National Symposium on Extreme Weather Event Impacts on Transportation Infrastructure

May 22, 2013

Extreme Winter Lake Effect Operations and Maintenance

Gregory C. Johnson, PE
Chief Operations Officer
Michigan Department of Transportation
Winter Events – Continental U.S.

U.S. Annual Snowfall
Estimated from Observed and Modeled Data
“Economic costs of disruption from a snow storm is $66-$700 million per day in some states - $251 million for Michigan - for just a one-day shutdown due to impassible roads.”

– Study prepared for the American Highway Users Alliance by IHS Global Insight
Great Lakes Region’s Climate

Credit: Accuweather.com
Great Lakes Region’s Climate Lake Effect

Michigan’s proximity to the Great Lakes has a profound influence on its weather and climate. The lake effect influence results in a cloudier, wetter, more moderate climate.
Great Lakes Region’s Climate Lake Effect

Warmer Water – More Evaporation

Changes in Great Lakes Evaporation by Decade

Notes:
* Data used to estimate the 2010’s decade is provisional data from 2010 - 2012.
** Water temperature data is a combination of modeled and observed water surface temperatures.
Great Lakes Region’s Climate Lake Effect
Winter Melt/Spring Rains - More Flooding
Michigan’s Climate and Transportation

- 35% of US/Canada trade flows through Michigan
- $520 billion in freight is moved each year on Michigan’s highways, rail and water ports
- Trucking accounts for 67% of all freight tonnage moved in Michigan
Michigan’s Climate – Lake Effect

Blizzard warnings!  
Most roads impassable here!
Extreme Weather Event
Winter Operations (Operations & Maintenance)

Event Summary
5 inches to a Foot or More of Snow
Snow Expected Through Saturday
All of Southwest Lower Michigan

Created: Thursday, January 31, 2013 – 100 PM

NOAA National Weather Service - Grand Rapids, Michigan
Website: http://www.weather.gov/grandrapids
Email: w-grr.webmaster@noaa.gov
Phone: 616-949-0643
Winter Operations
Extreme lake effect storms changing O&M

Continuously investigate policy and procedures solutions
Winter Operations
Extreme lake effect storms changing O&M

- Number of employees
- Numbers/start times of shifts
- Temporary winter employees
- Need for lodging

Continuously investigate workforce solutions
Winter Operations
Extreme lake effect storms changing O&M

Continuously investigate equipment solutions
Winter Operations
Extreme lake effect storms changing O&M

Y-Chute
Bounce and Scatter Collection

Rear Cross Conveyor
Bounce and Scatter Collection

Continuous investigation of material solutions
Winter Operations
Extreme lake effect storms changing O&M

Maintenance Decision Support System - Predictions for the Southwest Region’s I-94 corridor:

- Start of storm event – January 30, 2013 at 8:00 pm
- Average temperature – 16 degrees
- Inches of snow – 7 inches
- Wind speed – 20 mph with 35 mph gusts
- Recommended action: Patrol and plow, no material

Continuously investigate operating system solutions
Temperature and snow accumulation for I-94 in Van Buren County along mile markers 41 to 56
Winter Operations
Good Government in Action: User Delay Costs

Winter event impact to I-94 users:

- Actual user delay costs $223,898
- Target user delay costs $35,000

Continuously improve performance measurements and outcomes
Winter Operations
Good Government in Action: Event Regain Time

Coloma Garage I-94: Week 12 - Event 1

Winter event impact to I-94 users:

- Average travel speed 47 mph
- Regain time achieved in 10 minutes

Reported Event Start Time: 12am 1/31/13
Reported Event End Time: 7:30pm, 2/2/13
Time Normal Speeds Achieved: 7:40pm 2/2/13
Garage Reported LOS: 10:30pm 2/2/13
Winter Operations
Good Government in Action: Traffic Incident Mgt.

Coloma Garage I-94: Week 12 - Event 1

Weather event impact to I-94 users: Traffic incidents – six (two over 2-hrs)
Winter Operations
Great Lakes Regional Transportation Operations Coalition

1) Connecting Traffic Operations Centers
2) Seeking to expand the Gateway Traveler Information System from part of three states to five states plus Ontario
3) Regional Operations Forum in June 2014
Winter Operations
The Future State

• Better management of our performance
  – More advanced logistics with workforce, equipment, materials, decision-making, communication, etc.
  – Improved regain time (clearer roads)
• Better results and satisfied customers

It is all about Customer Satisfaction!
Questions?

Customer Service is Important
Please take our customer survey:

www.michigan.gov/mdot