in Eddington made these years ago.

They have recently been discovered by MaineDOT Innovates and a new design with wheels to make them easier to move is under development at the MaineDOT Fab Shop.

Engineered plans for either design are available for replication.

Photo by MaineDOT

BENEFITS

The stand reduces the repeated lifting of arms when mounting and dismounting, keeps the arms off the floor to reduce tripping hazard, and protects the connecting pins.

FIND OUT MORE . . .

Engineered plans to replicate available. Contact MaineDOTInnovates@maine.gov to have file e-mailed.

Jim Harper

Eddington Crew Supervisor

207-592-1458

jim.harper@maine.gov

Maintenance, Safety

Disaster Fiscal Recovery Playbook

County Road Association OF MICHIGAN

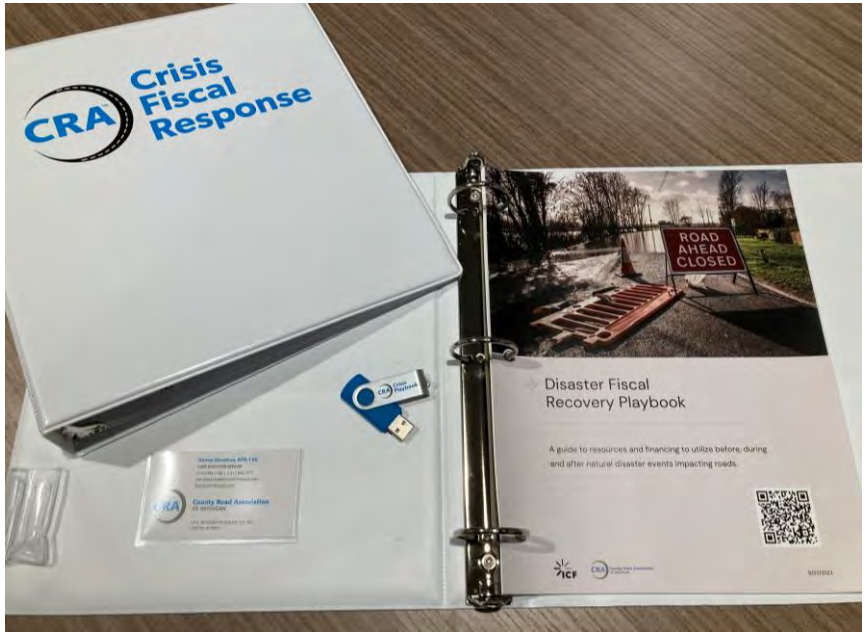
OVERVIEW OF INNOVATION

The County Road Association (CRA) of Michigan's ***Disaster Fiscal Recovery Playbook*** was developed to assist Michigan county road agencies before, during and after natural disaster events to ensure they can receive all available state and federal funding sources to recover from disaster events.

The *Playbook* provides recommended actions and templates for use at every stage of a natural disaster event, including:

- Details on five funding sources, when they're available and how to apply for them;
- Policies to adopt prior to a disaster (now) to enable road agencies to best capture funds and spend most efficiently; and
- Financial templates for documenting site-by-site costs to submit for reimbursement.

The *Playbook* was funded by a Michigan State Transportation Innovation Council grant applied for in collaboration with the Gladwin County Road Commission.



Source: CRA

BENEFITS

CRA's *Disaster Fiscal Recovery Playbook* and accompanying videos benefit county road agencies by providing tools to assist in preparedness, response and fiscal recovery after a natural disaster on county roads. County road agencies received training on fiscal recovery guidelines, and media training to build support for legislative funding.

FIND OUT MORE . . .

micountyroads.org

micountyroads.org/DisasterPlaybook

Contact info:

***D. Donohue**, CEO*
ddonohue@micountyroads.org

***S. Puuri**, PE, Engineering Specialist*
spuuri@micountyroads.org

Keywords: Disaster playbook, disaster management on roads, crisis management, fiscal recovery, natural disasters on local roads

Barrier Saddle

OVERVIEW OF INNOVATION

Years ago, the median of I-70 was closed in. Grated inlets in the median had Type C Concrete Median Barrier slip formed over them. A cut-out in the concrete was made to allow water to drain into the inlets, but it was impossible for maintenance to remove the grate to clean out the inlet with a suck/vac truck. Over time, the inlets became plugged with debris and resulted in standing water on the inside shoulder and fast lane. The Barrier Gap Protection Assembly (BGPA aka Barrier Saddle) allows a four feet section of concrete median barrier to be removed to allow access to routinely, effectively and safely clean out the inlets. The gap in the concrete barrier is permanently protected by the Barrier Gap Protection Assembly which can be unbolted, section by section, to gain full access to remove the grate and clean the inlet. The total cost of materials was $10,465 with zero recurring reoccurring costs.

Source: Missouri Department of Transportation

BENEFITS

Plugged inlets cause standing water in the shoulder and fast lane. By having access to clean out the inlets, allows the maintenance crews to clean the inlets quickly and safely. In one shift, the barrier saddle can be disassembled, the grate removed, the inlet cleaned, and everything reassembled.

FIND OUT MORE . . .

Missouri Department of Transportation Innovations Showcase

BarrierSaddle_SL.pdf (modot.org)

Niall Jansson, MoDOT Resident Engineer

Matthew.Jansson@modot.mo.gov

(314) 275-1525

Safety, Median, Maintenance, Pavement

Tractor Halo

OVERVIEW OF INNOVATION

The halo for a cab tractor is a barrier that surrounds the top of the cab and was built to protect the glass, fiberglass body and lines of the tractor from being damaged by overhanging limbs. The halo also protects the operator from flying debris caused by branches breaking through the cab glass. The halo sweeps low lying limbs up and over the cab protecting the lights and glass. The halo can be custom sized depending on the tractor model and implemented on any tractor that has a secure attachment point to the existing rollover protection system.

Existing metal at the district maintenance shed was used to fabricate the halo so the cost was minimal.

Source: Missouri Department of Transportation

BENEFITS

The Tractor Halo has saved MoDOT money due to fewer costs related to replacement of expensive glass, lights and cab parts. The halo provides safety to the operator during mowing operations, which reduces injuries and related costs.

FIND OUT MORE . . .

Missouri Department of Transportation Innovations Showcase

50: Tractor Halo | Missouri Department of Transportation (modot.org)

Tom Bishop, MoDOT Senior Maintenance Worker

Thomas.Bishop@modot.mo.gov

(573) 689-2321

Safety, Savings, Maintenance, Operations, Mowing

Wing Camera

OVERVIEW OF INNOVATION

When a wing plow is attached to a snowplow in the up position, it is impossible see out the passenger window while plowing or when pulling out of an intersection. This requires lowering and raising the wing every time or continuously driving with it down. Both of which could inadvertently damage a car, sign, mailbox, or anything along the roadway. With a backup camera mounted to the top of the passenger side mirror, you can see over the front mounted wing plow, making it easier to see cars or other obstructions while plowing.

Source: Missouri Department of Transportation

BENEFITS

Drivers can now use the camera to see over the wing in places they could not see before. This keeps the public and MoDOT drivers safer and reduces claims for damages.

FIND OUT MORE . . .

