THE STATE OF GOOD REPAIR OF THE STATE’S TRANSPORTATION SYSTEM: PAVEMENT AND BRIDGES

Allison Dane Camden, Deputy Assistant Secretary for Multimodal Development and Delivery
Washington State Transportation Commission
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Outline

• Overview of Washington’s multimodal transportation system

• Asset Management at WSDOT

• Drivers of asset condition

• Pavement State of Good Repair Backlog

• Bridge Outlook

• Key Takeways
Overview of the state’s connected, multimodal system

THE STATE’S TRANSPORTATION NETWORK IS A CONNECTED SYSTEM THAT MUST SERVE MANY MODES AND USERS

- 18,712 Highway lane miles
- 307 HOV lane miles
- 3,322 state-owned bridges
- 23 Ferries
- 24.7 million passengers per year
- 32 Transit systems
- 16 WSDOT-operated airports
- 125* miles dedicated bike lanes
- 400 miles of sidewalk within/adjacent to WSDOT right-of-way
- 333 miles Amtrak Cascades
- 800,000 annual passengers
- 298 miles WSDOT-owned shortline freight railroad

*Most sidewalks/bike lanes are controlled by locals
Where does the 49.4¢ state gas tax go?

Where Does the 49.4¢ State Gas Tax Go?

2018

- 17.9¢ (37%)
- 8.0¢ (16%)
- 11.5¢ (23%)

Where Will the 49.4¢ State Gas Tax Go?

2029

- 26.5¢ (52%)
- 8.0¢ (16%)
- 2.9¢ (8%)

* Includes operations, maintenance, preservation and safety improvements.
** Includes funding for projects specified in the 2003 Nickel, 2005 Transportation Partnership, and 2015 Connecting Washington acts, as well as funding to pay off bonds funded by pre-2003 fuel tax.
## Asset Management – All WSDOT

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Highways</td>
<td>$109,390</td>
<td>$330</td>
<td>$335</td>
<td>$330</td>
<td>$665</td>
</tr>
<tr>
<td>Multimodal (i.e. Aviation, Public Transportation, Rail)</td>
<td>$600</td>
<td>$15</td>
<td>$20</td>
<td>$90</td>
<td>$110</td>
</tr>
<tr>
<td>Intra-Agency (i.e. IT, Facilities, Fleet, Real Estate)</td>
<td>$66,480</td>
<td>$55</td>
<td>$70</td>
<td>$55</td>
<td>$125</td>
</tr>
<tr>
<td>Ferries</td>
<td>$4,940</td>
<td>$110</td>
<td>$125</td>
<td>$215</td>
<td>$340</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$181,410</strong></td>
<td><strong>$510</strong></td>
<td><strong>$550</strong></td>
<td><strong>$690</strong></td>
<td><strong>$1,240</strong></td>
</tr>
</tbody>
</table>
Drivers of Asset Conditions

<table>
<thead>
<tr>
<th>PRESERVATION PROGRAM</th>
<th>MAINTENANCE PROGRAM</th>
<th>IMPROVEMENT PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Completes major repair and rehabilitation projects</td>
<td>▪ Operates the system</td>
<td>▪ Adds new assets to the transportation system to improve mobility and safety</td>
</tr>
<tr>
<td>▪ Replaces assets at the end of their useful life</td>
<td>▪ Repairs the system when necessary</td>
<td>▪ Includes items such as adding a lane to a highway, purchasing a new ferryboat or</td>
</tr>
<tr>
<td>▪ Includes work such as bridge painting, asphalt overlays, bridge &amp; pavement</td>
<td>▪ Performs preventative maintenance</td>
<td>building a new tunnel</td>
</tr>
<tr>
<td>replacement</td>
<td>▪ Delivers small, non-programmed projects</td>
<td>▪ New assets must then be maintained and preserved</td>
</tr>
</tbody>
</table>

CONDITION OF HIGHWAY ASSETS

▪ Measured deficiencies in highway assets
▪ Level of Service ratings

Wear and tear from extended use over time
General deterioration over time (weather, corrosion)
Damage from natural events (storms, earthquakes)
Damage from motor vehicle collisions
System additions (inventory)
Bridge and Pavement Preservation Funding

Preservation program investment levels

In millions of 2017-2019 dollars; adjusted for inflation using the Construction Costs Index

1. Bridge preservation funding
2. Pavement preservation funding
3. Lowest Life Cycle Cost Zone

Past

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>200</td>
<td>300</td>
<td>500</td>
<td>700</td>
<td>300</td>
</tr>
</tbody>
</table>

Planned

<table>
<thead>
<tr>
<th>Year</th>
<th>2019-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>600</td>
</tr>
</tbody>
</table>

Data source: WSDOT Capital Program Development and Management, WSDOT Pavement Office.

