FHWA Maintenance Operations Update

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FHWA Office of Operations

July 20, 2016
Traffic Incident Management (TIM) Training Programs
Training for TIM Responders and Program Managers

- Classroom
- Discipline-Specific Academy or
- e-Learning

Specialized Unit Training
Unified Command Management or Discipline-Specific Training
Intermediate & Advanced Level Traffic Incident Responder Course
SHRP2 Traffic Incident Responder Training Course
- (1) Train-the-Trainer classroom;
- (2) 4-hour Practitioner classroom;
- (3) Web-based (individual self-paced);
- and (4) Virtual classroom (coming soon)
SHRP2 Traffic Incident Responder Awareness Training Evaluation Process
TIM Advanced Management Workshop
Decision Maker Awareness Briefing
Executive Briefings
National TIM Responder Training (SHRP2)

Train-the-Trainer Sessions
- 240 sessions with 8,187 participants

In-Person Responder Training
- 7,226 sessions with 174,275 participants

Web-Based Training (WBT)
- 9,057 participants

Total Trained: 191,519
Total Trained by Discipline

- **Fire/Rescue**: 68,165 (17.0%) - 400,615
- **Law Enforcement**: 59,658 (15.0%) - 396,676
- **EMS**: 9,061 (4.0%) - 224,900
- **Transportation/Public Works**: 23,051 (27.6%) - 83,430
- **Towing and Recovery**: 16,558 (20.9%) - 79,376
- **Other Disciplines**: 15,026 (34.1%) - 44,035

Legend:
- **Total Trained**
- **Total To Be Trained**
Road Weather Connected Vehicle Applications
Connected Vehicles

Windshield Wiper
Head Lights
Outside Air Temperature
Barometric Pressure

ABS/Brakes
Traction and Stability Control
Steering Angle
Throttle Position

Speed
Location
Heading
Elevation

Differential Wheel Speed
Accelerometer
Yaw/Pitch/Roll
Engine Load

Images: USDOT, NCAR
Connected Vehicle Data Translator (Pikalert® VDT)

- **Software** that creates highly detailed weather and road condition nowcasts and forecasts
- **Inputs:**
  - Vehicle-based measurements (vehicle actions, pavement conditions, atmospheric measurements)
  - Traditional weather data sources

Image: NCAR
Using Pikalert VDT

Data is wirelessly transmitted from vehicles

Data is QC’d and processed

Vehicle Data Translator

Content Providers

Road Weather Info. is disseminated

Road Weather Info. is fed into Decision Support Systems
The Weather Data Environment (WDE)  
https://wxde.fhwa.dot.gov

- The WDE is a database system that collects, quality checks, archives, and disseminates road weather observations.

- The purpose of WDE is to provide a data and interoperability platform to meet the weather-related research needs of the community, especially for ITS.
WDE Functions

- **Collection of Data**
  - Road Weather Information Systems (RWIS)
  - Mobile Vehicles
  - Weather observations from the National Weather Service (NWS) - used for quality checking
  - Metadata about the contributors, sites, stations, sensors, observations, quality checks, and more

- **Quality Checking of Observations (using Pikalert)**

- **Dissemination of Data**
  - Map Graphical User Interface (GUI)
  - On-Demand Query
  - Subscription Service
WDE User Interface
Integrated Mobile Observations (IMO) Project

Objectives:
- Better understand how to capture, communicate, and process data from the vehicle’s internal codes and external road weather sensors placed on the vehicle
- Identify uses for and incorporation of the data in new and established applications
- Evaluate the impacts and results of utilizing the data in applications

Outcomes:
- Used to enhance decision making by traffic operators, maintenance managers, and travelers
Integrated Mobile Observations (IMO) Project

Explore the feasibility of using vehicle-based data to improve transportation safety & mobility

**Minnesota DOT**
- ~550 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Wiper Status
  - Brake Status
- AVL & Cellular

**Michigan DOT**
- ~50 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Brake Status
  - Accelerometer
- Bluetooth & Cellular

**Nevada DOT**
- ~20 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Wiper Status
  - Maintenance Status
- Radio & Cellular
Enhanced Maintenance Decision Support System (EMDSS)

- Produces road weather forecasts and winter maintenance treatment recommendations
- Aids maintenance managers and other personnel in key decisions of treatment type, timing, rates, and locations
- The plow truck becomes a connected vehicle.

Image: USDOT
EMDSS Display - Vehicle Locations, Radar, Road Segment Trouble Areas
Motorist Advisory and Warning (MAW) System

- Displays road weather alerts and hazard forecasts to decision makers ranging from DOT personnel to the traveling public
- Uses VDT output and road weather forecasts to provide these alerts
- Pre-trip: web-based display
- En-route: mobile application
MAW Web-based Display

**Map Overview**

- The map displays various locations in Minnesota, including major cities and towns.
- Icons indicate different road conditions and weather-related events.