Missouri Department of Transportation Innovations Showcase

WingCamera_NW.pdf (modot.org)

Wing Camera NW Hamilton MT - YouTube

David Poynter, MoDOT Maintenance Crew Leader

David.Poynter@modot.mo.gov

(816) 583-4343

Operations, Maintenance

NCDOT Traffic Incident Management (TIM) Training Track

OVERVIEW OF INNOVATION

NCDOT has envisioned a lifelike classroom where IMAP responders can train and refine their skills in a more realistic environment without being exposed to the hazards of live traffic. The initiation of the track design focused on the intended purpose of training IMAP responders to safely and efficiently manage and clear incidents.

The NCDOT partnered with the North Carolina State Highway Patrol (NCSHP) to construct a training track on land located within the larger loop of the NCSHP's high-speed training track. The new TIM Training Track includes a half-mile of TIM-focused training facilities and ties into the existing two miles of track. The TIM Training Track was designed to incorporate a broad range of physical characteristics that allow agencies to practice various incident work zone applications and vehicle maneuvers.

The track allows IMAP responders and other agencies to train on newer technologies, such as drones for crash investigations and on new technologies for IMAP vehicles.

With the construction of the TIM Training Track, IMAP training is evolving from individualized, agency-led training to an all-responder training environment, focused on fostering consistent TIM culture across multiple agencies.

Source: NCSHP, Apex PD, and IMAP Multi Vehicle Crash Simulation

BENEFITS

The typical classroom-style learning paired with hands-on practical training on the TIM Training Track will prove helpful in efficient on-scene management, quicker incident clearance, and injury reductions to first responders while on the scene of an incident.

An additional benefit of training on a closed course is having the ability to record activities and review the response. These recordings are used to play back and highlight specific actions that were conducted properly as well as identify activities that require further training or the development of additional training modules.

FIND OUT MORE . . .

NCDOT TIM Training Track Website:
https://www.ncdot.gov/news/press-releases/Pages/2022/2022-06-23-incident-management-track-ncdot.aspx

NCDOT Transportation Mobility and Safety Division

Jennifer Portanova
(919) 825-2621, jportanova@ncdot.gov

Incident management, First responder, Roadside safety

BridgeWatch: Public Safety Through Real-time Structure Monitoring

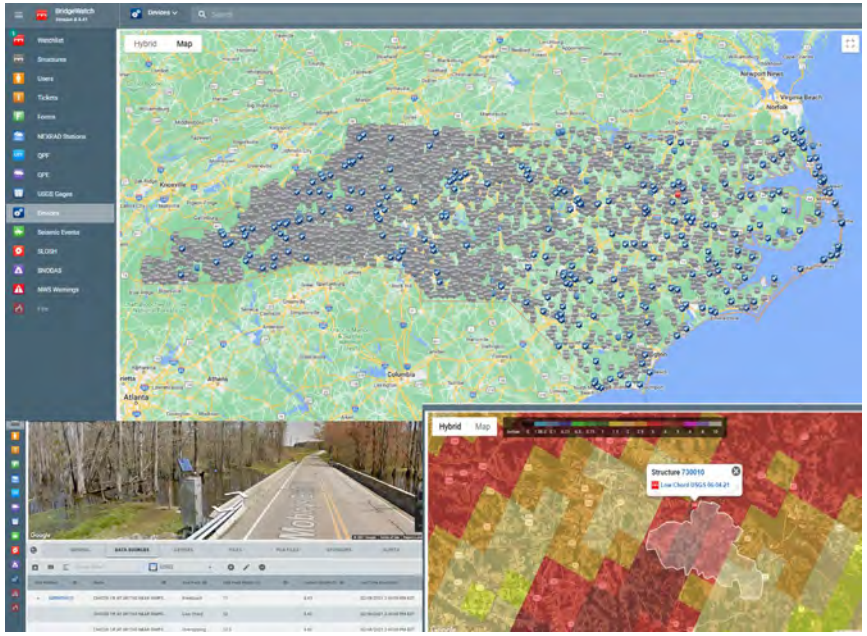
OVERVIEW OF INNOVATION

BridgeWatch empowers bridge management to predict, identify, prepare for, and record potentially destructive environmental events by proactively monitoring, in real-time, bridge infrastructure.

BridgeWatch collects and processes real-time data at regular intervals from meteorologic, hydrologic, and oceanographic sources, gauges, and other sensing devices. Data comparisons are then performed with internal NCDOT bridge parameters such as flood impact (floodwaters reaching structure levels) or roadway overtopping. NCDOT officials and Emergency managers can customize alerts, when appropriate, via any electronic medium (cell phones, email, application dashboard, etc.) when bridges are experiencing a dangerous or critical condition.

Officials are notified as sensors in the field detect water levels or high rainfall intensity levels that could indicate that the roadway is overtopped either at the bridge or bridge approaches based on elevation or design data. This valuable information can be used for road closure, emergency response, and post-event inspection prioritization.

In addition, BridgeWatch can also be utilized as a hands-on training and scenario tool for emergency evacuation or security drills with event simulation capabilities.



Source: BridgeWatch

BENEFITS

The benefits of using BridgeWatch include improved monitoring and awareness of structures impacted during major storm events.

In the past 3 years, the North Carolina DOT has piloted BridgeWatch and integrated it into its storm response. Structures management uses BridgeWatch alerted structures to aid in identification of critical structures to inspect post-storm.

FIND OUT MORE . . .

NCDOT BridgeWatch Website (Login Required) BridgeWatch v8.4.41 from USEngineeringSolutions

Hydraulics Storm Tools Website NCDOT - Hydraulics & EM Flood Warning Tools - Home (sharepoint.com)

US Engineering Solutions Website (BridgeWatch) https://usengineeringsolutions.com/bridgewatch/

NCDOT Hydraulics Unit

Charles Smith, P.E.
(919) 707-6754, crsmith1@ncdot.gov

Matthew Lauffer, PE, CPM
(919) 707-6700, mslauffer@ncdot.gov

Structure Management, Flood Warning, Emergency Response, Situational Awareness, Roadway Flooding, Hydraulics, Operations,

T-SURGE

OVERVIEW OF INNOVATION

Expanding on the FIMAN-T (Flood Inundation Mapping and Alert Network for Transportation) system, T-Surge helps NCDOT identify potentially-impacted roadways and assets during a storm surge event.

Rather than relying on gauge-based data like the rest of the FIMAN-T network, this dashboard uses data from RENCI (Renaissance Computing Institute at The University of North Carolina), which models storm surge for the entire North Carolina coastline based on National Hurricane Center official advisories.

T-Surge automatically downloads maximum water elevation and wave height rasters as soon as they are available. This data runs through a model that maps predicted flood inundation extents and depths, and uses lidar-derived roadway elevations to estimate flooding along roadways. The roadway inundation is then viewable on the interactive dashboard application that allows users to view mapping, filter roads by type and depth of flooding, and view summaries of predicted impacts.

T-Surge provides visualization and metrics for roadway inundation from forecasted hurricane and tropical storm surges. The dashboard application maps predicted flood and roadway impacts for the entire North Carolina coastline. This information allows emergency managers and first responders to reach critical destinations, like hospitals, while avoiding potential roadway flooding.

