

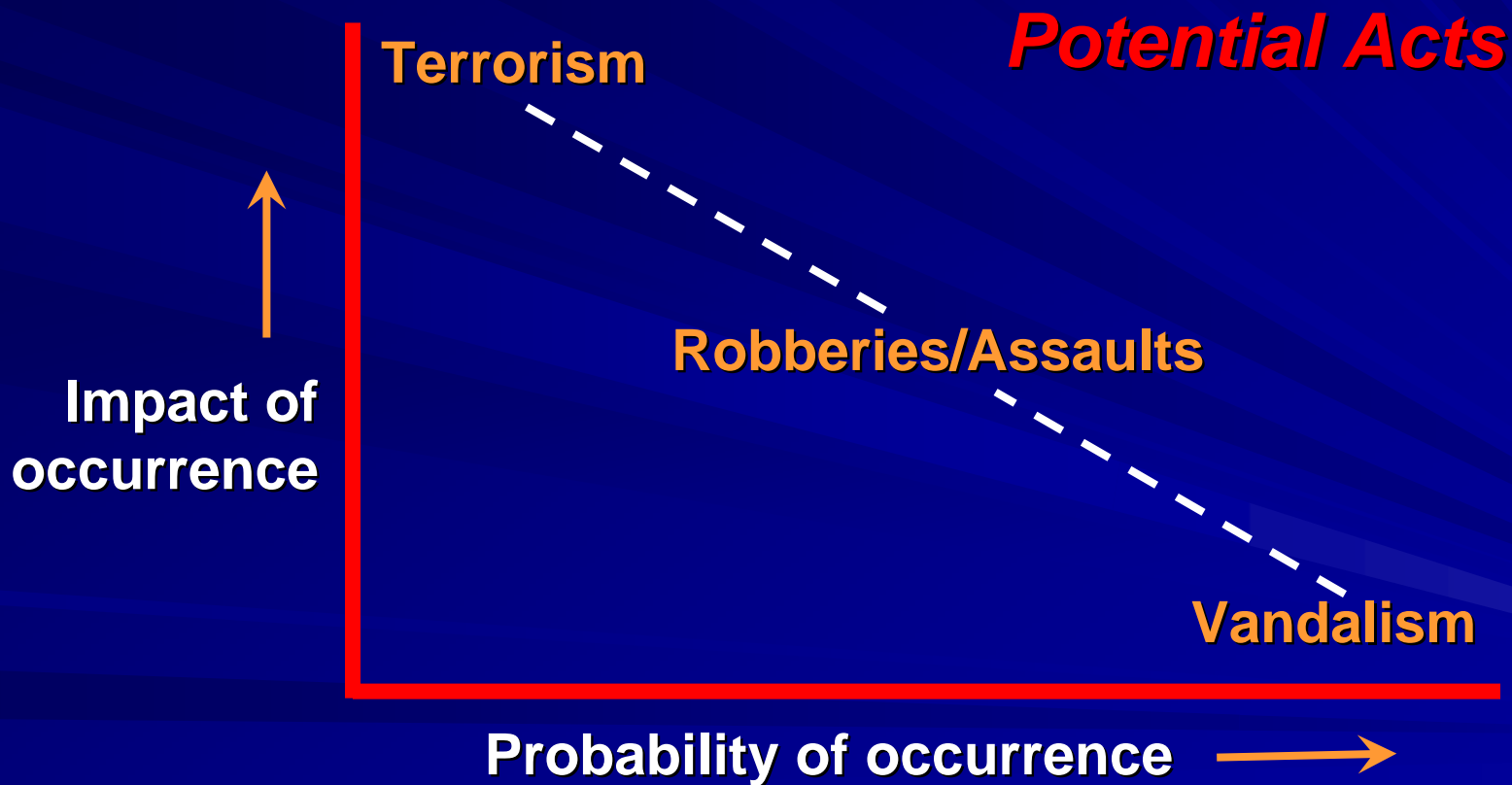
FUTURE CHALLENGES

- Homeland Security/Emergency Management
 - Workforce Management
 - Construction Impact on Traffic
 - Winter Maintenance Operations
 - Environment/Materials Recycling

