Roadway & Bridge Investment Needs in North Dakota

Upper Great Plains Transportation Institute
North Dakota State University
Study Overview

• Estimates funding needs to maintain existing roadway and bridge condition

• Does not include snow removal, signing, mowing or other maintenance activities indirectly relating to roadway surface condition
State Highways

- Needs (HERS-ST/HPMS)
  - **Pavement resurfacing/reconstruction**
    - Reconstruction due to insufficient roadway width
  - **Resurfacing with shoulder improvements**
  - **Widening (capacity-related improvements)**
    - Wider lanes; Wider shoulders; Additional lanes
  - **Cost to maintain system with limited expansion; does not necessarily increase structural capacity**
- Bridges
Pavement Preservation and Maintenance: Asphalt Surfaces

- Crack sealing @ $369 per mile per year = $2.78 million/year = $55.7 million over 20 years

- Seal coats applied every 6 years @ $25,000 per mile for two-lane roadway = $682.5 million over 20 years

- Each mile patched costs $85,000
<table>
<thead>
<tr>
<th>HPCS</th>
<th>2008/Year</th>
<th>Low/Moderate Inflation Trend*</th>
<th>Current Inflation Trend*</th>
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<tbody>
<tr>
<td>Interstate</td>
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<td>District Corridor</td>
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<td>$71,030</td>
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<td>District Collector</td>
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<td>Total</td>
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</table>

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future.
State Highway Bridges

• $526 million needed for bridge replacement, rehabilitation, preventive maintenance, and deck overlays during next 20 years.
  Annual needs: $26.3 million

• 44 percent needed for replacement of existing bridges

• 46 percent needed for bridge rehabilitation
Paved County Road Construction and Maintenance

• Based on survey; estimated expenditures for next 10 years

• 42 counties responded; survey findings expanded to state using miles of road

• Estimated 10-year construction cost = $306.1 million

• Estimated 10-year maintenance cost = $398 million

• Extrapolation = $1.408 billion for 20 years
Gravel Road Maintenance

• Computed from survey: cost per mile x miles of gravel road

• Counties spend $1,212/mile/year (weighted average) to blade and gravel unpaved roads

• Total cost = $69.68 million per year

• Over 20 years = $1.394 billion
County Bridges

- 2,753 bridges (exclusive of culverts)
  - 22% > than 60 years old
  - 85% more than 20 years old

- 10-year bridge needs forecast from survey
  - $72.1 million of bridge construction
  - $21.6 million of bridge maintenance

- Extrapolate to 20 years = $187.4 million.
County Bridge Needs (current)

- Analysis based on Bridge Inventory
- Deficiency: superstructure or substructure rating \( \leq 4 \) (poor)
- Currently 451 deficient bridges
- Replacement cost = $150 per sq ft = $137.4 million
- Cost based on replacement length
Future & Total County Bridge Needs

• Additional bridges will deteriorate to “poor” in next 20 years

• Typical rate: 1 point loss every 10 years

• 808 bridges projected to deteriorate to poor or worse in next 20 years

• Replacement cost = $165.7 million

• Total replacement cost including currently deficient bridges = $303.1 million

• Does not include culvert or maintenance cost

• Bridge improvements are not prioritized based upon traffic levels
Total County Bridge Needs

- Maintenance cost from the survey (when extrapolated to 20 years) is $43.2 million.

- With maintenance costs, county bridge needs (replacement and maintenance = $346.3 million).

- May not include all maintenance needs; doesn’t include rehabilitation cost of decks on bridges otherwise structurally sound.

- Does not necessarily include replacement of all obsolete bridges: outmoded because of load limits or deck/roadway geometry or conditions.
## County Roadway & Bridge Needs

<table>
<thead>
<tr>
<th></th>
<th>$ 2008/Year</th>
<th>Low/Moderate Inflation Trend*</th>
<th>Current Inflation Trend*</th>
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</thead>
<tbody>
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<td>Paved Roads</td>
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*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future
Estimated Funding Needs of Townships and Small Cities

- Update of 2002 study
- Three scenarios: current, reasonable, and ideal.
- *Current* is defined as “improvements that you average per year”

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<thead>
<tr>
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<tr>
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*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future*
Highway Funding Needs of 13 Urban Centers

- Estimated from long range plans and past survey responses from “Urban Street and County Road Funding Needs Assessment for 13 North Dakota Cities and 53 North Dakota Counties”

- Amount of detail varies from city to city

- Each plan includes lists of expected improvements for next 15 to 20 years

- Some plans include expected maintenance costs

- When maintenance costs could not be determined, the survey results from the 2000 study were used and indexed

- Estimated funding need in 2008 dollars for all 13 cities is $70.7 million = $1.414 billion for 20 years (moderate inflation trend = $87.3 million, current inflation trend = $101.5 million)
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<thead>
<tr>
<th>Jurisdiction/Agency</th>
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*Not estimated