BENEFITS

- Easily identify areas and roadways forecasted to be impacted by flooding during a storm event
- Provides summary reports and navigable tables for predicted roadway inundation to aid in quick decision-making
- Expands coverage to include all coastal areas

FIND OUT MORE . . .

T-Surge Dashboard (beta version – open to NCDOT staff)

NCDOT Hydraulics Unit

Kurt Golembesky, PE, CFM
Highway Floodplain Program – Engineer III
(919) 707-6733, kpgolembesky@ncdot.gov

Matthew Lauffer, PE, CPM
Assistant State Hydraulics Engineer
919-707-6700, mslauffer@ncdot.gov

Emergency Response / Relief, Technology, Roadway Flooding, Inundation Mapping, Hurricane Preparedness

Metal Arrow Stencil Tool

OVERVIEW OF INNOVATION

Metal arrow stencil tool increases efficiency during line striping and reduces time spent in the roadway.

To facilitate effective snow removal around stormwater drains and maintain adequate drainage in roadways, the Concord General Services team paints arrows in the street pointing towards the drains. Josh Brown from the city of Concord, NH General Services team created a metal arrow stencil that is attached to a metal pole. This allows the technician to remain standing upright, hold the metal stencil in place, and paint without having to bend down, reposition the stencil, and without replacing the nylon cord. Previously, the team had been using a standard flat stencil and the process often included burning off the remaining old paint with a heat gun, which would sometimes burn through the nylon cord attached to the stencil.

Josh used an old one-way street arrow sign with the paint ground off and cut out the arrow to create a durable, metal arrow stencil. He then bent the end of the street sign up at a 90-degree angle, in order to bolt a metal pole handle to the edge. This metal pole allows the operator to stay standing while holding the stencil from an upright position and lift and move the stencil easily. Josh used just a couple hours of labor time to create the new stencil, and since an old sign was used for the metal, there was no direct cost.

Source: City of Concord, NH General Services

BENEFITS

The benefits of using the metal arrow stencil tool include reducing the ergonomic stress of repeatedly bending over and picking up the stencil, reducing the amount of time that a team member is in the roadway, and eliminating the time and cost in replacing the nylon cording on the previously used stencil due to heat damage.

FIND OUT MORE . . .

Concord, NH General Services Website
https://www.concordnh.gov/491/General-Services-Public-Works

UNH Technology Transfer Center
https://t2.unh.edu/

Concord, NH General Services

Josh Brown
(603)228-2737, ttommila@concordnh.gov

Safety, Maintenance, Stormwater Management

Pipe Measuring Tool

OVERVIEW OF INNOVATION

Pipe measuring tool saves time when measuring pipe sizes for design builds or other applications and reduces the risks associated with entering confined spaces.

The Pipe Measuring Tool is constructed out of wood and can be inserted through a grate to measure pipe sizes, minimizing the risks involved with having someone physically enter a confined space. Using the measurement tool, the process of measuring pipe sizes for design builds or other applications is now a one-person task, and no longer requires entering the catch basin.

Craig Borgeson from the City of Laconia, NH DPW developed and constructed a simple tool out of wood that can be inserted through the grate to complete the measurement. It is constructed of one piece of wood strapping (1"x2") with a flat wedge attached at the end with hash marks showing predefined measurements (6", 8" 10" 12" and 15"). Limited time and resources were involved in constructing this tool as Craig used existing wood that he had on hand and limited labor time for the construction process.

Source: Craig Borgeson, City of Laconia, NH DPW

BENEFITS

The benefits of the pipe measuring tool include reducing the risks associated with entering confined spaces, reduced time spent on the roadway, less impact on roadway users, and reduced time spent by employees completing the task.

FIND OUT MORE . . .

Laconia DPW Website
https://www.laconianh.gov/668/Public-Works

UNH Technology Transfer Center
https://t2.unh.edu/

City of Laconia, NH DPW

Craig Borgeson
(603)528-6379, cborgeson@laconianh.gov

Safety, Maintenance, Construction

Sidewalk Salt Hopper Filler

OVERVIEW OF INNOVATION

Sidewalk salt hopper filler reduces the risks associated with climbing a ladder and saves time when refilling the bobcat spreader hopper.

A bobcat with a salt/sand spreader is used to maintain the city's sidewalks during winter storms. Three team members from the City of Claremont, NH Public Works Department created a sidewalk salt hopper filler which is a mechanical conveyor/funnel that channels material from the pickup truck into the bobcat spreader hopper. Previously, a pick-up truck had to drive out to the bobcat's location, maneuver the truck to park close to the bobcat, and then the driver of either vehicle had to get out and climb a ladder up into the back of the pickup truck to shovel salt from the pickup truck into the bobcat spreader hopper.

Three team members (Ted Wadleigh, Bruce Therrien, and Warren Mordenti) used scrap materials from the DPW yard consisting of an old damaged v-box salt spreader and other scrap metal. They installed a new chain to the v-box, replumbed the hydraulics, and fabricated a chute for the back from scrap metal as well as fabricated new locks for the dump body. The controls to funnel salt/sand from the pickup truck are operated from within the pickup truck, and the operators can communicate via radio or cell phone to indicate on/off and other instructions for filling the hopper. By using the new sidewalk salt hopper filler, the operator can now top off the sidewalk hopper in about 30 seconds without the driver of either vehicle having to get out of their vehicles, without using a ladder, and without shoveling.

Source: City of Claremont, NH Public Works

BENEFITS

The benefits of the sidewalk salt hopper filler includes the ability to top off the sidewalk hopper in 30 seconds on average, eliminates the risk of employee injuries from climbing a ladder and shoveling, and increases the service level to the citizens of Claremont by treating the sidewalks faster during winter storms.

FIND OUT MORE . . .

City of Claremont, NH Public Works
https://www.claremontnh.com/dpw

UNH Technology Transfer Center
https://t2.unh.edu/

City of Claremont, NH Public Works

Alex Gleeson
(603)542-0353,
agleeson@claremontnh.com

Maintenance, Safety

Bicycle-Friendly Resurfacing in Mercer County

OVERVIEW OF INNOVATION

Mercer County's Bicycle Friendly Resurfacing Program integrates bicycle facilities into resurfacing projects and ensures that bicycle facilities are considered during routine road maintenance, reconstruction, construction, and land development reviews to create a network in alignment with the County's Complete Streets Policy.

The Mercer County Bicycle Master Plan describes factors for analysis of County Roads such as cartway width, environmental constraints, crashes records involving bicycles, network connectivity, Level of Traffic Stress (LTS), Annual Average Daily Traffic, truck volumes, existing bus routes, existing and proposed speed limits, bicycle travel demand modeling and 8-80 Design.

Some routes require simple striping and others will require more intensive work such as road widening or intersection redesign that may involve drainage or right-of-way issues for example. The County prioritizes roadways that are in need of repaving, and only need additions of epoxy paint or thermoplastic and signage to define the bicycle facility, and continues to plan for more complicated segments.

BENEFITS

Bicycle infrastructure is integrated into the repaving program to conduct all work at one time which increases efficiency and cost savings.

The addition of bicycle infrastructure increases safety for all road users.

