MDSS
Road Condition – Surface Temperature

Approach

• Adapt SNTHERM/RT code for Road surface Temperature calculations
  ✓ Turned off latent heat calculations for road surface
  ✓ New free convection curves for road surface

• Implement SNTHERM/RT algorithm within MDSS FP

• Establish validation/calibration research site
  ✓ Continuous collection of environmental information since the first of the year including several winter weather events
  ✓ Evaluate road temperature algorithm with and without presence of chemical application
MDSS: SNTHERM/RT
Tuned for road properties
Asphalt 2
Asphalt Interior (2.5 in) Predicted
Gravel (7 in) Predicted
Asphalt Interior (2.5 in) Measured
Gravel (7 in) Measured
Air
MDSS Pavement Research Site Configuration

- Concrete: 0 inches
- Gravel: 3 inches
- Gravel: 12 inches
- Gravel: 27 inches
- Soil
Reflected solar radiation
Radiometric surface temperature
Incident solar radiation
Downwelling IR radiation
Air temperature
Wind speed
Relative humidity
Concrete
Asphalt-chemical
Asphalt-temperature
MDSS Pavement Research Site
MDSS Pavement Research Site

Flux Measurements

Asphalt
Concrete
Met Station
Undisturbed Snow Cover

Pavement Surface Temperatures

Snow Cover with Treatment on Day 31

MDSS Pavement Test Site
Diurnal Variation in Surface Temperature

Temperature Profile (C)

Click the graph to start animation

Depth (inches)

Concrete Chemicals
Asphalt Chemicals
Asphalt No Chemicals

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MDSS Road Temperature Algorithm
Future Efforts

• Support implementation/running of SNThERM/RT within MDSS FP

• Continue to operate research site to provide calibration and verification data for road temperature algorithm

• Analyze research site measurements and evaluate/validate MDSS FP predictions/recommendations using site data

• Demonstrate temperature prediction capabilities to state DOTs and attempt to validate ESS readings

• Publish findings and present results at conferences