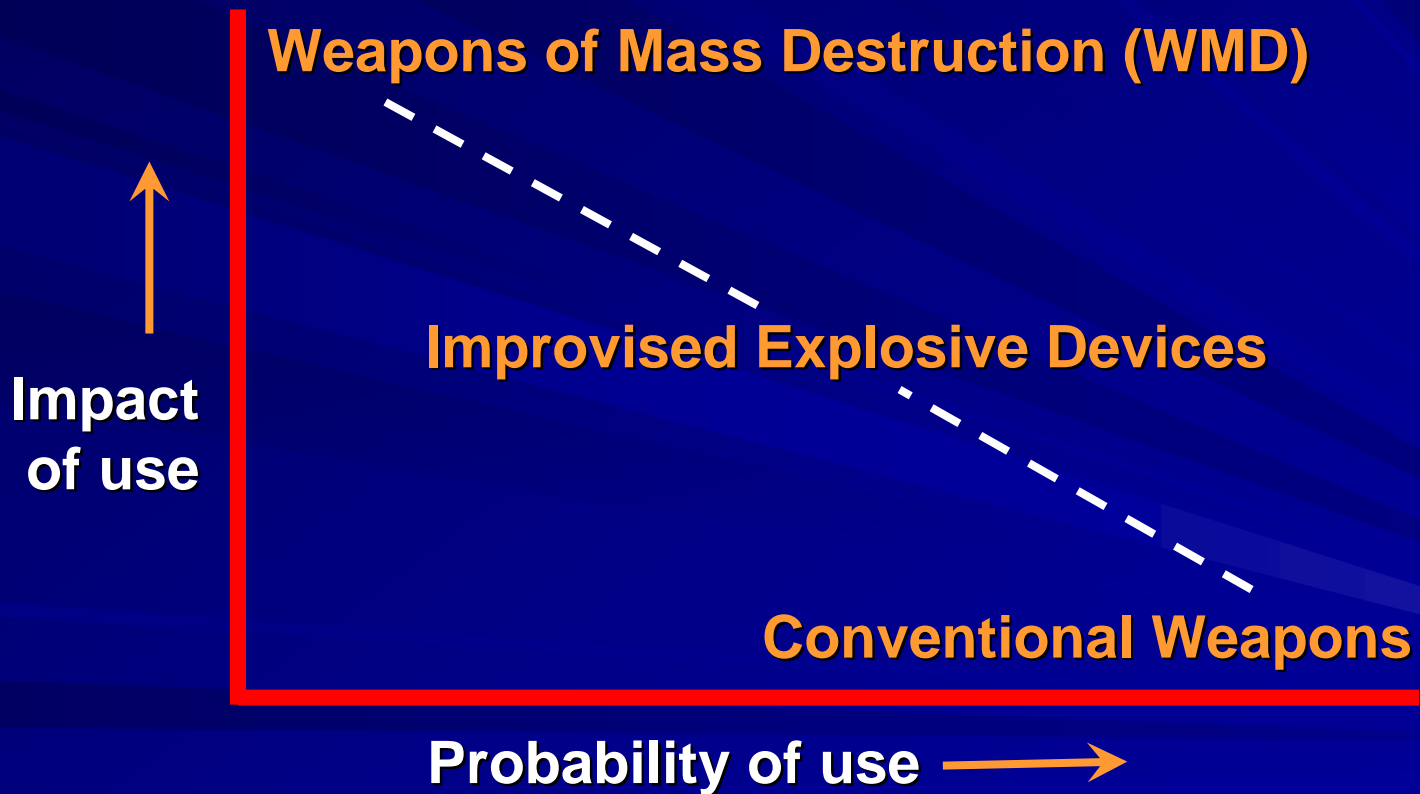
What is System Security?

