Lessons Learned in Portable Work Zone Monitoring

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Agenda

- Overview of Work Zone Monitoring Systems
- Overview of Technical Specifications from Different States
- Lessons Learned
- Questions & Answers

Overview of Work Zone Monitoring Systems

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Sample Vendors

- **Trichord, Inc.**
  - 12888 James Monroe Hwy
  - Leesburg, VA 20176
  - 703-737-0162
- **ASTI**
  - 18 Blevins Drive
  - New Castle, DE 19720
  - 302-328-3220
- **Ver-Mac**
  - 2560 Minnehaha Ave., Suite 500
  - Minneapolis, MN 55406
  - 612-521-2122

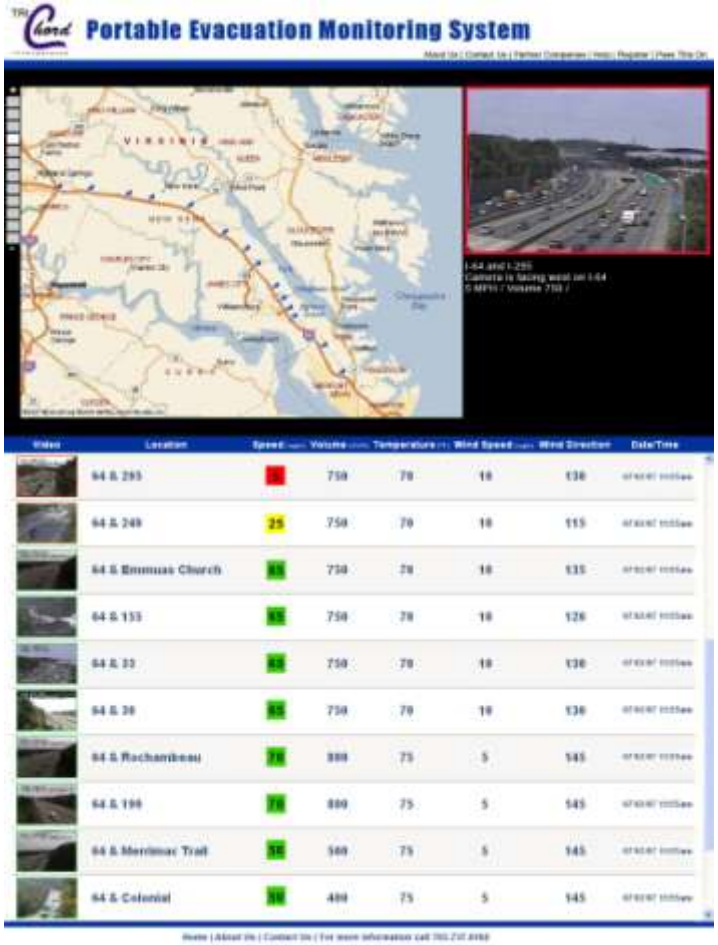
FHWA Requirements for Work Zone Monitoring

- **Each state shall implement a policy** for the systematic consideration and management of work zone impacts on all federal aid highway projects
- **Each state shall develop and implement systematic procedures** to assess work zone impacts. The details of the systematic procedures are left to the state
- **State shall use field observations**, available work zone crash **data**, and **operational information** to manage work zone impacts.
- **State shall train personnel** in the development, design, implementation, operation, inspection, and enforcement of work zone related traffic management
- **Specific plans shall be developed for significant projects**. A significant project is a project that is expected to cause sustained work zone impacts that are greater than what is considered tolerable based on state policy or engineering judgment. For a significant project, you need to develop a Transportation Management Plan (TMP) that addresses Temporary Traffic Control (TTC), Transportation Operations (TO) and Public Information (PI) components. The TCC plan describes the temporary traffic control measures that will be used in the project. The Traffic Operations component identifies the strategies that will be used to mitigate the impact of the work zone on the transportation network. The Public Information component identifies the communication strategies that will be used to inform the public about the project and its affects upon the transportation network.
- **These rules apply to any project released after October 12, 2007**.

