Agency Practices for Low Visibility Detection and Communication

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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

California

- 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.

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Questions?

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