- The use of operating and management policies and procedures to reduce security vulnerabilities to the lowest practical level
- A process focusing on preventing *all* levels of crime against the general public, employees and property

Transportation System Threats



Potential Weapons



Critical Assets and Facilities



The Effects on D.O.T.'s

- Incidents - injuries and casualties
- Road Closures
- Panic and confusion
- Evacuations
- Economic dislocation



How is Vulnerability Reduced?

- Vulnerability assessments
- Develop and implement security plans
- Repair or enhance system weaknesses
- Policy enforcement
- Employee training
- Employee alertness



Roles and Responsibilities

Front-Line Employee

- Observation and reporting

Supervisors

- Assessment and decision-making

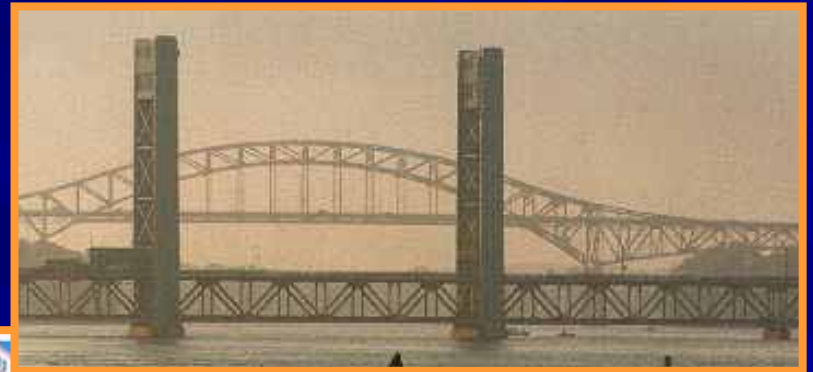
Management

- System-wide safety and security planning



Bridge Types

- ✓ Suspension Bridges
- ✓ Through-Span Bridges
- ✓ Deck Bridges
- ✓ Cantilever Bridges
- ✓ Movable Bridges
- ✓ Floating Bridges



Bridges - Areas of Concern

- ✓ Footings, piers and abutments
- ✓ Hidden areas of supports and beams
- ✓ Stairwells and walkways
- ✓ Service rooms and cabinets
- ✓ Decking and railings



Roads

- ✓ Along shoulders
- ✓ Bushes and foliage
- ✓ Light poles
- ✓ Equipment cabinets
- ✓ Guardrails
- ✓ Retaining walls
- ✓ Culverts
- ✓ Overpasses



Neighboring Systems

- ✓ Local and county roads
- ✓ Railroads
- ✓ Transit systems
- ✓ Electrical lines
- ✓ Pipelines
- ✓ Cable and phone lines
- ✓ Water and sewerage lines



OTHER THREATS

- Natural Disasters
- Biological (hoof & mouth, epidemics)
- Amber Alerts
- Nuclear Plant Releases
- Chemical Release / Spill

Continuity of Operations / Continuity of Government (COOP / COG)

WORKFORCE DEVELOPMENT

- HIRING

- TRAINING

- RETAINING

Iowa Department of Transportation HIGHWAY DIVISION

- Equipment Operators and Maintenance Employees (1,172)
- Construction Technicians (240)
- Materials Technicians (80)

IOWA DOT HIGHWAY DIVISION TRAINING ACADEMY



Chris Anderson
Technical Training &
Certification
Coordinator

Training Academy

- Identify and Maintain Technical Competencies
- Provide Efficient Deployment of Training Opportunities
- Train for New Technologies
- Provide Essential Cross Training for All Functional Areas

Academy Purpose

- Employees to better understand the skills necessary to perform their jobs and the training needed and/or available to obtain those skills
- Deliver a new employee Basic Training to give Equipment Operators an introduction into Maintenance, Construction, and Materials, as well as, needed safety and Employee Development training.