The integration of bicycle facilities into resurfacing projects advances a multimodal network in alignment with the County's Complete Streets Policy.

FIND OUT MORE . . .

2020 Mercer County Bicycle Plan Element
http://www.mercercounty.org/departments/planning/2019-bicycle-master-plan

NJ STIC Innovation Spotlight: Bicycle-Friendly Resurfacing Program
https://www.njdottechtransfer.net/bike-friendly-resurfacing

FHWA's Incorporating On-Road Bicycle Networks into Resurfacing Projects
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/

Mercer County Planning Department

Matthew Zochowski, Senior Planner
609-989-6985,
mzochowski@mercercounty.org

Safety, Planning, Pavement, Maintenance

Inlet Repair Trailer

OVERVIEW OF INNOVATION

The 2021 NJ Build A Better Mousetrap Award for a local public agency was given for an Inlet Repair Trailer. Montgomery Township's Public Works Department converted an older trailer into a basin repair trailer to eliminate the amount of equipment and time required to load and unload onto trucks.

The task of Inlet Repairs requires saws, various hand tools, concrete, block, bricks, wood for forms, water for concrete, concrete mixer, and a way to lift heavy grates. There can be significant labor time and safety considerations in loading and unloading trucks with needed equipment.

A generator, electric cement mixer, electric crane, electric water pump and water storage tanks, were mounted on the trailer. The trailer has plenty of room for pallets of concrete and basin block as well as lumber and all needed tools including electric outlets to operate saws. The labor to complete the project was around 100 hours and about $3,500 was spent on equipment and materials for the trailer.

Source: New Jersey Department of Transportation

BENEFITS

By having all equipment and tools on one trailer, the Township reduced the number of vehicles needed from three trucks to one which offers equipment utilization efficiencies.

When mobilizing a crew for a project, all needed equipment can be found stored on the dedicated use trailer which can improve daily labor productivity

Working off a low deck trailer eliminated climbing into a truck bed, and the electric crane eliminated heavy lifting of the grates which improves worker safety.

FIND OUT MORE . . .

2021 BABM Award Winner Video: https://www.njdottechtransfer.net/share-your-ideas/build-better-mousetrap/

2021 BABM Local Award Winner Video: 2021 BABM Local Award Winner: Inlet Repair Trailer - YouTube

Montgomery Township, New Jersey

Art Villano, Superintendent of Public Works, Montgomery Township
908-874-3144, villano@twp.montgomery.nj.us

Maintenance, Stormwater Management

Innovations in Crash Investigation Technology.

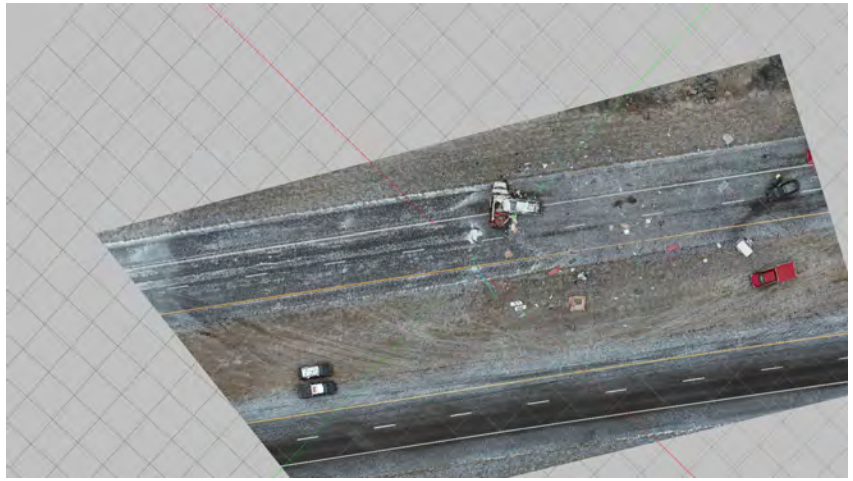
OVERVIEW OF INNOVATION

The New Mexico State Police Crash Reconstruction Unit uses drone technology to safely and quickly manage and clear crash sites.

In 2017, New Mexico State Police started the Police Crash Reconstruction Unit. This unit not only investigates and reconstructs crashes, but they also improve traffic safety by clearing crash sites quickly and efficiently with the use of drones.

Prior to using drones, clearing a crash site could take 2-4 hours, now it takes 10-45 minutes. Utilizing drone technology reduces: the opportunity for additional crashes, additional pedestrian injuries, the amount of time the motoring public is stopped, and grants faster access to emergency response / relief so injured parties may receive aid faster. Police officer resources at the site are also maximized because now it only requires 1 police officer to investigate the crash site. Ultimately, drone technology at crash sites, reduces the amount of time all involved in the crash have to be exposed to a dangerous situation.

Due to the high resolution and quality of the cameras and software installed on these Crash Site Investigation Drones, it results in higher quality mapping, documentation and better visual aids at trials for: the Defense, Prosecution, Judges, Witnesses and Jurors.



Aerial Diagram of a multi-vehicle and multi-fatality crash.

Source: New Mexico State Police Drone

BENEFITS

Drone technology reduces the amount of time it takes to clear a crash site from hours to minutes, which increases the safety of the motoring public, grants faster access to emergency response/relief, maximizes police officer resources, and provides better documentation.

FIND OUT MORE . . .

https://uavcoach.com/drones-accident-reconstruction

https://nationalpolice.org/drones-transform

NMDOT Research Bureau

Margaret Williams

505.470.6455

Margaret.Williams@dot.nm.gov

Safety, Technology, Emergency Response / Relief

Catch Basin Trailer

OVERVIEW OF INNOVATION

Outfitting an available trailer with equipment and materials needed to replace or repair catch basins has improved service, increased efficiency, and reduced costs associated with this ongoing Violet Township, Ohio work.

Before implementing the trailer's use each catch basin took hours to repair. Preparing the materials and equipment would take at least an hour alone.

Its use also reduced the number of people and equipment that were needed for the work.

Using the trailer freed two employees that could be deployed for other work.

An additional benefit includes if a basin is observed in the field and needs repaired the only requirement now is hitching the trailer and returning to complete the needed work eliminating time consuming prep.

Outfitted trailer ready for catch basin repair project - Violet Township, Pickerington, Ohio

BENEFITS

Reduces set up and break down time.

Saves taxpayer funding.

FIND OUT MORE . . .

Welcome to Violet Township, OH

Violet Township

Will Yaple
(614) 206-3273
will.yaple@violet.oh.us

Operations, structures, maintenance

Electric/Gas Utility Account Aggregation

OVERVIEW OF INNOVATION

Consolidating the Ohio Department of Transportation's (ODOT) electric and gas utility accounts saved state taxpayer's $3 million over a four-year period.

ODOT consolidated over 3,000 various electric and gas utility accounts and bid on the open market.

This account combination took a great deal of coordination with ODOT 12 districts offices that were previously responsible for bidding their own accounts.

It was identified that ODOT could get better bids by aggregating all of the accounts. This effort took several years to synch the expiration date of all accounts so they could be bid together.

The savings from this activity is reinvested into the maintenance, preservation, and strategic expansion of Ohio's state transportation system.

