

NATIONAL SYMPOSIUM: IMPACTS OF EXTREME WEATHER ON TRANSPORTATION

Synthesis of Overarching Themes, Best Practices, and
Lessons Learned

Extreme Weather

- Not only are certain types of extreme weather getting worse, but public expectations of DOT response have greatly increased

Examples of extreme weather:

- Alabama experiences wet and dry cycles that trigger landslides and sinkholes
- Longest flood in U.S. history experienced in Iowa
- Seasonal timing of lake-effect snow in Michigan is getting harder to predict
- Frequency and magnitude of flooding has changed in western Washington

Overarching Themes

- State DOTs handle a diversity of extreme weather events, from 8-hour dust storms to blizzards in April
- However, there are strong similarities between many of the emerging best practices and data needs for all extreme weather types
- The community of practice present at this symposium represents a wealth of knowledge on how to handle these events – there is a tremendous need to share experiences

“Wish List” for Increasing Resilience to Extreme Weather

- Weather forecast needs (across all types of extreme weather)
 - ▣ **Real-time data** on actual weather conditions during an event.
 - ▣ Ability to **translate weather forecasts into metrics that matter** to specific types of transportation decision making.
 - ▣ Information on the **reliability of weather forecasts**.
 - ▣ Weather **forecasts that match the timing of our budget cycles**.
- Institutional understanding within state DOTs
 - ▣ To what extent can we use **known threshold points** (e.g., 3 inches of snow/hour) to make management decisions?
 - ▣ **What level of risk is acceptable to us?**

Best Practices: Communication and Outreach

- Use many communication channels to provide real-time information (Twitter, calls, texting, traditional media outlets, etc)
- Build relationships with stakeholders (e.g., commercial carrier services) ahead of time
- Methods of ensuring interoperability can save time and resources

Lessons Learned: Operations and Maintenance

- Designing a transportation system to cover all extreme events at every location is impractical and very expensive –emergency response and maintenance can be a more efficient option
- Performance metrics (such as user delay costs) can provide helpful ways of measuring efficiency and effectiveness of O&M tactics
- Technologies are rapidly emerging to collect real-time information on road weather conditions (e.g., using data collected by vehicles)

Lessons Learned: Design

- Context-sensitive design changes may be warranted in critical and vulnerable areas
- Need to increase awareness in your organization regarding extreme weather planning and design across *functional areas* (e.g., VTrans/ANR river channelization)
 - ▣ Training
 - ▣ Updated data and models reflecting recent trends
- Partnerships with information providers to understand what data exists and associated uncertainties
- Regulatory partners are important
- Guidance manuals must reflect flexibility and may be used to justify augmentation to standard design approaches

Lessons Learned: Vulnerability Assessment and Asset Management

- Asset management systems and spatial data on asset locations enable effective vulnerability assessments
- Drawing on the institutional knowledge of maintenance staff and working with locals to understand vulnerability is key

Learning from the Past and Sharing Best Practices

- Let's learn from past experiences through post-event “de-briefs” and events such as this one
- This field is rapidly evolving; it is critical for state DOTs to share best practices with each other