Basic Training – 2004/05

- Safety, Employee Development
 - 4 days
 - Computer excluded
- Maintenance
 - 3 days
- Construction/Materials
 - Spring (April)
 - 5 days
 - PCC I held in District locations

JOB DUTY	TRAINING	
	Required Year 1	Required As Needed
<u>General</u>	<u>New Employee Orientation</u>	<u>Basic Math</u>
	<u>Achieving Communication Effectiveness</u>	<u>Practical Math</u>
	<u>EEO/AA for Employees</u>	
	<u>Preventing Sexual Harassment for Employees</u>	
	<u>Valuing Diversity</u>	
<u>Computer</u>	<u>Computer Basics</u>	<u>Microsoft Word</u>
	<u>Introduction to Outlook</u>	<u>Microsoft Excel</u>
	<u>FieldBook2</u>	<u>Electronic As-builts</u>
		<u>ERMS</u>
<u>Safety</u>	<u>Right-to-Know</u>	<u>OSHA (to be determined)</u>
	<u>First Aid</u>	<u>Lock out Tag out</u>
	<u>Defensive Driving</u>	<u>Excavation awareness</u>
	<u>Work Zone Safety Workshop</u>	<u>Loading & transporting equipment</u>
	<u>Fire safety</u>	<u>Hand and power tools</u>
	<u>Bloodborne Pathogens</u>	<u>Chain Hoists and Lifts</u>
	<u>Confined Spaces</u>	
	<u>Weather Emergencies</u>	

HIGHWAY CONSTRUCTION AND MAINTENANCE

- Accommodating Traffic
- Public Expectations

CONGESTED TRAFFIC

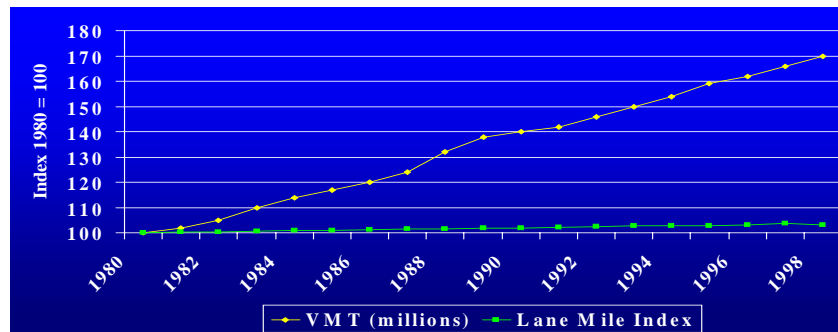


Traffic is Growing...

1980-1998

Vehicle Travel up 72%, Road Miles up 1%

- We're traveling more miles without increasing highway capacity significantly.



3/29/2005



- Growth in our nation also imposes needs for greater capacity and level of service of the highway network.
- From 1980 to 1998, vehicle travel increased 72 percent while miles of public roads increased only 1 percent.
- We are traveling more miles. We have a limited amount of new roads. The result is more congestion.

[illegible]

The graph illustrates the growth of U.S. federal debt over a 15-year period. The vertical axis represents the debt in billions of 1997 dollars, ranging from \$0 to \$80 in increments of \$10. The horizontal axis shows the years from 1982 to 1997. A single line with square markers connects the data points, showing a consistent upward trend.

Year	Debt (Billions of 1997 Dollars)
1982	21.6
1983	23.7
1984	26.2
1985	29.3
1986	32.7
1987	35.3
1988	40.2
1989	44.4
1990	47.9
1991	49.3
1992	51.9
1993	55.3
1994	57.7
1995	62.3
1996	67.3
1997	72.2

3/29/2005



MAINTAINING TRAFFIC DURING CONSTRUCTION

- Increase volumes of traffic warrant maintaining open lanes during construction.
- Challenge maintaining safety for traveling public and contractor.

