Low Volume Road Surface Selection Tool

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Presentation Outline

- Purpose and Need for Tool
- Existing South Dakota Tool
- Objectives for enhancements to SD Tool
- Overview of newly developed SST
- Deployment Plans
- Questions
Purpose and Need for Tool

- Should I turn this paved (kind of) road back to gravel?
- Should we pave this gravel road?
- Should we do dust control?
Purpose and Need for Tool

“When you gonna pave this damn dusty gravel road?”

Becker County
- 450 miles Paved
- 250 miles gravel
Purpose and Need for Tool

- The answer usually involved something like...We just don’t have enough $ for that or some rule of thumb.

- Instead we should be analyzing and reporting total life cycle costs of available options considering...
  - Various levels of traffic
  - Several surface type options
  - Initial construction and all maintenance costs
  - Agency and optional user costs
Existing South Dakota Tool

- This type of analysis is typically not done

- South Dakota tool developed to assist Counties in developing this type of detailed cost analysis
  - Spreadsheet tool for download
  - Default values with ability to change
  - Reporting of total life cycle costs with 4 treatments
Existing South Dakota Tool

**Introduction**

This analytical tool applies the low volume road management methodologies recommended under the project titled Local Road Surfacing Criteria (SO 2022-10). The objective of this study is to develop a methodology that allows the user to compare the costs associated with different road surfaces. Specifically, this spreadsheet tool is used to determine the costs associated with maintaining roads with different surfaces and selecting the most appropriate road surface for a specific set of circumstances.

To start your analysis session, fill in the general project description information below and click on the "Next" button. Continue processing through the analysis setup steps by clicking the "Next" buttons included in subsequent dialog boxes. To enable additional inputs for advanced users, click on the "Enable Advanced User Inputs" check box below.

**Agency Cost Details**

Use the following controls to define the cost details associated with each surface type you have chosen to include. Note that a separate tab is displayed for each surface type you have chosen to include in the analysis.

**Maintenance Treatment Timing and Cost Details**

Use these controls to define specific maintenance-related costs associated with HMA surface treatments.

<table>
<thead>
<tr>
<th>Maintenance Treatments</th>
<th>Treatment/Application Timing/Frequency</th>
<th>Unit Treatment Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crack Sealing</td>
<td>Applied 1 time(s)/yr every 5 years</td>
<td>$1,200/mile</td>
</tr>
<tr>
<td>Seal Cost</td>
<td>Applied 1 time(s)/yr every 5 years</td>
<td>$15,000/mile</td>
</tr>
<tr>
<td>Overlay (thickness: 2 in)</td>
<td>Applied 1 time(s)/yr every 5 years</td>
<td>$356,450/mile</td>
</tr>
<tr>
<td>Striping and Marking</td>
<td>Applied 1 time(s)/yr every 5 years</td>
<td>$450/mile</td>
</tr>
<tr>
<td>Patching/Maintenance</td>
<td>Applied 1 time(s)/yr every year</td>
<td>$800/mile</td>
</tr>
</tbody>
</table>

**Other**

Apply Default "HMA" Strategy
Objectives for enhancing SD Tool

- Update the hard coded default values
- Transform to a Web-based tool
- Consider additional surface types
- Add options to improve initial construction costs
- Add capability for storing County and Regional values
- Allow Counties to create a save default values
- Update user cost methods
Overview of ND/SD SST

Local Road Surface Selection Tool

Home Analysis Administration Help Contact

This analytical tool applies the low-volume road management methodologies recommended under the project titled “Local Road Surfacing Criteria (SD 2002-10)”. The objective of this study is to develop a methodology that allows the user to compare the costs associated with different road surfaces. Specifically, this tool is used to determine the costs associated with maintaining roads with different surfaces and selecting the most appropriate road surface for a specific set of circumstances. More information about this project and tool can be found by clicking “Software Introduction”.

Click “Start Analysis” to start a regular analysis. Click “Administrator Login” to log in if you are an administrator. Detailed user’s guide is available by clicking “User’s Guide”.

DISCLAIMER: Although the information generated by this model has been produced and processed from data that is believed to be reliable, the information generated by this model is for estimation uses only. The Upper Great Plains Transportation Institute and North Dakota State University make no representation or warranty, expressed or implied, regarding the accuracy or reliability of the model or results.

Start Analysis
Overview of ND/SD SST

Local Road Surface Selection Tool

Please select your state and county:

Select your state
North Dakota

Select your county
Adams

Next
Overview of ND/SD SST

Local Road Surface Selection Tool

Home  Analysis  Administration  Help  Contact

General Setup

Selection of Default Setting Type
- Region-Level  Default Base Year: 2014
- County-Level  Default Base Year: 2014

Selection of Surface Types
- Hot-Mix Asphalt (HMA)
- Asphalt Surface Treatment (AST)
- Gravel
- Dust Control
- Stabilized Gravel

Selection of Alternative Cost Items
- Include Salvage value
- Include user costs

Back  Next  HELP
Overview of ND/SD SST

Local Road Surface Selection Tool

Home Analysis Administration Help Contact

Common Parameters Setup

- Project Length: 5 miles
- Project Width: 24 feet
- Average Daily Traffic (ADT): 100-199 vehicles/day
- Analysis Period: 20 years
- Discount Rate: 3.5%
- Start Year of Analysis: 2015

