Agency Practices for Low Visibility Detection and Communication

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2015 National Rural ITS Conference
August 11, 2015
Overview

• Introduction
• Approach
• System summaries
• Conclusions
Introduction

• Visibility reducing events have a safety impact on motorists and require warning.
• Arizona DOT faced with windblown dust issues.
• Agencies have deployed systems and approaches to provide warnings to travelers.
• Specifics related to these systems and approaches remained largely unknown.
Introduction cont’d

• Goal: document information/agencies that used visibility warning systems.
  – Approaches used to provide visibility warning information to drivers.
  – General communications about such events with the public.

• Provide ADOT with a state-of-the-practice summary of how visibility was detected and messages were conveyed to the public.
Approach

• High-level literature review to identify visibility warning systems previously documented.
  – Use this general system information to identify prospective contacts with agencies.

• Conduct telephone interviews to obtain information of interest.

• Contact further staff familiar with the system when applicable.
  – Determine if contacts knew of similar systems at other agencies that should be investigated.
Approach cont’d

• Information of interest:
  – Nature of problem addressed
  – Frequency and scope of problem
  – Approach(es) taken to address problem
  – Overview of the system(s) employed, including system components.
  – Approaches to communications with drivers, other entities and the general public
  – System status
Systems

• 20 systems identified in 16 states
• Addressed fog, smoke, dust, snow
• Various components used – visibility sensors, RWIS, message signs, etc.
• Warning universally provided to drivers in the field
  – Some secondary warning provided via web, 511, etc.
Alabama

• I-10 Bay Bridge Fog Warning System
  – Addresses fog on the Bay Bridge in Mobile
  – 8 miles in length
  – Components – visibility sensors, RWIS, DMS, Variable Speed Limit (VSL) signs
  – Warning messages posted to DMS, VSL implemented
  – Status = Active
District 10 Fog Warning System
- Addresses fog, smoke, dust, inclement weather
- Deployed district wide
- Components – visibility sensors, RWIS, CMS
- Warning messages posted to CMS, posted to QuickMap website
- Status = Active
California

• State Route 99 Fog Detection and Warning System
  – Addresses Tule fog (November – February)
  – 12 miles in length
  – Components – visibility sensors, radar speed sensors, CMS, CCTV
  – Warning messages posted to CMS, website
    • Fog education pamphlet and website also developed.
  – Status = Active
California

• State Route 18 and 138 Visibility Warning System
  – Addresses fog at intersection
  – 400 feet in advance of intersections
  – Components – Visibility sensors, DMS
  – Warning messages posted to DMS for low visibility and intersection ahead
  – Status = Active
Florida

• Paynes Prairie Low Visibility Warning System
  – Addresses smoke and fog
  – 2.5 miles in length
  – Components – visibility sensors, CCTV, Forward Looking Infrared (FLIR) cameras, DMS
  – Warning messages posted to DMS, flashing beacons activated, message posted to 511 and Twitter, warning posted to website, email alerts to trucking companies, staff posted at rest areas
  – Status = Active
Georgia

- I-75 Fog and Smoke Warning System
  - Addresses fog and smoke/smog
  - 14 miles in length
  - Components – Fog detectors, loop detectors, CCTV, VMS
  - Warning and speed advisory messages via VMS
  - Status = Active
Idaho

• I-84 Storm Warning System
  – Addresses blowing dust (most common), fog, smoke and blowing snow
  – 40 miles in length
  – Components – Visibility sensors, RWIS, DMS, NWS weather forecasts
  – Warning messages via DMS, general warning on website and 511
  – Status = Active
Louisiana

• Reduced Visibility Enhancement System
  – Addressed fog
  – 25 miles in length
  – Components – Visibility sensors, RWIS, VSL signs, DMS, CCTV, raised pavement markings/striping
  – Driver warning via DMS, VSL implemented
  – Status = Inactive
Maryland

• I-68 Fog Warning System
  – Addresses fog
  – 20 miles in length
  – Components – DMS, weather reports, staff field observations
  – Driver warning via DMS
  – Status = Active
Montana