Work Zone Safety

- Maintain public traffic under construction
 - Build Off site
 - No work during heavy traffic periods
 - Night work



Night Work

- Safety for motorists and contractor



NON-TRADITIONAL CONTRACTING AND CONSTRUCTION

- Contractor Incentives
- Lane Rental
- A & B Bidding
- Rapid Construction Techniques
- Expanded Construction Season

I-80 / I-235 Construction

- Maintain Traffic
- Traffic Management Center
- Public Information
 - Media Releases
 - Dynamic Message Signs
 - 511



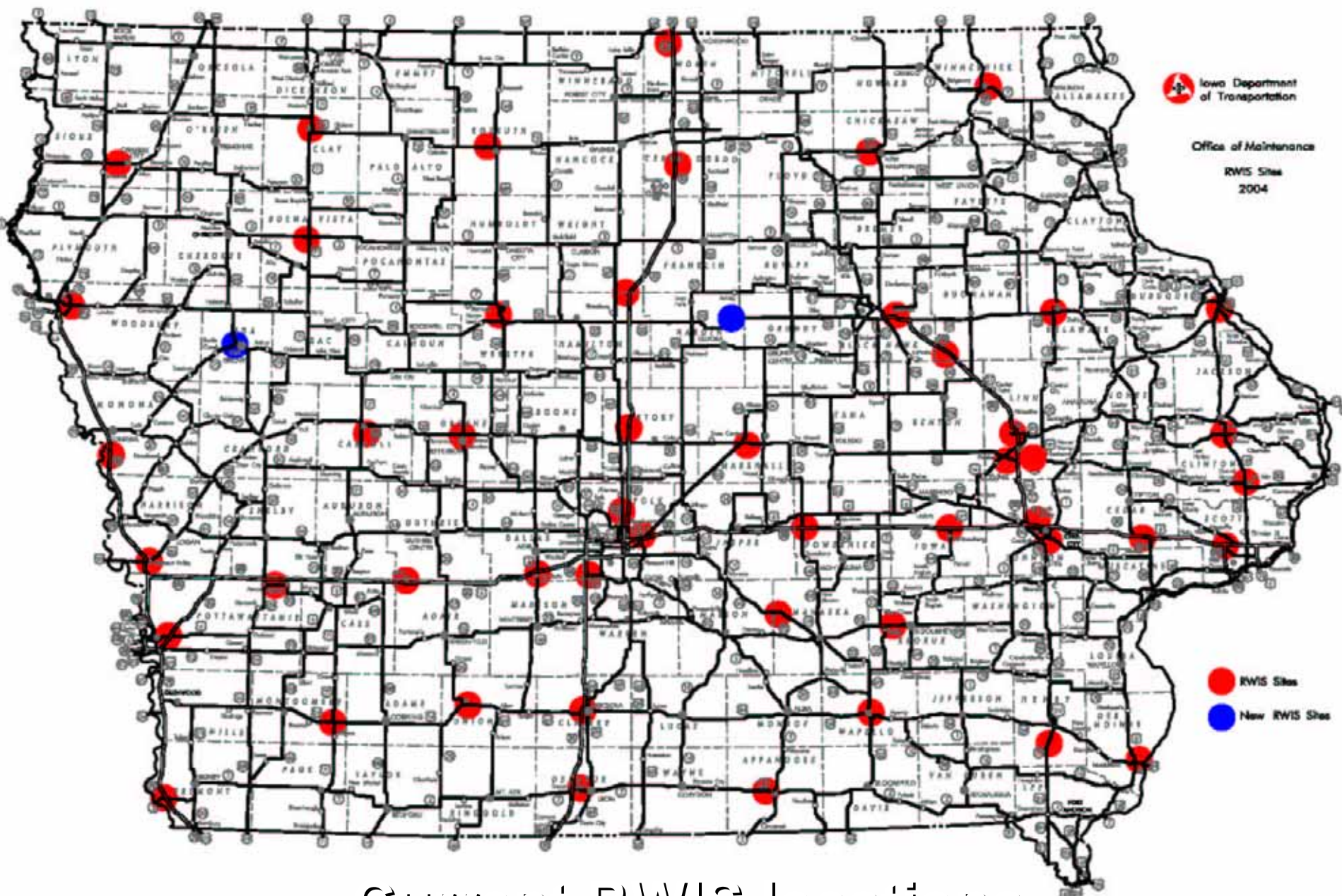
Winter Operations Overview

Dennis Burkheimer

WINTER OPERATIONS OVERVIEW

■ IDOT WINTER FACTS (FY 05)

