Highway Maintenance and Preservation Needs

WSDOT Can Provide Reliable Long-Term Pavement Estimates, but Accuracy of Bridge Estimates Is Uncertain

Presentation to Washington State Transportation Commission

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JLARC

Who We Are & What We Do

- The Joint Legislative Audit & Review Committee (JLARC) is a joint, bi-partisan committee of 16 legislators
- JLARC has conducted performance audits and other studies for the Legislature since 1973
- Non-partisan staff conduct work using Generally Accepted Government Auditing Standards
- Study assignments are made by the Legislature and the Committee itself
  - ✓ This study was assigned in the 2013-15 transportation budget

Key findings related to estimating highway preservation costs

1. Long-term (10-year) cost estimates reliable for pavement, not bridges

Pavement	**Condition data is accurate** **Cost estimates can be verified** • Developed using industry best practices • Viewed as national leader
Bridges	**Condition data is accurate** **Cost estimates cannot be verified** • Not developed using industry best practices • May be high or low

2. Involving stakeholders in estimating process improves confidence in long-term cost estimates

Two part review of WSDOT's long-term cost estimating practices

Driven by 2013 needs estimate – focus on highway maintenance and preservation needs

Phase 1 of 2: December 2013

How are maintenance and preservation needs identified and documented?

JLARC staff found that WSDOT uses a logical process but has limited documentation for preservation

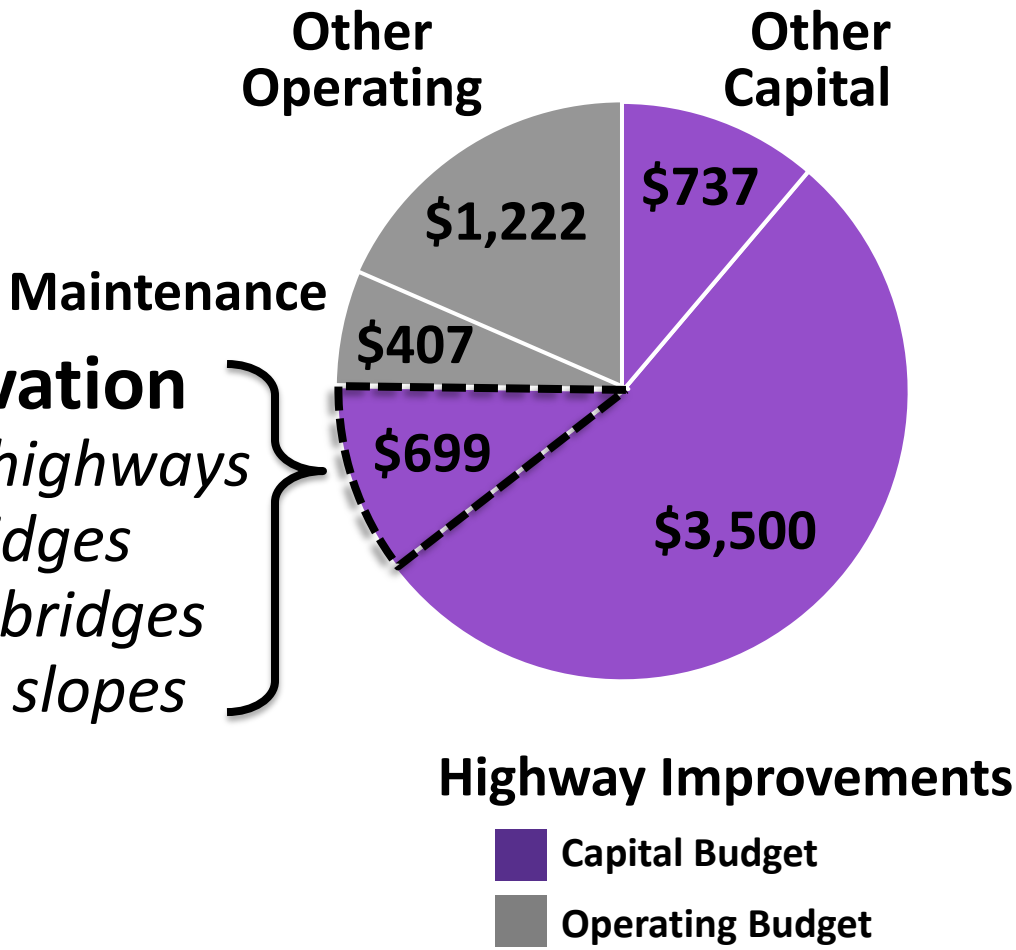
Phase 2 of 2: December 2015

Procedures consistent with industry & other practices?