• I-15 Dust Warning System
  – Addresses alkali dust
  – 1 mile in length
  – Components – Infrared sensors, flashing beacons on static signs
  – Driver warning via flashing beacons
  – Status = Active
Nevada

- I-80 Fog-based VSL System
  - Addressed fog
  - 4 miles in length
  - Components – RWIS, VSL
  - VSL implemented
  - Status = Inactive
New Jersey

• I-287 Fog Sensor/ITS Integration
  – Addresses fog and hazardous weather
  – Components – Visibility sensors, CCTV, RWIS, VMS, pavement temperature and traffic sensors
  – Driver warning and lowered speed limits via VMS
  – Status = Ongoing
New Mexico

• I-10 Dust Control System
  – Addresses dust
  – 1 mile in length
  – Components – Visibility sensors, CCTV, speed sensors, RWIS, DMS
  – Advisories or warnings posted to DMS, HAR, 511, website
  – Status = Active
North Carolina

- I-40, I-26 Fog Warning Systems
  - Address fog and snow
  - 17 miles in length
  - Components – RWIS, CCTV, flashing beacons
  - Activate flashing beacons on static signs, email alerts to agency staff
  - Status = Active
Pennsylvania

• Route 22 Fog Warning System
  – Addresses fog
  – 4.9 miles in length
  – Components – Visibility sensors, VMS, auto dialer, wireless pager technology, CCTV
  – Driver warning via VMS
  – Status = Active
Pennsylvania

• Turnpike Fog Warning System
  – Addresses fog
  – 10 miles in length
  – Components – Visibility sensors, CCTV, RWIS, microwave traffic sensors, DMS
  – Driver warning and variable speed limits via DMS, warning on website, smartphone app, and 511
  – Status = Active
Tennessee

• I-75 Fog Warning System
  – Addresses fog
  – 17 miles in length
  – Components – Visibility sensors, VSL, radar detectors, HAR, closure gates, flashing beacons, DMS
  – Driver warning via DMS, flashing beacons on static signs, VSL, road closures via TMC staff (graduated response plan)
  – Status = Active
Utah

• I-215 Low Visibility Warning System
  – Addresses Tule fog
  – 1 mile in length
  – Components – Visibility sensors, vehicle detectors, DMS
  – Driver warning and speed guidance via DMS
  – Status = Inactive
Virginia

• I-64 Afton Mountain Fog Warning System
  – Addresses fog
  – 8 miles in length
  – Components – Visibility sensors, CCTV, RWIS, CMS
  – Driver warning via CMS, driver guidance via in-pavement lighting, message on 511 (graduated response plan)
  – Status = Active
Virginia

- I-77 Fancy Gap Variable Speed Limit System
  - Addresses fog
  - 14 miles in length
  - Components – Visibility sensors, VSL, VMS
  - VSL based on conditions, driver warning via VMS
  - Status = Under construction
Lessons Learned

• The human element remains an important part of many systems.
• System components must be regularly maintained.
• Maintenance and replacement costs should be budgeted.
• When an issue is limited to a localized site, less complex systems can meet the needs of an agency.
Lessons Learned

• For longer corridors, electronic notification via mechanisms such as a traveler information website may be a preferred option compared to in-field equipment.

• Collect good field data and clearly define the problem before designing and implementing a system.

• Engage key stakeholders.
Conclusions

• A number of states have deployed or are deploying systems to address visibility conditions.
• Low visibility conditions identified include fog, smoke, dust and blowing snow.
• Visibility sensor use is almost universal.
• Warning provided to drivers in the field.
  – Challenge is warning drivers before they reach the site of concern.
Conclusions cont’d

• Most agencies do not extensively provide warning via other mechanisms.
  – When done, it is via web or 511.

• Limited education and outreach activities related to low visibility events.
  – “Local residents are aware of them.”

• Few evaluations of the impacts of systems on safety have been made to date.
Acknowledgments

- Arizona Department of Transportation
- ADOT Project panel members – Dianne Kresich, Tim Tait, Matt Burdick, Garin Groff and Beverly Chenausky
- Sonoma Technologies – Stephen Reid and Clinton MacDonald
- Individuals that were interviewed about the various systems
Questions?

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