- 3,943 bridges
- 24,211 lane miles
- \$35 M. average winter operations budget
- 898 snow removal trucks
- 191,140 rock salt (tons)
- 7.6 M. gallons liquid salt brine
- 1,172 permanent employees



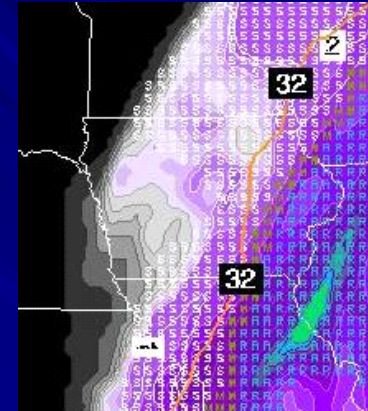
Current RWIS locations

Automated Bridge Deicing System Sensors

- Roadway Weather Information System to measure air temperature, relative humidity, wind speed and direction and pavement temperatures
- Active and passive pavement sensors to measure freezing point of roadway
- Fog/frost detector- measures fog/frost on the roadway
- Video Camera
- Precipitation sensor



What is the Maintenance Decision Support System (MDSS)?



The prototype MDSS combines:

- **Advanced weather prediction**
- **Advanced road condition prediction**
- **Rules of practice for anti- and de-icing**

Generates treatment recommendations on a route-by-route basis



What Makes the MDSS Unique?

- First attempt at completely integrating weather prediction, road condition prediction and rules of practice components in a fully automated system.
- MDSS allows users to perform 'What if' treatment scenarios.
- System updates recommendations every 3 hours.



Treatment recommendations

5: US-30

Recommended Treatments:
(at the beginning of each model run)

Tue Dec 09 18:00:00 CST 2003
12/09/03 2000 CST - Plow and Treat with NaCl at 500.0 lbs/2-lane mile
12/10/03 0500 CST - Plow and Treat with NaCl at 400.0 lbs/2-lane mile

Tue Dec 09 15:00:00 CST 2003
12/09/03 1600 CST - Plow and Treat with NaCl at 500.0 lbs/2-lane mile
12/09/03 2000 CST - Plow and Treat with NaCl at 500.0 lbs/2-lane mile
12/10/03 0500 CST - Plow and Treat with NaCl at 400.0 lbs/2-lane mile

Tue Dec 09 12:00:00 CST 2003
12/09/03 1300 CST - Plow and Treat with NaCl at 110.0 lbs/2-lane mile
12/09/03 1400 CST - Plow and Treat with NaCl at 500.0 lbs/2-lane mile
12/09/03 2100 CST - Plow and Treat with NaCl at 500.0 lbs/2-lane mile
12/10/03 0600 CST - Plow and Treat with NaCl at 400.0 lbs/2-lane mile

Selected Treatments:
(last selections before next model run)

Tue Dec 09 18:00:00 CST 2003
None

Tue Dec 09 15:00:00 CST 2003
None

Tue Dec 09 12:00:00 CST 2003
None

Graph View Text View

Close Print

Configuration Dialog

Configuration

Current Time:
01/05/04 15:42

Selected Route:
1: US-30 East and US-65 South

Reset Segments:

☒ 1: US-30 East and US-65 South ☐ 2: US-65 North ☐ 3: I-35 North
☐ 3B: I-35 North Bridge ☐ 4: I-35 South ☐ 5: US-30
☐ 6: IA-210

* indicates that the segment is already scheduled to be reset at the next model run

Reset Selected Segments... Reset All Segments...