ODOT consolidated over 3,000 various electric and gas utility accounts. - Ohio Department of Transportation

BENEFITS

Greater buying power and access.

Reduced energy pricing.

Lowered transaction costs.

FIND OUT MORE . . .

Ohio Department of Transportation | Ohio.gov

ODOT Office of Facilities Management

Tim Brunney
(614) 387-1190,
Timothy.Brunney@dot.ohio.gov

Operations, Maintenance

LED Highway Lighting Conversion

OVERVIEW OF INNOVATION

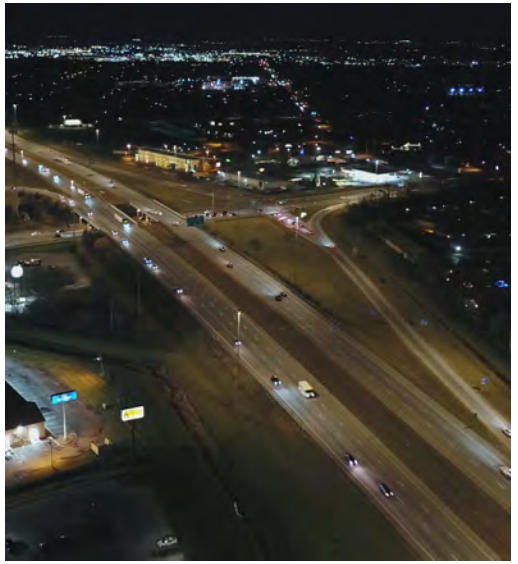
Replacing all high-pressure sodium lightbulbs with brighter, more efficient LED lights improves highway visibility and safety while reducing long-term maintenance costs.

The implementation of an Ohio Department of Transportation (ODOT) employee LED highway lighting conversion recommendation to the department's $100 million cost savings initiative will result in a long-term savings of nearly $27 million.

The project replaces all ODOT's existing high-pressure sodium luminaires on high and low mast light supports with more efficient LED luminaires that provide superior roadway illumination.

There are over 45,000 total luminaires lighting ODOT's system with more than 24,000 (over 53%) of being high-mast luminaires. The 19,000 high-pressure sodium lights will be replaced by 11,000 LED lights.

The conversion will save money, improve safety, and lower environmental impacts. This project is well underway and is expected to be completed by the summer of 2023.



Lucas County, Ohio I-75 and U.S. 20 interchange before (left) and after (right) LED highway lighting conversion. - Ohio Department of Transportation

BENEFITS

LED highway lighting improves nighttime visibility, increases safety, and reduces long-term maintenance costs.

Ohio's overall savings is projected to be nearly $27 million.

FIND OUT MORE . . .

The following videos do not represent ODOT projects, rather they present the benefits of switching to LED lights from the HPS lamps:

Wellesley Municipal Light Plant Switches to LED Street Lights – YouTube

Urban Green - Streetlight Replacement Project - December, 2018 - YouTube

ODOT Office of Roadway Engineering

Kevin Duemmel
(614) 728-2450,
Kevin.Duemmel@dot.ohio.gov

Safety, Operations, Maintenance, Materials

Backhoe Folding Forks

pennsylvania
DEPARTMENT OF TRANSPORTATION

OVERVIEW OF INNOVATION

Backhoe folding forks help crews be more efficient while reducing the risk of injuries.

Clearfield County in PennDOT's Engineering District 2 has installed foldable forks on backhoes – something routinely done in private industry. The forks can be installed to move items such as pallets or large sections of pipe and can be folded out of the way – depending on what the work needs are for a particular assignment. This helps crews be more efficient and it also reduces the risk of injury from lifting and moving heavy objects.

The forks are attached to the digging bucket. While in use, the forks are flipped down and rest against the cutting edge of the bucket. When not in use for loading/unloading, they fold back over the top of the bucket and are out of the way while performing digging operations. This simplifies use of the backhoe in the field on a routine basis without installing or removing attachments.

By using the foldable forks, a second piece of equipment, such as a forklift or track hoe, is not needed. More importantly, the foldable forks provide a more stable platform and fewer moving parts than using chains connected to the track hoe bucket. This provides the operator better control of the load during lifting operations. By using this method, the safety factor is higher, and the potential for injury is lower. Productivity is also increased because it takes less time to complete load and unload activities.

Forks folded over attached to digging bucket of backhoe.
Source: PennDOT

BENEFITS

The benefits of using backhoe folding forks include increased efficiency and reduced injury risks. This innovation also allows for the capability of performing two different operations using one piece of equipment. Additionally, forks fitted with hydraulics allow operators to deploy the forks and adjust widths automatically.

FIND OUT MORE . . .

Pennsylvania DOT

Anja Walker
(717) 425-6288, penndotstic@pa.gov

Construction, Maintenance

Fabricated Snow Plow

pennsylvania
DEPARTMENT OF TRANSPORTATION

OVERVIEW OF INNOVATION

The fabricated snow plow allows crews to quickly return roads to an acceptable level of service without sacrificing operator safety.

When it comes to plowing snow, a few variables rise to the top of the list. First, keeping operators and roadway users safe during plowing, and second, efficiently plowing and moving through route cycles as quickly as weather and road conditions allow.

Clinton County in PennDOT's Engineering District 2 was able to develop an innovation that meets both variables. Through videos and travels where operators saw similar plows in use, county staff determined that the lead point of the plow must hang out further over the cutting edge than traditional plows. To replicate this, Clinton County refabricated an existing plow by cutting the back supports and adding more curvature to the barrel. The retrofit makes the plow height shorter, like a lower case "c" when viewing from the side as opposed to an upper case "C."

This innovation prevented snow from rising over the top of the plow barrel and building up on the truck's windshield. Making this change has greatly improved visibility and elevated the safety factor. It also allows the operator to travel at normal speeds, dependent on weather, which keeps plowing cycle times on track and assures consistent service. The result provides better service during plow events without sacrificing safety.

Retrofitted plows have a smaller curve height. Source: PennDOT

BENEFITS

The benefits of using the fabricated snow plow include increased visibility for operators allowing them to quickly return roads to an acceptable level of service. This not only increases safety for the operators but for the general public as well.

FIND OUT MORE . . .

Pennsylvania DOT

Anja Walker
(717) 425-6288, penndotstic@pa.gov

Winter, Maintenance, Safety

The Grader Ice Blade

pennsylvania
DEPARTMENT OF TRANSPORTATION

OVERVIEW OF INNOVATION

The grader ice blade provides a low-cost method for removing ice build-ups on roadways.

Sometimes in winter, maintenance crews see a build-up of ice on roadways that materials and grader blades cannot remove easily. When there is ice pack on roadways, an ice blade can break up the packed snow or ice that has bonded with the road into smaller pieces that can then be removed through plowing. However, purchasing these ice blades can cost around $3,200. Therefore, Indiana County in PennDOT's Engineering District 10 was able to repurpose an old grader blade into an ice blade.

To make the ice blade, a welder cut notches into the old grader blade, and then smoothed the edges of the cuts. A wearing layer and paint was added to the blade to protect it from weathering. It took the crew two days to make the blade. The blade mounts just like a grader blade, and it takes 20 minutes to switch out the blades.

