Surface Selection Tool

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NDTLAP/UGPTI

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Rapid City, SD - October 17-18, 2018
Program Background

- Developed in 2015-2016
- Final Report 2017
- Web-based economic model for pavement and gravel

http://dotsc.ugpti.ndsu.nodak.edu/SurfaceSelection/Default
Existing Data

- North Dakota
  - Regional Level
    - 3 Regions
  - Some County Level
- South Dakota
  - In Progress
- Minnesota
  - In Progress
Steps for Analysis

1. Gather General Data
2. Identify Road Section
3. Select Surface Types to Analyze
4. Identify Common Parameters
5. Update Specific Roadway Costs
6. Analyze!
Analysis

Please select your state and county:

Select your state
- Minnesota
- North Dakota
- South Dakota

Select your county
- Aitkin

Next
General Setup

Selection of Default Setting Type
- Region-Level: Default Base Year: 2017
- County-Level: Select county is not updated.

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
## Analysis

### Local Road Surface Selection Tool

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Length</td>
<td>5</td>
<td>miles</td>
</tr>
<tr>
<td>Average Daily Traffic (ADT)</td>
<td>300-399</td>
<td>vehicles/day</td>
</tr>
<tr>
<td>Discount Rate</td>
<td>3.5</td>
<td>%</td>
</tr>
<tr>
<td>Project Width</td>
<td>24</td>
<td>feet</td>
</tr>
<tr>
<td>Analysis Period</td>
<td>20</td>
<td>years</td>
</tr>
<tr>
<td>Start Year of Analysis</td>
<td>2018</td>
<td></td>
</tr>
</tbody>
</table>

*Reset*
## Agency Cost Parameters Setup

### HMA

**Total Initial Cost ($/mile):** $372,605

### Maintenance Cost

<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>7</td>
<td>4</td>
<td>4000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Seal Coat</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>40000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Thin Lift OverLay</td>
<td>1</td>
<td>20</td>
<td>21</td>
<td>200000</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Striping and Marking</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1500</td>
<td>per mile</td>
</tr>
<tr>
<td>✓</td>
<td>Patching/Maintenance</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>6000</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 Calculator

- **Total Initial Cost ($/mile):** $372,605
- **Unit Cost:** per mile
## Analysis

![NDSU Local Road Surface Selection Tool](image)

### HMA Initial Cost Parameters Setup

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA Thickness (new)</td>
<td>4</td>
<td>inches</td>
</tr>
<tr>
<td>HMA Cost (placed)</td>
<td>60</td>
<td>$/Ton</td>
</tr>
<tr>
<td>Base Thickness (New)</td>
<td>6</td>
<td>inches</td>
</tr>
<tr>
<td>Base Gravel Cost (placed)</td>
<td>26</td>
<td>$/Ton</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reshaping / Sub-grade Prep</td>
<td>15000</td>
<td>$/Mile</td>
</tr>
<tr>
<td>Reclaiming / Milling (if asphalt)</td>
<td>2.5</td>
<td>$/Sqyd</td>
</tr>
<tr>
<td>Widening (if necessary)</td>
<td>0</td>
<td>$/Mile</td>
</tr>
<tr>
<td>Pavement Marking</td>
<td>1500</td>
<td>$/Mile</td>
</tr>
<tr>
<td>Engineering / Contingencies</td>
<td>15</td>
<td>% of total</td>
</tr>
</tbody>
</table>

**Total Initial Cost ($/mile)**  $372,615

[Done] [Cancel] [Reset] [Help]
Output

- Outputs cost summary and line chart summing costs over analysis period
- Can create PDF report of analysis information and outputs
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>$372,615</td>
<td>$204,564</td>
<td>$63,386</td>
<td>$69,386</td>
<td>$89,386</td>
</tr>
<tr>
<td>Total Maintenance Cost</td>
<td>$126,200</td>
<td>$188,099</td>
<td>$325,348</td>
<td>$258,175</td>
<td>$221,219</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>$498,815</td>
<td>$392,663</td>
<td>$388,734</td>
<td>$327,561</td>
<td>$310,605</td>
</tr>
</tbody>
</table>

Comparison of Cumulative Costs Associated with Different Surface Types

Cumulative costs, dollars

Years since initial construction or last major rehabilitation

Back  Generate PDF Report
Data Updates

• Data can be updated by County Managers

• Can update Regional data based on inputs of Counties within regions
Other State Usage

- Other states and entities are free to use the program
  - Choose a similar county for baseline data
  - Update as necessary
  - Will not save data on single analysis
Questions?

- There will be a webinar on this subject
  - December 19 10 AM - 11:30 AM CST
Contact Information

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NDLTAP.org
UGPTI.org
TRB Low Volume Roads

12th TRB International Conference on Low Volume Roads
Kalispell, Montana
September 15 – 18, 2019

More information at
www.ucprc.ucdavis.edu/LVR2019