Set Shifts:

Title: Default Shift

Mon Jan 05, 07:00 to Mon Jan 05, 16:00

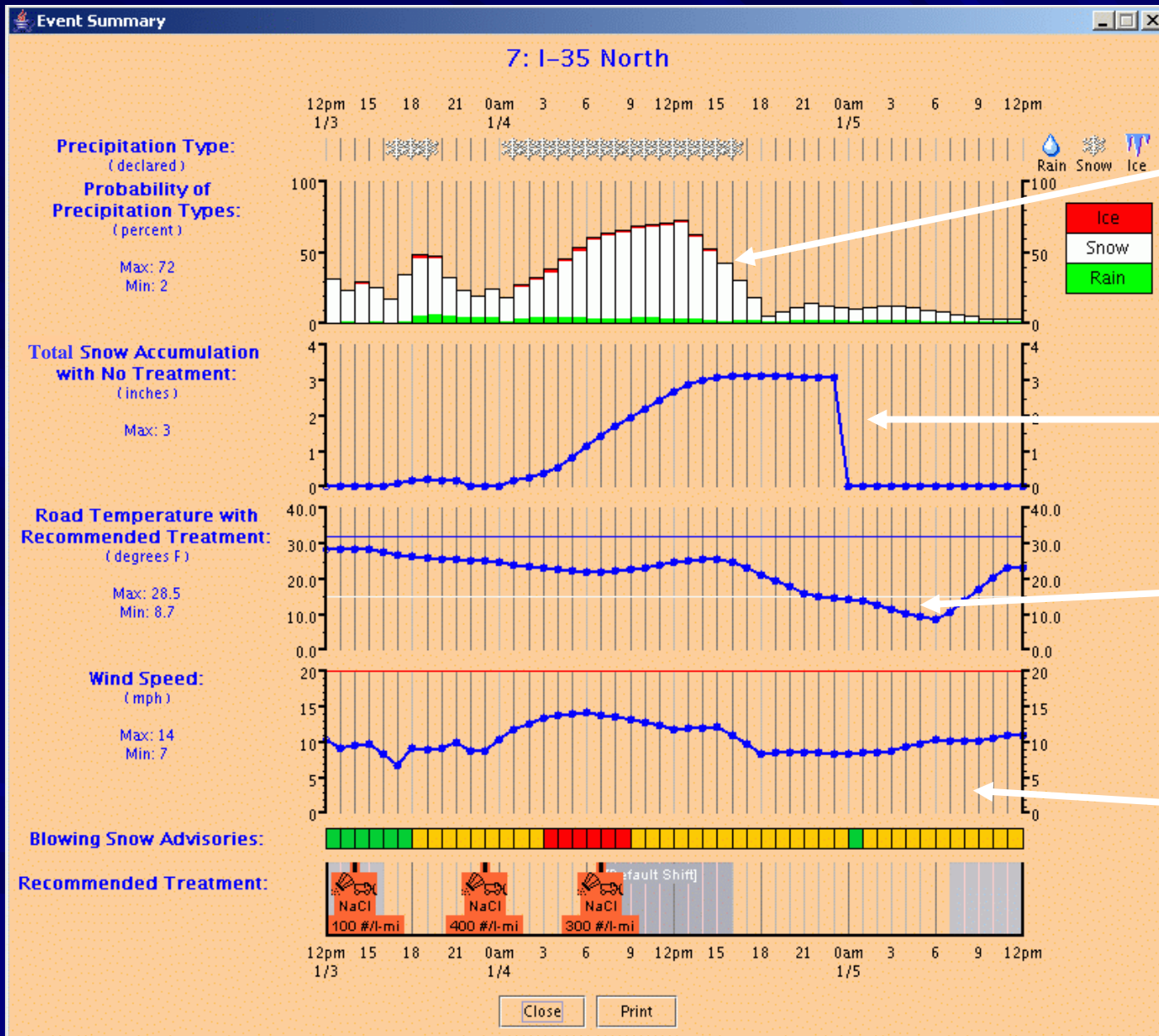
Add Shift Remove Shift

Default Shift - Mon Jan 05, 07:00 to Mon Jan 05, 16:00
Default Shift - Tue Jan 06, 07:00 to Tue Jan 06, 16:00
Default Shift - Wed Jan 07, 07:00 to Wed Jan 07, 16:00

OK

Examples of the “Treatment History” and “Configuration” dialog boxes. These functions are not available in restricted-access versions of the MDSS software.

Event Summary Table



An easy way to visualize the probabilistic forecasts of each precipitation type.

