



Work Zone webinar: Connected Vehicle Work Zone Pilot & Work Zone Monitoring Tools April 19, 2018

Agenda:

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1	Welcome & Overview	Denise Markow, PE I-95 Corridor Coalition
2	Slow Moving Vehicle Warning System	Amber Reimnitz, PMP Pennsylvania Turnpike Commission
3	Connected Work Zone Pilot	Michael Pack Pennsylvania Turnpike Commission
4	SPATEL Tool and the Queens Midtown Tunnel	Robert Glantzberg TRANSCOM
5	Improving Work Zone Safety and Mobility	Nikola Ivanov, PMP University of Maryland CATT Lab

The complete presentation and audio are available for this webinar:

- [Presentation with Audio](#)
- [Slides only](#)

Meeting Highlights:

- **Welcome:**
 - Denise Markow welcomed all, provided a brief overview of the webinar and introduced the speakers. She noted the I-95 Corridor Coalition is a partnership of transportation agencies, including 16 DOTs from Maine to Florida and including the District of Columbia. It provides a forum for key decision makers to address transportation management and operations issues of common interest. More information about the Coalition may be found on their website: <http://i95coalition.org/>.
 - This webinar focuses on connected work zone applications and tools currently being piloted and utilized at different transportation agencies. Presenters also demonstrated the importance of reliable travel time data for slow moving traffic and tools that may be used to assess work zone operations. These applications and tools are being examined by agencies in an effort to improve the safety and mobility in and around work zones.
- **Slow Moving Vehicle Warning System (Amber Reimnitz, PMP, Pennsylvania Turnpike Commission (PTC)):**
 - The PTC identified the need for this type of system based on their large number of work zones, high number of crashes in work zones, and high number of Truck Mounted Attenuator (TMA) hits (76 from FY14-FY17).
 - The Total Reconstruction from A31-A38 along I-476 was selected to be the pilot project. Along with lane width restrictions, trucks and heavy vehicles are designated to be along the same lane as the construction entrances for two of the three Maintenance and Protection of Traffic (MPT) phases.



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- As a pilot, the system will be completely local and monitored by the system provider. It is not visible to the PTC Traffic Operations Center (TOC). The potential to monitor the system at the job trailer is an option.
- Trucks Entering/Exiting a work zone pull-off area would trigger a portable changeable message sign (PCMS) downstream with a safety message.
- Standard specs for emergency pullover/construction entrance will be used but they are adding three sensors and a PCMS, plus a fob sensor for a flagger so the PCMS can be manually activated if the system malfunctions.
- PTC has developed reporting requirements for the Vendor/contractor as part of the evaluation. They will report on usage stats, maintenance, crashes, etc.
- The current bid price is \$2777 per month per entrance. The PTC will evaluate new crash data versus previous crash history to determine the effectiveness.
- During and following the presentation, the following questions were discussed:
 - Chris Brookes (MDOT): Asked how will the system handle a slowdown in traffic? The system will turn on when one vehicle is slow but if traffic is slow due to a queue is there logic to change the message to congestion? *Amber Reimnitz (PTC) responded that they went in with the understanding that any vehicle slowing down would trigger the detectors but we wanted to prove validity of this pilot at reducing crashes due to slow moving construction vehicles. The system has the flexibility to detect if all traffic slows down, as well as post different types of warning messages. The performance of the system will be monitored on a regular basis, as well as through a before/after study including crashes, so this option can be considered in the future.*
 - Alan Shapiro (NC Turnpike Authority): Asked if once the facility is widened to a 6-lane section providing additional capacity, does the PTC anticipate the number of rear-end collisions and/or attenuator collisions to go down during routine maintenance operations? *Amber Reimnitz (PTC) responded that they don't anticipate reduction of rear-end collisions or attenuator hits during operations once we have our 6 lane sections. Unfortunately, they still see the same issue of distracted drivers regardless of the number of lanes or if it is a work zone. Distracted drivers are still the biggest issue they face in reducing accidents.*
 - Ashar Ghulam (Maryland DOT): Asked if there are any plans to tie this system to the State emergency response to help the system from a safety and mobility standpoint? *Amber Reimnitz (PTC) noted that they are currently in the process of getting a new Active Traffic (Transportation) Management System (ATMS) in their Traffic Operations Center. As part of the deployment of the software there will be a Smart Work Zone management module to ensure that their operations center has visibility to the system to increase situational awareness and safety. Unfortunately, due to timing of ATMS and short turnaround for design they could not incorporate this integration requirement in the pilot. She noted that all future Smart Work Zone deployments will be integrated into their Operation Center. Michael Pack (PTC) further noted that their ultimate goal is to connect all PA Turnpike vehicles, contract vehicles, and emergency response vehicles as the technology matures.*
 - Jack Sullivan (ResponderSafety.com): Asked a follow-up question on the funding source for equipping emergency vehicles with the new technology. *Michael Pack (PTC) noted that is yet to be determined. Once the technology is proven the PTC will draft a deployment plan and identify funding options.*