The ice blade has been used throughout Indiana County when ice build-up cannot be removed using typical methods. According to Indiana County, making the grader blade into an ice blade has allowed them to use available materials to make a new piece of equipment to better handle a job.

Ice blade uses tines to break up ice for removal. Source: PennDOT

BENEFITS

This innovation allows maintenance crews to break up ice build-up on roadways for easy removal at a low cost. Repurposing the grader blade into an ice blade saved District 10 $3,000 in purchasing costs.

FIND OUT MORE . . .

Pennsylvania DOT

Anja Walker
(717) 425-6288, penndotstic@pa.gov

Maintenance

Spreader Chute for Winter Operations

pennsylvania
DEPARTMENT OF TRANSPORTATION

OVERVIEW OF INNOVATION

The spreader chute directly deposits materials to the shoulders making repairs more efficient, easier, and safer.

In the past, when placing materials to repair roadway shoulders during the winter months, an additional piece of equipment or effort was needed due to the truck's salt spreader being in the way. If this work was being done during mild winter days, it meant removing the winter material spreaders from the dump truck and then reattaching it in preparation for winter weather.

To eliminate or decrease some of that work, Warren County in PennDOT's Engineering District 1 fashioned a prototype chute from a PVC pipe. The goal was to find a way to cover and bypass the spreader while also efficiently place the material along the shoulder. Once the prototype was approved, the county upgraded to a metal chute. The total material costs were approximately $300 compared to purchasing one for approximately $750.

The aluminum device attaches to the spreader and can be used to fill low shoulders along the roadway without having to remove the spreader. The chute directs material to the shoulders to fill low spots while keeping the equipment and truck on the main road. Along with making shoulder repairs easier and more efficient, using the chute also created safer work conditions for the operators and laborers.

Aluminum device attaches to the spreader. Source: PennDOT

BENEFITS

The benefits of using the spreader chute include directly depositing materials to the shoulders while keeping the truck and equipment on the roadway. Not only is this more efficient, but it is safer for the crew.

FIND OUT MORE . . .

Pennsylvania DOT

Anja Walker
(717) 425-6288, penndotstic@pa.gov

Maintenance, Construction

Develop a DOT Specific UAS Simulator and Flight Proficiency Exam

South Carolina Department of Transportation

OVERVIEW OF INNOVATION

Most state DOT Unmanned Aircraft Systems (UAS) commercial operations are governed by CFR 14 Part 107. This regulation requires pilots pass a knowledge test but does not require a demonstration of minimum flight proficiency to operate in the national airspace. This project addresses this limitation by developing a computer-based flight proficiency simulator based on the National Institute of Standards and Technology (NIST) Basic Maneuvering Test (BMT). The simulator realistically recreates environmental conditions, UAS physics, stick control and field conditions of the BMT. A "drone rodeo" was hosted to evaluate if the simulator BMT performance data is simulator to traditional in-person methods. Twenty-four Part 107 pilots completed the BMT in-person and with the simulator. At 95% confidences, the pilots scores ad times were statistically the same. The significant percentage of the SCDOT pilots completed the BMT under proctored conditions. Based on their performance and similar nationally recognized organization's certifications, the research team recommends that the SCDOT require a minimum score of 80% on the BMT with a maximum duration of 5 minutes per maneuver before flight privileges are granted. In addition to the NIST scenarios develop, a bridge inspection scenario was developed to support this common use for UAS.

Source: Clemson University

BENEFITS

Drone flight proficiency is a skill that requires continual practice. The simulator developed in this project provides a convenient way to practice, teach and assess UAS flight skills. This software is available at no cost to all state DOTs.

To date, 24 state DOTs have requested licenses and made this simulator an important part of their drone program.

FIND OUT MORE . . .

Little Arm Studio:
https://www.zephyr-sim.com/

Clemson University – Department of Construction, Development, and Planning:
http://www.clemson.edu/degrees/construction-science-and-management

Eric Stuckey (SCDOT)

803-737-1003 StuckeyEC@scdot.org

Joe Burgett (Clemson University)

864-722-2026 jmburg@clemson.edu

UAS, UAV, Drone, Simulator

Strategic Deployment of Drone Technology and Software to Support SCDOT Operations

South Carolina Department of Transportation

OVERVIEW OF INNOVATION

A recent FHWA publication found that all 50 state DOT's are using Unmanned Aircraft Systems (UAS), commonly referred to as "drones," in some capacity. As the cost of UAS equipment can be relatively low, the greatest challenge limiting the benefit that this technology can provide is the lack of education and training. By partnering with Clemson University, this project aggressively addressed this challenge and made meaningful drone deployment a viable option for employees across the SCDOT. The project leveraged Clemson University's nationally recognized School of Construction Management to develop a drone training program tailored to the SCDOT's needs. The course was structured so Clemson students and SCDOT employees could work shoulder-to-shoulder as they learned leading edge drone workflows. The program participants came from a wide range of SCDOT offices including (among others) Construction, Communications, IT Services, Preconstruction Engineering, Planning, Traffic Engineering, Survey and Maintenance. Through its professional studies program, Clemson University has made this course available fully online to any state DOT.

Source: Clemson University

BENEFITS

This project created an in-person and online drone course for SCDOT employees. During the class, students earn their FAA Part 107 drone license, flight skills (in-person and with a simulator), and how to create 3D maps/models with drone data. It is an excellent way for employees to gain the skills and knowledge to operate a UAS to benefit their department.

The course is available online for all state DOT employees.

FIND OUT MORE . . .

Overview video of the course: https://www.youtube.com/watch?v=YIkoQl64D3w

Clemson University – Department of Construction, Development, and Planning: http://www.clemson.edu/degrees/construction-science-and-management

Eric Stuckey (SCDOT)

803-737-1003 StuckeyEC@scdot.org

Joe Burgett (Clemson University)

864-722-2026 jmburg@clemson.edu

UAS, UAV, Drone, Class, Course, Professional Development

Creating a Resilient Port System in Texas: Assessing and Mitigating Extreme Weather Events

OVERVIEW OF INNOVATION

Extreme weather events, such as hurricanes and tropical storms, pose considerable challenges to the Texas port system. Given the economic and strategic significance of the Texas port system, ensuring its resilience against such hazards is essential.

The port resilience assessment considered not only the ability of the port system to endure the extreme weather events, but also the other aspects of port operations that augment rapid restoration and recovery of constituent infrastructure components if impacted by large-scale extreme weather events.

The project employed techniques capable for assessing both quantitative and qualitative aspects of risk and resilience so that the findings from the research could be immediately implemented to improve real-world practices.

BENEFITS

The project team provided port resilience improvement recommendations to TxDOT, the Texas legislature, port authorities, port tenants, and other stakeholders to act on, respectively.

FIND OUT MORE . . .