Snow Accumulates with no treatment

Road Temps with recommended treatment

Forecast wind speeds, blowing snow and treatment recommendations

OTHER TECHNOLOGY

Zero Velocity Spreaders



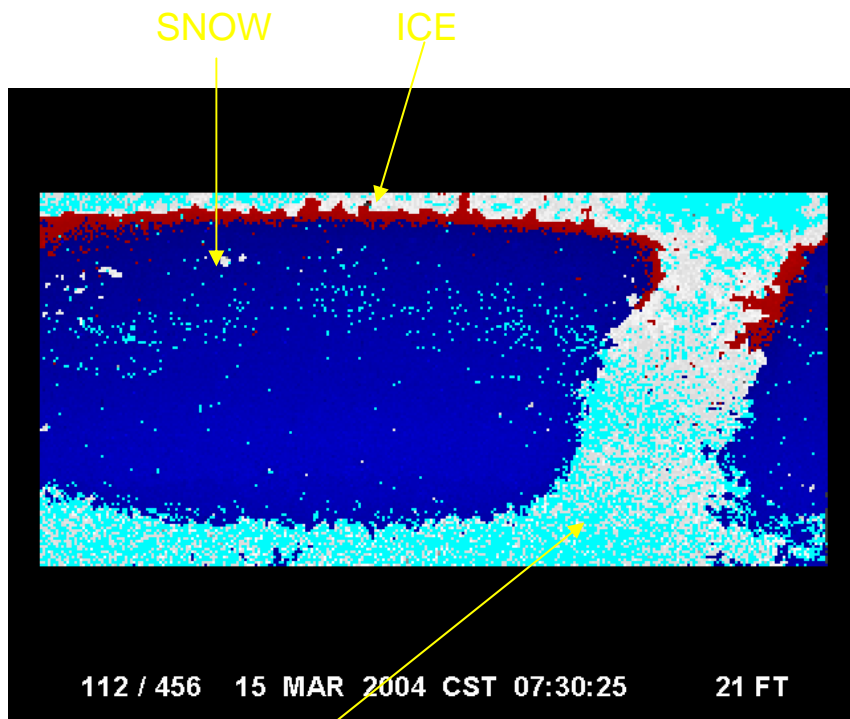
Latest nozzle design



Laser Road Surface Sensor



Iowa Images



WATER ICE AND SNOW DETECTED

LRSS Evaluations for 2004-2005

- Ability to detect frost
- Monitor transition of roadway surface after deicing materials are applied
- Determine cameras ability to detect onset of precipitation
- Determine cameras ability to detect different precipitation types
- Monitor against RWIS sensor information
- Determine how system can be adapted to highway operations

Computer-based training program for Anti-icing and RWIS



USE OF RECYCLED MATERIALS

■ IN TRANSPORTATION INFRASTRUCTURE:

- Social responsibilities
- Economic Impact
- Engineering Challenges
- Political / Social Input vs. Engineering

Recycled HMA Pavement

- Stockpile management
- Effect on Performance



GGBFS

- Slag tapped from blast furnace used as cement replacement
- Limestone source affects performance



Cement Kiln Dust (CKD)

- Dust generated from cement production
- Contains heavy metals and alkalis



Quarry Dust

- Some quarries recover less than 50% of aggregate quarried
- Fine dust is generated
- Effect on performance



Recycled Concrete

- Stockpile Management
 - Contamination
- Effect on Performance
 - Application



Gray Water Re Use

- Regulations in some areas require re use of ready mix wash water
- Effect on Performance and placement



GLASS IN ASPHALT



OTHERS:

- Plastics (in asphalt)
- Kosher Salt
- Foundry Sand
- Taconite Tailings
- Fly Ash
- Agricultural By-products

AVAILABILITY / USE OF MATERIALS AND NATURAL RESOURCES

- Materials Shortage (steel, cement)
- Fuel
- Aggregate Sources
- Plant Site Permitting

CONSTRUCTION ADMINISTRATION CHALLENGES

- Fraud
- Workload
- Contractor Quality Control
- FHWA Oversight
- Implementing New Technology