**Table of Conditions**

<table>
<thead>
<tr>
<th>Time</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 11/30 11:00 am</td>
<td>Advisory: Precip. light snow, Pavement: wet, Visibility: normal</td>
</tr>
<tr>
<td>Mon 11/30 12:00 pm</td>
<td>Advisory: Precip. light snow, Pavement: wet, Visibility: normal</td>
</tr>
<tr>
<td>Mon 11/30 1:00 pm</td>
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</tr>
<tr>
<td>Mon 11/30 2:00 pm</td>
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<td>Mon 11/30 3:00 pm</td>
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<tr>
<td>Mon 11/30 4:00 pm</td>
<td>Clear</td>
</tr>
<tr>
<td>Mon 11/30 5:00 pm</td>
<td>Clear</td>
</tr>
<tr>
<td>Mon 11/30 6:00 pm</td>
<td>Warning: Precip. moderate snow, Pavement: slick, icy, Visibility: low</td>
</tr>
<tr>
<td>Mon 11/30 7:00 pm</td>
<td>Warning: Precip. heavy snow, Pavement: slick, icy, Visibility: heavy snow</td>
</tr>
<tr>
<td>Mon 11/30 8:00 pm</td>
<td>Warning: Precip. light snow, Pavement: slick, icy, Visibility: normal</td>
</tr>
<tr>
<td>Mon 11/30 9:00 pm</td>
<td>Warning: Precip. light snow, Pavement: slick, icy, Visibility: normal</td>
</tr>
<tr>
<td>Mon 11/30 10:00 pm</td>
<td>Warning: Precip. light snow, Pavement: slick, icy, Visibility: normal</td>
</tr>
</tbody>
</table>
MAW Mobile Application

Alerts: ON

Phone Id: 2187914824
State: Minnesota
Session Id: 1393365182
Sequence No: 3

No alert.

Alerts: ON

Phone Id: 2187914824
State: Minnesota
Session Id: 1393450710
Sequence No: 3

Icy roads possible ahead. Drive slowly and use caution.

Alerts: ON

Phone Id: 2187914824
State: Minnesota
Session Id: 1393605611
Sequence No: 6

Light snow ahead. Snowy, slick roads. Delay travel, seek alternate route, or drive slowly and use extreme caution.
Weather Responsive Traffic Management

- **Wyoming DOT**
  - Road condition reporting app on tablets
  - Installed on plow trucks
  - Data electronically sent to TMC
  - VSL and DMS are adjusted

- **South Dakota DOT**
  - Combined IRIS/MDC road reporting and MDSS forecasting
  - Enhanced content and display of severe weather advisories
  - Website, mobile app and 511 alert travelers

- **Michigan DOT**
  - Combined fixed and mobile obs
  - Quality checking and analysis
  - Conditions and forecasts used in ATMS, DMS and website
Smarter Work Zones: an EDC-3 Initiative
EDC-3 Smarter Work Zone Initiative

Innovative strategies designed to optimize work zone safety and mobility

**Project Coordination**

Coordination within a single project and/or among multiple projects within a corridor, network, or region, and possibly across agency jurisdictions

**Technology Application**

Deployment of ITS for dynamic management of work zone traffic impacts, such as queue and speed management
Project Coordination Strategy

Examples

• Region or corridor-wide software for ROW construction activity coordination
• Corridor-level Traffic Management Plans (TMPs) to address traffic-related construction impacts
• Corridor-level thresholds to minimize work zone mobility impacts
• Multi-agency construction traffic management activities

For more information check out the SWZ PC website
https://www.workzonesafety.org/swz/swzproject-coordination/
Project Coordination Tool
Work Zone Implementation Strategies Estimator (WISE)

• Developed under the SHRP2 R11 project
• Made up of two modules (planning and operations)
• Proactively reduces WZ impacts by:
  ▪ Effective project coordination upfront in planning/programming
  ▪ Carrying coordination through to project planning/design decisions
• Four organizations awarded grants to pilot the WISE tool
  ▪ California – Assoc. of Monterey Bay Area Governments MPO
  ▪ Florida – MetroPlan Orlando MPO
  ▪ Maryland DOT
  ▪ Tennessee DOT

Tool and documentation available at http://www.trb.org/Main/Blurbs/168143.aspx
Types of Technology Applications

- Real-Time Traveler Information
- Queue Warning
- Dynamic Lane Merge
- Incident Management
- Variable Speed Limits
- Automated Enforcement
- Entering/Exiting Construction Vehicle Notification
- Performance Measurement

For more information check out the SWZ TA website
https://www.workzonesafety.org/swz/swztechnology-application/types-of-applications/
Several States are already Utilizing SWZ!

- **34 States** have implemented Project Coordination strategies
- **41 States** have implemented Technology Applications
How can I gather more information?

**SWZ Interactive Toolkit**

https://www.workzonesafety.org/swz/
Learning Opportunities

- In-Person Workshops
- Virtual Peer Exchanges
- In-Person Peer Exchanges
- Demonstration Site Visits

Free educational opportunities are available!

Contact Jawad Paracha for more information
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AASHTO Maintenance Subcommittee Meeting Technical Working Group Breakout