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- Skip Yeakel (Volvo Group North America): Asked if they would consider adding a demo for active (DSRC) communication between the oncoming traffic and a beacon or vehicle-based message sending unit? *Amber Reimnitz (PTC) noted that they very interested in deploying DSCR application along their roadway. Mike Pack (PTC) will discuss how the PTC is looking at deploying DSRC in a couple different applications including a mobile application and they will be deploying some RSUs at a few ITS devices. The PTC is finalizing a large Smart Work Zone evaluation on deployment of their systems. That evaluation includes deploying DSRC in their Smart Work Zones. Skip Yeakel noted that he was pleased to hear that DSRC is being used and offered assistance and support. Mike Pack (PTC) encouraged Skip to reach out to the PTC to discuss.*
- Ram Venkatanarayana (VDOT/VTRC): Noted that for construction vehicles entering/exiting the work zone, it seems like any traffic speed is important - especially the fast moving traffic. Ram asked that the PTC share the rationale for using speeds below (Speed Limit – 10mph) for all PCMS messages. *Amber Reimnitz (PTC) noted that the intent of the system is to reduce rear-end crashes from slow moving construction vehicles entering/exiting from within the work zone. These construction vehicles travel at a lower speed in the work zone out of necessity; therefore, they are at risk of being involved in a rear-end crash by another vehicle traveling at a higher speed. The project team and Construction staff discussed the average speed of construction vehicles as they are approaching a construction area entrance. They noted the vehicles are slowing down to 45mph or slower as they approach the entrance. They utilize the 10 MPH differential in the speed limit as the proposed threshold, but it can be adjusted based on the system observation and testing. The PCMS will be used to warn all motorists of the slow moving trucks within the work zone. As noted this is a fluid project and that they may be adjusting the detection thresholds, message duration and possibly message to ensure they are providing the best system to the customer to keep them informed.*
- **Connected Work Zone Pilot (Michael Pack, Pennsylvania Turnpike Commission):**
 - The PTC CAV roadmap was completed in April 2017. It includes short term (0-4 years), mid-term (4-10 years) and long term (10+ years) projects and connected vehicle applications. The Connected Truck Mounted Attenuator (TMA) Pilot was identified as a quick win opportunity to reduce the number of crashes.
 - The project objectives include communicating work zone information from a PTC Maintenance Vehicle to an evaluation vehicle (equipped with an on board unit (OBU)) and to Waze and to install and operate an OBU on a PTC Maintenance Vehicle without interaction required from the operator.
 - Several operational scenarios will be studied: stationary work zone, short term work zone, and mobile work zone.
 - Within the pilot program, DSRC will be used to communicate between an OBU on a PTC maintenance vehicle and other vehicles equipped with OBUs. Data will also be transmitted wirelessly from the OBU on a PTC maintenance vehicle to a server which will be polled by Waze every 1 to 10 seconds.
 - The OBU will transmit work zone messages structured as Traveler Information Messages and will also be able to receive Basic Safety Messages (BSMs). Lane-specific messages will not be transmitted during pilot due to unknown accuracy, however will be evaluated.



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- The OBU will also accept BSMs from other nearby OBUs and keep count of DSRC-capable devices on the Turnpike that communicate with the PTC maintenance vehicle.
 - As a Connected Citizens Partner, the PTC sends incident and long-term construction information to a server polled by Waze. This server will be enhanced to process customized work zone messages sent by PTC maintenance vehicle OBU and router. The new Waze moving vehicle feed, if available in time for this pilot, will be used and Waze will poll the server every 1 to 10 seconds, providing more detailed information, especially for mobile work zones. If the new Waze moving vehicle feed is not available in time for this pilot, there are other options for the Waze interface.
 - The system is anticipated to go live by mid-July 2018. The evaluation period is anticipated to be from July to November 2018. The team, in an OBU-equipped vehicle, will drive through each operational scenario. Specific evaluation metrics will be assessed to prove the technology is able to transmit data via the infrastructure to Waze with high levels of accuracy.
 - The next steps include developing DSRC architecture and specifications, identifying potential short-term DSRC installations and configuring and testing the DSRC units.
- **SPATEL Tool and the Queens Midtown Tunnel (Robert Glantzberg, TRANSCOM):**
 - TRANSCOM (a coalition of 16 transportation and public safety agencies in the New York, New Jersey, Connecticut, region) developed their SPATEL tool (Selected Priorities Applied To Evaluated Links). The data to be assessed as part of this system includes: TRANSCOM's TI-MED system (formerly TRANSMIT), Bluetooth data, HERE data, INRIX data, NJ Turnpike puck system, and other technologies.
 - TRANSCOM's Data Fusion Engine considers a variety of data sources including operational maps, CCTV, DMS messages, and travel times. They also have transit data, as well as some private carriers currently in development.
 - In October 2012, 12 million gallons of corrosive water flooded the two tunnel tubes of the Queens Midtown Tunnel (QMT) during Hurricane Sandy. Extensive repairs have been ongoing since that time. During the construction, the general work schedule has been to have one tube closed and 2-way traffic in the open tube with trucks banned - 9pm to 6am Monday through Thursday and from 10pm on Friday through 5am on Monday.
 - MTA notifies TRANSCOM of the upcoming construction schedule and TRANSCOM blasts the information to its members for their use.
 - Their Data Fusion Engine tools that are used to monitor the QMT construction project include: CCTV (viewable on map, standalone viewer, string together for a video wall – cameras can be from various agencies), VMS (view real-time messages from various agencies), Events and Incidents (real time and historical), SPATEL system (travel times), Real-time Transit Map and Planning tools.
 - The goal is to provide accurate travel time information to motorists in this area with high traffic volumes.
 - Data sources often report different speeds and travel times. This often isn't a huge disparity, however, when there are significant slowdowns (traffic traveling at less than 3 mph) the differences in travel times vary greatly over a 1-mile segment. The TRANSCOM Data Fusion Engine selects the more appropriate data source. It also allows their time system to float to 1mph.
 - When significant delays are anticipated on the QMT based on the data, the appropriate signage for motorists is displayed.