JLARC staff engaged bridge and pavement experts to assess long-term estimating practices

Preservation is 11% of WSDOT's 2013-15 $6.5 billion biennial budget

Preservation
Repave highways
Paint bridges
Replace bridges
Stabilize slopes



Consultants reviewed cost estimating best practices

		Pavement	Bridges
1	Expected asset deterioration	Yes	Partial
2	Expected effectiveness of maintenance and preservation work	Yes	Partial
3	Investment options and predicted conditions for different funding scenarios	Yes	No
4	Investment recommendations based on life cycle cost analysis	Yes	No
5	Risk	Yes	Partial

1 Expected asset deterioration

Asset deterioration models allow a DOT to:

- Estimate future costs, and
- Use life cycle cost analysis to compare different preservation alternatives.

Pavement – Yes

Maintains site-specific models to characterize condition and determine when different sections are due for treatment

Bridges – Partial

- No deterioration models for most bridge elements
- Deterioration analyses are used ad hoc, rarely documented

2 Expected effectiveness of maintenance and preservation work

By measuring the effectiveness of preservation and maintenance work, a DOT can more accurately estimate the need for and impact of future work.

Pavement – Yes

- Models and data are specific to the work completed
- Update details of completed work in Pavement Management System and continuously recalibrated

Bridges – Partial

- With a few exceptions, effectiveness of bridge preservation work not measured
- No comparable bridge management system

3 Investment options and predicted conditions for different funding scenarios

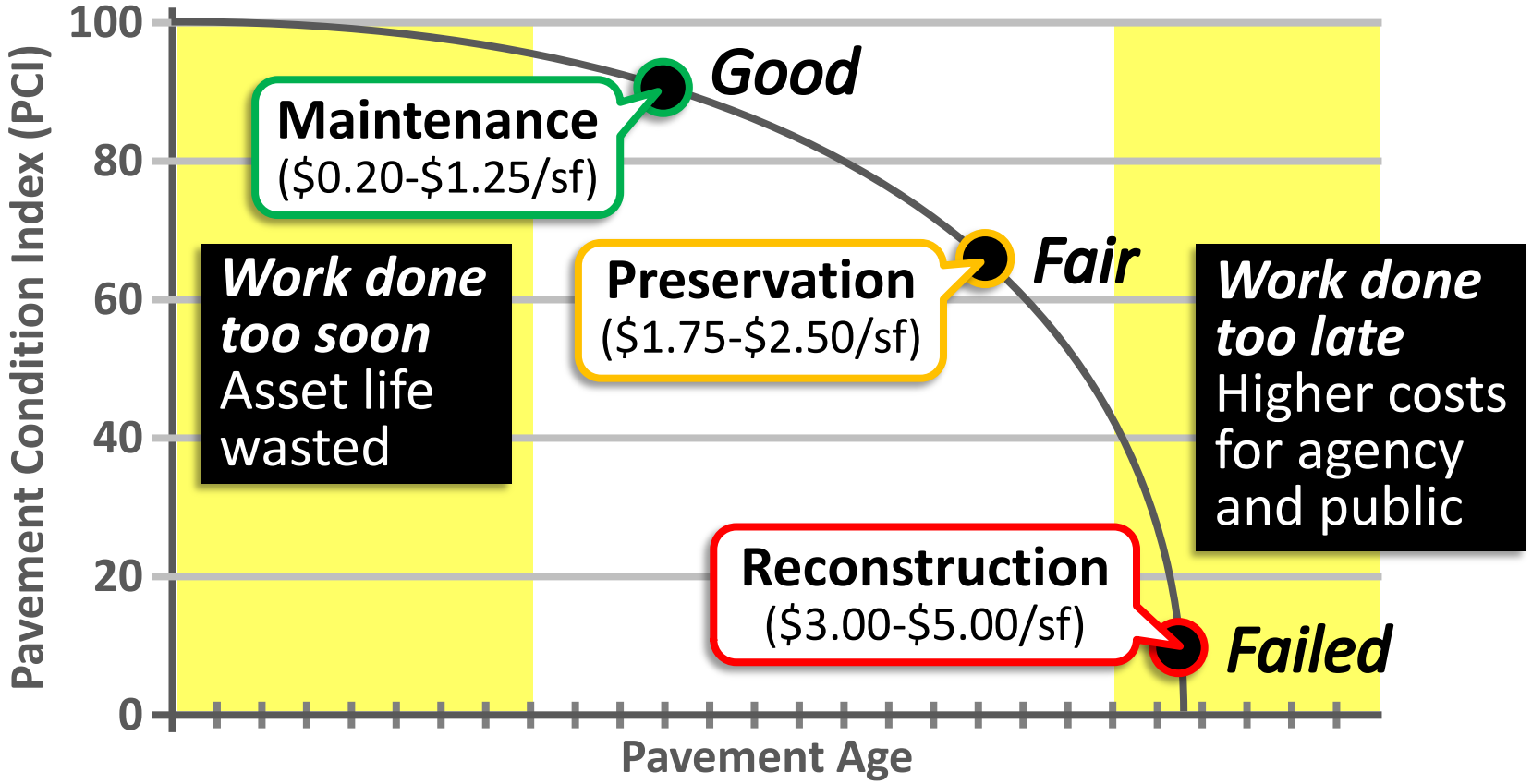
Allows Legislature to consider data-driven investment alternatives and answer questions such as:

- Cost to bring 95% of state roads to fair or better condition?
- Impact of investing $300 million more on bridge preservation compared to $500 million?

Pavement – Yes	Bridges – No
Provided report to Legislature on estimated outcomes of three funding scenarios in 2010	Estimated condition not based on validated, quantitative analysis of deterioration or treatment effectiveness

4 Life cycle cost analysis supports long-term, cost effective decisions

Evaluates feasibility of incurring a smaller expense (e.g., maintenance) to postpone a bigger expense.



4 Investment recommendations based on life cycle cost analysis

Work appropriate and effective for specific bridge or pavement segment may not be viable for entire system. LCCA helps determine:

- ✓ Timing of specific work
- ✓ Condition levels that can be maintained at lowest cost over long term, and strategies to do so

Pavement – Yes	Bridges – No
Determine funding needs using strategies that produce lowest life cycle cost and satisfy performance criteria	Does not have the models or software to estimate long-term costs or perform life cycle cost analysis

5 Risk

Long-term needs estimate should acknowledge inevitable uncertainties. A DOT needs to analyze and develop contingency strategies to address:

- **Systemic risks**, such as changes in the cost and quality of materials and in available revenues, and
- **Site specific risks**, such as natural or man-made hazards.

Pavement – Yes	Bridges – Partial
Quantify systemic risk, and consider risk during project prioritization process	Do not include all man-made hazards (e.g., over-height or over-loaded trucks)

Use best practices for bridge cost estimates

Recommendation 1: WSDOT should use best practices to make its bridge estimates as reliable as pavement estimates.

Start with a multi-year plan

Effective bridge management systems require several years of incremental changes

- Develop implementation plan by June 30, 2015
- Identify near-term and longer-term actions

WSDOT and OFM: Concur

Improving stakeholder confidence in WSDOT's long-term cost estimates

National best practices identify elements contributing to a forecasting and estimating process that builds stakeholder confidence.

Common theme: Involve other parties

Documented estimates	Clear, routine communication	Internal and external review
Phase I found process for long-term estimates not well documented	Communicate assumptions, uncertainties, and estimate changes	Examples such as project reviews and Caseload Forecasting Council

Organizational buffers

Ensure integrity in the processes of developing and identifying needs during estimate development

Improve stakeholder confidence

Recommendation 2: WSDOT and OFM should develop a process to improve stakeholders' confidence in its highway estimates.

Apply best practices

- Identify an approach that incorporates best practices
- Report plans by June 30, 2015

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