Reset Back Next Help

NDsu Upper Great Plains Transportation Institute
### Overview of ND/SD SST

#### Agency Cost Parameters Setup

<table>
<thead>
<tr>
<th>Treatment Selection</th>
<th>Treatment Name</th>
<th>Application Times Per Year</th>
<th>Year Interval Between Applications</th>
<th>Application Start Year</th>
<th>Unit Cost (dollars)</th>
<th>Unit Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Crack Sealing</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>10000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Seal Coat</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>20000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Thin Lift OverLay</td>
<td>1</td>
<td>20</td>
<td>20</td>
<td>250000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Striping and Marking</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Patching/Maintenance</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3000</td>
<td>per mile</td>
</tr>
<tr>
<td>□</td>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>per mile</td>
</tr>
</tbody>
</table>

**INITIAL COST**

Total Initial Cost ($/mile): $725,115

[Initial Costs Calculator]
Overview of ND/SD SST

Local Road Surface Selection Tool

HMA Initial Cost Parameters Setup

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA Thickness (new)</td>
<td>4</td>
<td>inches</td>
<td>Reshaping / Sub-grade Prep</td>
<td>200000</td>
<td>$/Mile</td>
</tr>
<tr>
<td>HMA Cost (placed)</td>
<td>120</td>
<td>$/Ton</td>
<td>Reclaiming / Milling (if asphalt)</td>
<td>0</td>
<td>$/Sqyd</td>
</tr>
<tr>
<td>Base Thickness (New)</td>
<td>4</td>
<td>inches</td>
<td>Widening (if necessary)</td>
<td>0</td>
<td>$/Mile</td>
</tr>
<tr>
<td>Base Gravel Cost (placed)</td>
<td>26</td>
<td>$/Ton</td>
<td>Pavement Marking</td>
<td>2000</td>
<td>$/Mile</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Engineering / Contingencies</td>
<td>20</td>
<td>% of total</td>
</tr>
</tbody>
</table>

Total Initial Cost ($/mile) $725,115

[Done] [Cancel] [Reset] [Help]
**Overview of ND/SD SST**

### Agency Cost Parameters Setup

<table>
<thead>
<tr>
<th>Dust Control</th>
<th>INITIAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Initial Cost ($/mile):</td>
<td>$286,182</td>
</tr>
</tbody>
</table>

**Initial Costs Calculator**

#### Maintenance Cost Parameters

<table>
<thead>
<tr>
<th>Treatment Selection</th>
<th>Treatment Name</th>
<th>Application Times per year</th>
<th>Year Interval Between Applications</th>
<th>Application Start Year</th>
<th>Unit Cost (dollars)</th>
<th>Unit Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Blading</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>200</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Regravel</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>20000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Reshape Cross Section</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Reapply Dust Control</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>per mile</td>
</tr>
</tbody>
</table>
### Overview of ND/SD SST

#### Agency Cost Short Summary - Per Mile

<table>
<thead>
<tr>
<th>Surface Type</th>
<th>HMA</th>
<th>AST</th>
<th>Gravel</th>
<th>Dust Control</th>
<th>Stabilized Gravel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Initial Cost</td>
<td>$927,149</td>
<td>$330,455</td>
<td>$506,773</td>
<td>$531,773</td>
<td>$94,182</td>
</tr>
<tr>
<td>Total Maintenance Cost</td>
<td>$299,164</td>
<td>$443,442</td>
<td>$633,314</td>
<td>$537,404</td>
<td>$398,303</td>
</tr>
<tr>
<td>Total Salvage Value</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total Agency Cost</td>
<td>$1,226,313</td>
<td>$773,897</td>
<td>$1,140,087</td>
<td>$1,069,177</td>
<td>$492,485</td>
</tr>
</tbody>
</table>

#### Comparison of Cumulative Costs Associated with Different Surface Types

- **HMA**: High Mass Asphalt
- **AST**: Asphalt Stabilized
- **Gravel**: Gravel
- **Dust Control**: Dust Control
- **Stabilized Gravel**: Stabilized Gravel

Cumulative costs are depicted over years since initial construction or last major rehabilitation.
Overview of ND/SD SST

- Administration – Region and County

State Administration

You are Welcome, state administrator of North Dakota!

Functionality

- Region Management
- Update Initial Cost Default Values
- Update maintenance Cost Default Values
- County Administrator Account Management
- Reset Personal Password
- Communication

Log Out

Maintenance Costs Default Values Up

Select region you want to update: East Area

Select a treatment: Seal Coat

HMA: Seal Coat

<table>
<thead>
<tr>
<th>AOT Level [vehicles/day]</th>
<th>Times per Year (County AVG)</th>
<th>Year Interval (County AVG)</th>
<th>App Start Year in order (County AVG)</th>
<th>Unit Cost (County AVG) [$/mile]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>100-199</td>
<td>1 (4)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>200-299</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>300-399</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>400-499</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>500-599</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
<tr>
<td>&gt;600</td>
<td>1 (1)</td>
<td>7 (3)</td>
<td>3 (3)</td>
<td>1000 (1000)</td>
</tr>
</tbody>
</table>

Set To County Average  Restore Region Default

Save All Changes To Database  Back to Administration Page
Deployment Plans

- Finish any missing items such as..
  - User Costs
  - Help links
  - Any bugs identified in testing
- Meet with LTAP Directors and complete Region Defaults
- Create County contact email list and send out link
- Complete Tool and put link on UGPTI website by end of year
Local Road Surface Selection Tool

October 21, 2015

Questions?

Demonstration

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