Human Factor Effects within the Deployment of a Maintenance Decision Support System (MDSS)

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2009 NRITS – Seaside, OR
August 25th, 2009
What is MDSS?

- A Maintenance Decision Support System (MDSS) is a device or process helping aid the maintenance decision process.
  - Prior Knowledge (Experience)
  - Snow and Ice Guidance Documents
  - RWIS-ESS Observations
  - Fellow operators/supervisors (Communication)
  - “That’s the way we’ve always done it”
  - A computer-based algorithm that integrates weather, road and maintenance information to provide scientifically driven maintenance recommendations
Resistance To Change

• It is human nature to resist change
Pooled Fund Study
Maintenance Decision Support System (PFS MDSS)
Participation Growth

Present Members: 16*State DOTs

- 2002
  - In, Mn, ND, SD, Ia
- 2004
  - Co
- 2005
  - Ks, Wy
- 2006
  - Ca, NH
- 2007
  - NY, Va, Ne
- 2008
  - Ky
- 2009
  - Id, Pa

* As of August 1st, 2009
Phase I of PFS MDSS

- At the outset of the PFS MDSS project users of the system were asked to participate in an assessment survey.
- Provide a baseline of winter maintenance decision making prior to MDSS.
- Provide a baseline of use of technology within the agency.
- The following data were collected during 2002.
Question #3

• How receptive is your organization to suggestions for improvements to current methods and systems?

Scale of 1 to 10
1=Not Receptive; 10=Very Receptive
Question #8

- Considering recent developments in technology in the transportation industry, how helpful do you think technology could assist your decisions in winter maintenance?

Scale of 1 to 10
1=No Value; 10=Very Valuable
The Importance of Training

• Throughout the PFS existence training has been one of the most crucial components for success of the software
• Training is not limited to just the operation of the MDSS software
  – Cultural shift in maintenance operation
    • The concept of “That’s the way we’ve always done it”
  – Understanding road weather forecasts
  – Interpreting maintenance recommendations
Interpreting weather forecasts.
At first look the recommendations in the green box appear to be ‘wrong’. These recommendations call for patrol and plowing only. Road conditions become ‘compacted snow’ while additional snow falls on the route.
Now, if we look at a the wind speed/gust graph and pavement temperature graph we understand why the recommendations are not recommending chemicals for this route.
Human Factor Conclusions

• Greater comfort with computer-based applications and overall computer usage
• Better understanding of how to interpret and apply road weather forecasts
• Better understanding of maintenance treatment relationship to road weather
• Improved acceptance of decision support methods
Summary/Conclusions

• Decision support systems provide an effective tool for improving the use of large and often complex information

• Success depends upon users' willingness to participate in recurrent training and an openness to new ways of using information

• Challenges continue to be the resistance to change
Questions

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