Project Web Link: TxDOT Research Library: Project No. 0-7055 – Creating a Resilient Port System in Texas: Assessing and Mitigating Extreme Weather Events

Video: https://youtu.be/5wB1ZMr9Pp4

Texas STIC Website: http://txstic.org/

Contact Info:

Joanne Steele, Project Manager, TxDOT joanne.steele@txdot.gov

Shelley Pridgen, TxDOT STIC/EDC Coordinator Shelley.pridgen@txdot.gov

Keywords: Planning, Emergency Response/ Relief, Freight/Goods Movement

TranStar Roadway Flood Warning System Expansion

OVERVIEW OF INNOVATION

Problem

Southeast Texas Districts face numerous challenges when extreme weather events, such as Hurricane Harvey in 2017, generate high water conditions affecting the ability of travelers to safely navigate the roadways. It is essential that travelers, emergency response personnel and other roadway users receive real-time information that enables better decision-making.

Solution

Expansion of Houston's TranStar Roadway Flood Warning System into the other TxDOT Districts. The tool, developed in 2018 after Hurricane Harvey, synthesizes rainfall and stream elevation data with traffic information in real time to identify where roadway flooding is highly likely to occur and displays that data on TranStar's traffic map and mobile application.

This effort is a collaboration between TranStar, the Harris County Flood Control District, TxDOT and Texas Transportation Institute (TTI). TTI has incorporated existing rainfall sensors into the system, some owned and maintained by Jefferson County Drainage District 6.

BENEFITS

Improving the level of safety and availability of technology provides highway users the benefits of real-time information for more accurate route decision making. The system warns travelers to avoid potentially flooded areas and helps displaced individuals return to their communities following major storms.

FIND OUT MORE . . .

Web link:

http://www.houstontranstar.org/

Video:

https://youtu.be/MKwzhMDU5ME

Contact Info:

Eliza Paul, District Engineer, TxDOT Houston District eliza.paul@txdot.gov

Shelley Pridgen, TxSTIC Coordinator, TxDOT RTI Division shelley.pridgen@txdot.gov

Keywords: Safety, Technology, Emergency Response / Relief

Using Crowdsourced Data to Improve Emergency Response to Roadway Incidents in Dallas-Fort Worth (DFW)

OVERVIEW OF INNOVATION

The NCT9-1-1 section of the North Central Council of Governments (NCTCOG) operates 42 Public Safety Answering Points (PSAPs) in DFW. **NCTCOG's Transportation Department (NCTCOGTrans) introduced NCT9-1-1 to the Waze roadway incident data stream.** NCT9-1-1 then incorporated this data stream into 911 operations at its 42 PSAPs. PSAP operators reported that this crowdsourced roadway incident data is very helpful in alerting them to roadway hazards and in helping them find the exact location of crashes reported via 911 calls.

NCTCOGTrans, in cooperation with TxDOT, funded a project through which the 911 centers in the DFW region not served by NCT9-1-1 were introduced to the tools necessary so they could also incorporate the Waze incident data stream into their operations. As part of this project, the Texas Transportation Institute at Texas A&M University and the Center for Transportation Research at UT-Austin compared crowdsourced roadway incident reports with 911 calls in an expressway corridor between Dallas and Forth. This study found that crashes were reported first via crowdsourced data 20% of the time and that crowdsourcing was a much richer data set for notice of roadway hazards.

Incorporating crowdsourced roadway incident reports is just one element of a combined NCT9-1-1 and NCTCOGTrans strategy to improve emergency response to roadway operations. The other elements include: (i) give 911 centers access to TxDOT roadway cameras, (ii) establishing a system alerting 911 centers of traffic speeds on roadway segments that differ substantially from historical norms, suggesting the possible presence of a roadway incident requiring emergency response, and (iii) mining crowdsourced, CRIS, and other data to identify patterns of hazard reports and traffic speed deviations indicating a high risk that a crash has or will occur.

Source: NCT9-1-1 Website

BENEFITS

One of the five pillars of USDOT 2022 Roadway Safety Strategy is to improve emergency response to roadway incidents, resulting in better medical outcomes for crash victims. By giving 911 centers more timely notice of roadway incidents, 911 centers can dispatch appropriate forces sooner. Over time, this will result in lives saved and a reduction in the severity of crash-related injuries. In addition, more timely response to roadway incidents means less time to restore the roadway to normal operations and fewer secondary crashes.

FIND OUT MORE . . .

Project Web Link:

NCT9-1-1 Program North Central Texas 9-1-1 Program
https://www.nct911.org/

Video: https://youtu.be/To-lEoRbdiQ

Texas STIC Website: http://txstic.org/

Contact Information:

Christy Williams, Project lead
CWilliams@nct911.org

Thomas Bamonte, Transportation Department
tbamonte@nctcog.org

Keywords: Safety, Technology, Emergency Response

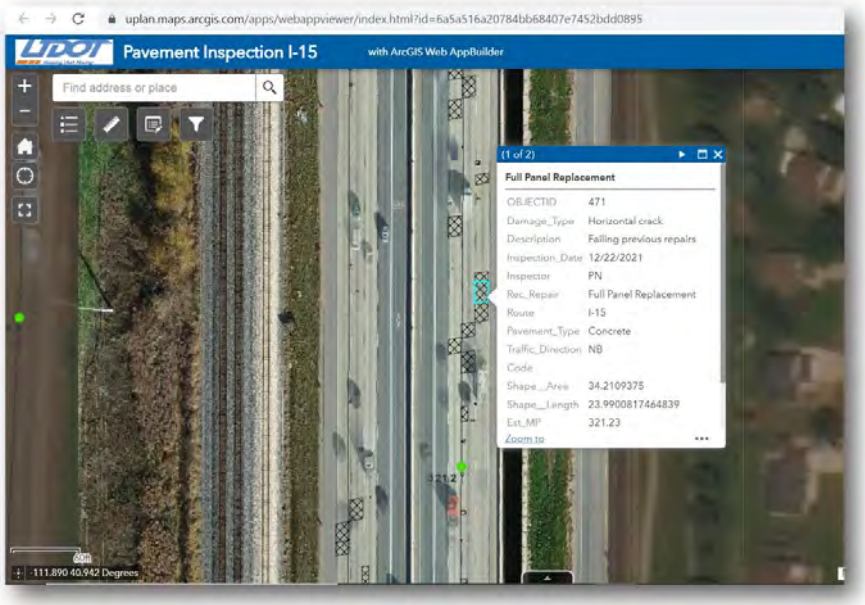
Aerial Images Used to Conduct Pavement Inspections

OVERVIEW OF INNOVATION

The aerial images are used to create a dynamic GIS map with embedded feature layers to mark the necessary repairs.

This new method of conducting pavement inspections results in improved efficiency, safety, and accuracy of inspections. The UAS pilot can collect images of the area in need of repair from a safe distance, and the inspection completed on a computer in the office. The location of the repairs and damage area measurements are marked with greater accuracy, leading to better project cost estimates. This in turn decreases the number of change orders made during construction.

The Central Design and GIS teams are taking the next steps to improve this new process by developing a machine learning program that will analyze photos taken by a UAS and automatically identify cracks and potholes to create a database for further processing.



Source: UDOT UPLAN

BENEFITS

Using aerial imagery is helping crews conduct inspections that are done more efficiently and with greater accuracy and safety.

FIND OUT MORE . . .