Notes: 1 Both Bridge and Pavement funding would need to be in the Lowest Lifecycle Cost Zone in each biennium in order for WSDOT to manage these assets in the most cost-effective way.
Doing all we can with Practical Solutions

- **Asphalt & Chip Seal: Practical Solutions Strategies**
  - Strategic Preventive Maintenance (One-touch policy)
  - Converting Asphalt Pavement Overlays to Chip Seal Treatment (2,300 of 3,000 planned lane miles converted)

- **Concrete: Practical Solutions and Age of Network**
  - WSDOT has used rehabilitation treatments on over 45% of its concrete (as of 2016)
  - The majority of WSDOT’s concrete pavement was constructed in the 1960’s, 1970’s and 1980’s, and so needed little-to-no repair until the 1990’s. **Much of this pavement has been rehabilitated as much as possible, and is now in need of reconstruction.**
Asphalt Pavement Deterioration

Reconstructing failed pavement costs five times as much as rehabilitating pavement that is in the Lowest Life Cycle Zone.

Asphalt pavements

<table>
<thead>
<tr>
<th>Condition Index</th>
<th>Approximate condition rating of asphalt pavement without rehabilitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Optimal condition rating for Chip Seal Conversion ($50,000 to $60,000 per lane mile)</td>
</tr>
<tr>
<td>90</td>
<td>Optimal condition rating for Strategic Preventive Maintenance ($10,000 to $60,000 per lane mile)</td>
</tr>
<tr>
<td>80</td>
<td>Lowest Life Cycle Zone for Rehabilitation ($225,000 to $275,000 per lane mile)</td>
</tr>
<tr>
<td>70</td>
<td>Pavement is past due (part of the backlog) Major Rehabilitation is required ($400,000 to $500,000 per lane mile)</td>
</tr>
<tr>
<td>60</td>
<td>Pavement has failed Reconstruction is required ($1 million to $1.5 million per lane mile)</td>
</tr>
<tr>
<td>50</td>
<td>Failed Pavement</td>
</tr>
<tr>
<td>40</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
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<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Average age of Pavement in Years
Projection: 2024 under current funding conditions

Due and repaired by 2024
Past Due in 2024
WSDOT Bridge Replacement Due to Age

Total Bridges Hitting 80 Year Age by Decade

- Current: 301
- 2030: 177
- 2040: 448
- 2050: 909
- 2060: 496
- 2070: 317
- 2080: 251
- 2090: 236
- 2100: 99

The replacement value for all WSDOT-owned bridges is $57.6 billion.

Good asset management and preservation will help extend the life of WSDOT’s bridges, reducing the spike in 2050.
Bridges Currently in Poor Condition
Bridge Outlook: No Good Options

- Bridge needs, like other asset classes, are currently funded at about 45% of needs.
- There will be many hard decisions about which bridges to repair in the future.

<table>
<thead>
<tr>
<th>Category</th>
<th>Current needs</th>
<th>Predicted additional needs</th>
<th>Total 10-year needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border bridge preservation(^1)</td>
<td>$81.2</td>
<td>N/A(^2)</td>
<td>$81.2</td>
</tr>
<tr>
<td>Bridge element repairs</td>
<td>$26.5</td>
<td>$85.9</td>
<td>$112.4</td>
</tr>
<tr>
<td>Expansion joint preservation(^3)</td>
<td>$250.5</td>
<td>$155.2</td>
<td>$405.7</td>
</tr>
<tr>
<td>Movable bridge preservation(^3)</td>
<td>$39.6</td>
<td>N/A(^2)</td>
<td>$39.6</td>
</tr>
<tr>
<td>Concrete deck preservation</td>
<td>$115.6</td>
<td>$726.5</td>
<td>$842.1</td>
</tr>
<tr>
<td>Steel painting</td>
<td>$414.5</td>
<td>$292.1</td>
<td>$706.6</td>
</tr>
<tr>
<td>Bridge rehab or replacement</td>
<td>$255.7</td>
<td>$227.8</td>
<td>$483.5</td>
</tr>
<tr>
<td>Bridge scour</td>
<td>$9.5</td>
<td>$20.0</td>
<td>$29.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,193.1</strong></td>
<td><strong>$1,507.5</strong></td>
<td><strong>$2,700.6</strong></td>
</tr>
</tbody>
</table>
Key Takeaways

- Highway assets will need $6.65 billion in SOGR investment over the next ten years.
  - Current funding projections indicate a shortfall of $3.3 billion over those ten years.
- As a result, the number of bridge and pavement assets in poor condition (failed/past due) will increase, resulting in:
  - Reduced speed limits on roads in poor condition
  - Load restricted, posted and/or closed bridges
  - Difficult decisions will need to be made about which assets will be allowed to deteriorate/fail.
- Having a substantial portion of highway assets in poor condition is new and uncharted territory for WSDOT.
  - Decreased ability to make predictions about asset reliability.
  - Increased risk of unexpected urgent needs.
- Deferring preservation increases risks in other realms:
  - Safety impacts—driving at the speed limit on pavement in poor condition can be unsafe, leading to speed limit reductions
  - Mobility impacts—closed and/or weight-restricted bridges require detours and lowered speed limits, both increase travel times
  - Economic impacts—impacts to mobility may negatively impact freight routes and/or commute routes
Questions?

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Pavement Condition Categories

Good/Very Good

Fair

Poor

Very Poor