FUTURE CHALLENGES

- 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 Acts

Impact of occurrence

Probability of occurrence

Terrorism

Robberies/Assaults

Vandalism
Potential Weapons

- Weapons of Mass Destruction (WMD)
- Improvised Explosive Devices
- Conventional Weapons

Impact of use vs. Probability of use
Critical Assets and Facilities
The Effects on D.O.T.'s

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

Mobility
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
### Construction Technician

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HIGHPAY CONSTRUCTION AND MAINTENANCE

- Accommodating Traffic
- Public Expectations
CONGESTED TRAFFIC
• 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.
A recent Texas Transportation institute (TTI) study estimated that the cost of congestion more than tripled from $21 Billion to $72 Billion over a recent 15-year period.
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

Examples of the “Treatment History” and “Configuration” dialog boxes. These functions are not available in restricted-access versions of the MDSS software.
An easy way to visualize the probabilistic forecasts of each precipitation type.

- Snow Accums with no treatment
- Total Snow Accumulation
- 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
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
Lesson 3 - Roadway Ice and Winter Hazards

- A. Water and its Winter Forms
- B. Sensible on Pavement Surfaces
- C. Roadway Contaminates
- D. Freeze-Point Depressants
- E. Chemical Concentrations and Application Rates
- F. Friction on Road Surfaces
- H. Scenario
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