Technical summary document

Information from 2023 Innovation and Efficiency Report

Aerial Images Used for Pavement Inspections

For more information:

Utah Department of Transportation

Paige Nussbaum, pnussbaum@utah.gov

Cody Mori, cmori@utah.gov

Safety, Maintenance, Pavement, Asset Management

Saddle Lift Tool Makes Sign Repairs Safer and Faster

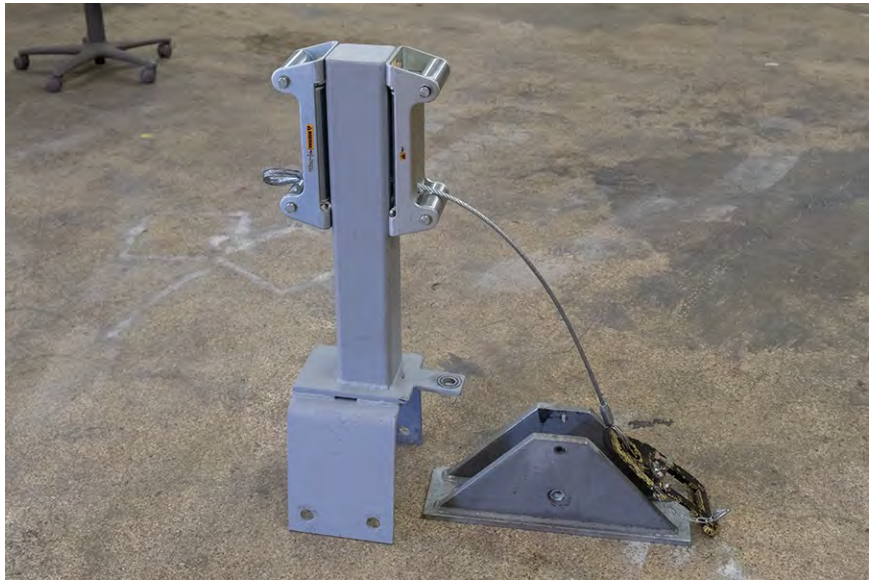
OVERVIEW OF INNOVATION

The saddle lift tool is a low-cost device that allows UDOT crews to quickly and safely repair SN14 signs, without the need for a crane or the closure of a lane of traffic.

Barrier mounted signs (Median Concrete Barrier Pivot Sign Base—SN14) are designed with a safety feature so that, if impacted, the sign post stays attached to the sign base, but swings down into a resting position.

To repair the sign, someone must raise the post to the correct upright position and insert a new pin into the sign base. This means having a couple of workers stand on the concrete barrier to lift the sign themselves. Or, they can close a lane (often the HOV lane) and use a crane to lift the sign. Either way, it is dangerous, resource-intensive, and time-consuming work.

The new tool easily raises the sign post using a truck-mounted winch. First the saddle lift is secured to the sign mount using the sign base bolt. The saddle lift can be mounted to pull the sign in either direction as needed. Once the tool is secured, a cable connects a square bracket to the sign post; the other end of the cable is connected to a vehicle winch cable. The winch provides the mechanical force to lift the sign post while the built-in rollers maintain correct cable alignment, regardless of the position of the winch. The sign is held in the correct position while the replacement pin is inserted in the base and, if needed, the ARGO safety bumper can be installed. Once the sign is repaired, the winch cable is released and the bracket is removed from the post. The saddle lift is disconnected from the base and the base bolt is again secured to the barrier.



Source: UDOT image

BENEFITS

Using this tool reduces the number of workers required to repair a sign, does not require a crane truck or closing a lane of traffic, and workers do not have to lift a sign while standing on the edge of the wall.

FIND OUT MORE . . .

Web link:

YouTube Innovation Station Video

Information from 2023 Innovation and Efficiency Report

Saddle Lift Tool

For more information:

Utah Department of Transportation

Jayson Kesler, 801 330-1772, jaysonkesler@utah.gov,

Maintenance, Operations

The Low Voltage Auto Start System: We'll leave the light on for you.

OVERVIEW OF INNOVATION

Often, WSDOT vehicles equipped with beacon lights or message signs need to be left in a work zone or near a hazard for prolonged periods of time. This system ensures that when it's time to head for the barn, the vehicle starts right up.

The Low Voltage Auto Start system took the top prize of the WSDOT Innovations Challenge in 2022.

This system integrates into the vehicle using factory electrical connectors and allows the operator to leave a vehicle unattended with warning and information delivering devices communicating to the traveling public.

When activated, the system battery voltage is monitored. When the system voltage drops to 11.5 volts, the vehicle will start up and run for a predetermined time period to properly charge the batteries. When that time period ends, the system shuts the vehicle off. The system will continue to operate in this manor until deactivated and includes safety features for technicians including preventing activation if the hood is open or the doors are unlocked. To prevent theft, when the system is activated and the brake pedal is pressed, the engine shuts off.

WSDOT
Employee Solutions
Making a Difference

INNOVATION CHALLENGE

Source: WSDOT Fleet Operations

BENEFITS

- A reduction in idle time by 70%.
- Reduced fuel consumption.
- Reduced Carbon Footprint.
- Reduced Maintence on Heavy Truck Emission Components.

FIND OUT MORE . . .

Low Voltage Auto Start video

The WSDOT Innovation Challenge is open to all full-time maintenance and operations employees. All Innovations must be in use and showing desired results.

Categories include - Tools & Equipment, Technology Best Practices, and Techniques Best Practices.

https://www.wsdot.wa.gov/

WSDOT Innovation Challenge Resources

Daryl Blumberg
(360) 705-7838,
blumbed@wsdot.wa.gov
challenge@wsdot.wa.gov

Innovations challenge, Auto Start, No Idle, Sustainability, Safety, Operations, Environment, Maintenance.

Spokane County Design and Fabrication of Grader Boots (Snow and Gravel)

OVERVIEW OF INNOVATION

Spokane County ER&R Crew designed and fabricated new boots for County graders to optimize multiple pieces of equipment, while saving overall costs.

Spokane County welders designed a boot that would require no modification to fit on motor graders from different manufacturers (e.g., Caterpillar and John Deere). The mounting plate on the moldboard is the only thing that is different.

The citizens of Spokane County have been requesting that the snow berms in their driveways be manageable to remove. The County's motor graders are used in both rural and urban operations. In the rural area, snow wings are required. In the urban area snow boots are required. The welders designed and fabricated a boot that was the right size and could be quickly fitted to all motor graders, no matter the manufacturer. The quick release attachment means our staff can quickly and easily change out the product on multiple pieces of equipment while not having to remove the existing wing.

In addition to optimizing operational time and getting a great product, approximately $243,000 in costs were saved in the production of 26 boots versus purchasing a product that would have to be modified to meet all the County's needs.

Source: Spokane County

BENEFITS

By designing and manufacturing snow boots in house, Spokane County can:

- **optimize time,**
- **save on costs, and**
- **get the exact product needed in the field.**

FIND OUT MORE . . .

Spokane County

Spokane County, WA | Official Website

Spokane County Road Maintenance and Operations:

Andy Schenk
(509) 477-7452, aschenk@spokanecounty.org

Jim Cotter
(509) 477-7499, jcotter@spokanecounty.org

Snow Boot, Grader, Fabrication, Design, Operations, Maintenance