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- **Improving Work Zone Safety & Mobility (Nikola Ivanov, PMP, University of Maryland CATT Lab):**
 - Compliance with FHWA's Final Rule on Work Zone Safety and Mobility was the impetus for the development of this tool.
 - The Work Zone Performance Monitoring Tools is part of RITIS (Regional Integrated Transportation Information System).
 - The data for this tool is provided by I-95 CC member states' ATMS and lane closure permitting systems, and by probe vehicle speed information from 3rd party providers including INRIX, HERE, and TomTom.
 - Worked to satisfy three distinct audiences for this tool: project engineers/managers, public relations staff, planners and decision makers. Able to look at three levels of information – regional, corridor, and individual work zone.
 - Work Zone Dashboard contains: Overview List (active work zones organized by state and county, provides information including queue information and user cost); Critical List (drilldown based on specified criteria); User Delay Cost matrix (by day of week and corridor); and a Map of the area.
 - Individual Work Zone Profile looks at delay just for that work zone and can compare delay on various days for the same work zone. The profile contains: Settings (allows the user to customize the information shown), Lane Profiles (shows segment speeds compared to historic averages, live CCTV & DMS and nearby bottlenecks), Performance Charts (parameters for speed or travel time charts can be customized, compared to historic averages, and results may be filtered), User Delay Cost (for individual work zones can be viewed by day and time period) and a Map with the roadway.
 - Work Zone Alerts may be created and set with thresholds on different metrics. Alerts may be received as a text message or an email.
 - Data from this tool may also be used for After Action Reviews, to view congestion over time, including nearby corridors affected by the work zone (trend map and congestion scan) and identify the user delay cost incurred.

Wrap Up:

Denise thanked all participants and speakers for their participation.

Questions/Contacts:

General Questions regarding the webinar or the I-95 Corridor Coalition –

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Agencies and Organizations in Attendance		
A&P Consulting Transportation Engineers	Florida International University	Michigan DOT
AAA	Florida DOT	Missouri DOT
AECOM	Florida Turnpike Enterprise	Montgomery County Planning Commission
AEM Corp	Gannett Fleming, Inc.	MWCOG
Alabama DOT	Genesee Transportation Council	New Hampshire DOT
APCTE	Georgia DOT	New Jersey DOT
Apex Design	Global-5 Communications	New Jersey Institute of Technology
Arizona DOT	Globetrotters Eng Inc	New Mexico DOT
Arkansas DOT	Gresham, Smith and Partners	New York City DOT
Athey Creek Consultants	HDR Engineering	New York State DOT
ATSSA	HERE Technologies	New York State Thruway Authority
AutoReturn	HNTB	NITTEC
Battelle	iCone Products	North Carolina DOT
Blyncsy	INRIX	North Carolina SHP
Baltimore Metropolitan Council	Iowa DOT	North Carolina Turnpike Authority
BPA	Iteris	Ohio DOT
Caltrans	ITRE	Oklahoma DOT
CIMA+	Jacobs Engineering	Peanut Belt RPO
City of Laurel, MD	Kansas DOT	Pennsylvania DOT
Collier County	KCI Technologies	Pennsylvania Turnpike Commission
Colorado DOT	KDT Towing & Repair	Puerto Rico Highway and Transportation Authority
Comcast	Kimley-Horn	ResponderSafety.com
Connecticut DOT	KMJ Consulting, Inc	Rhode Island DOT
County of Maui	Lehigh Valley Planning Commission	RK&K
CSRA	Leidos	Rockingham Planning Commission
Cumberland County Dept of Public Safety	LJA Engineering Inc.	South Carolina DOT
DC Water	Maine DOT	Tennessee DOT
Delaware DOT	Maine Turnpike Authority	TRANSCOM
Delaware Valley Regional Planning Commission	Manatee County	UMD CATT Lab
District DOT	Manufacturer - Gregory Industries	US DOL-OSHA
DOL - OSHA	Maricopa County DOT	UVM Transportation Research Center
Drive Engineering Corporation	Marlin Engineering	Virginia DOT
DriveOhio	Maryland DOT SHA	
Federal Highway Administration	Massachusetts DOT	