ConOps for Work Zone Monitoring Systems

- **Mobile trailers with traffic sensors, cameras, CMS, solar power and wireless communications are deployed for daily operations, e.g. work zone monitoring**
- **A Network Operations Center and/or Server provides real-time traffic monitoring that includes speed, count, travel time, and video**
- **DOT receives real-time traffic data on roads of interest via a secure website**
- **DOT influences traffic via CMS, HAR, 511, etc.**
- **Future extension of WZM systems to integration with temporary signals, ramp metering, and signal timing**

Web Site for Viewing Information



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Benefits

- **Work Zone Monitoring**
- **Hurricane/Natural Disaster Evacuation**
- **Rural Road Monitoring**
- **Infrastructure Monitoring**
- **Analysis and Testing for Permanent Equipment Locations**
- **Improved Operations**
  - Travel Times for “Cover in Place”
  - Travel Times to the Evacuating Public
- **Traffic Management for Special Events in Rural Areas**
  - NASCAR Races
  - Football Games

Overview of Technical Specifications from Different States

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Samples of State Specifications

- **Virginia**
  - 1st procurement: purchased cameras, sensors, software, and integration into Hampton Roads TMC (IFB)
  - 2nd procurement: purchased traffic monitoring service of cameras and sensors only (RFP)
  - 3rd procurement: purchased cameras and sensors (IFB)
- **Delaware**
  - Purchased cameras only with integration into TMC (IFB with bid bond)
- **New Hampshire**
  - Purchased signs, sensors, cameras and software as a service (IFB)
- **Illinois**
  - Purchased sensors & cameras, cameras alone, software, and integration into TMC (RFP)

Lessons Learned

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Disconnect Between TMC Operators and Field Staff

- **Issue: TMC Operators and Field Technicians do not understand each others role and/or job and do not work well together. They must work well together in order for the WZM system to be effective**
- **Solution: Cross training. Send operators out to the field and send field technicians to the TMC to see how data is used.**

Field Crews Forget Training When the System is Used Infrequently

- **Issue: Crews do not retain training if skills are rarely used.**
- **Solution: Deploy system for other purposes in addition to work zone monitoring to gain increased benefit from the system and keep crew skills fresh.**

Space is Tight in a Work Zone

- **Issue: Minimum offsets for radar sensors often cannot be met in a work zone and adversely affects data accuracy**
- **Solution: Allow other sensor solutions e.g. passive acoustic and/or blue tooth detection**

Data Communication and Costs

- **Issue: Data communication costs can be significantly affected by video (e.g. for private sector, 30 fps video communications can cost $5K per month per camera)**
- **Solution:**
  - Have the DOT use a state contract to get better pricing for communications and provide the service to the contractor
  - Specify 1 fps as the video requirement to cap communications costs within existing data plans
  - Have the DOT cover “overage” charges when operations requires more than 1 fps

Solar Power Market is Rapidly Changing

- **Issue: Parts are scarce (e.g. solar panels, batteries) and pricing is variable because manufacturers are leaving the market (e.g. BP, Sharp)**
- **Solution: Provide defined quantities and delivery schedules well in advance so contractors can guarantee on time delivery**

Estimated Costs of Systems

- **Issue: DOTs underestimate or overestimate the costs for a work zone monitoring system**
- **Solution:**
  - Develop an RFI that requests list price information from vendors before you release your procurement
  - Use cost results from other states for price guidance (with caution e.g. New Hampshire)
  - Use Engineering Rule of Thumb that WZM costs 0.5% - 0.75% of the total construction cost of your project

Procurements Appear "Wired"

- **Issue: Current Specs are often tailored and end up specifying particular vendors at a potentially higher cost**
- **Solution: Need functional requirements as a part of the specification to open competition**

Questions & Discussion

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