

Development of Bridge Asset Management in Washington State

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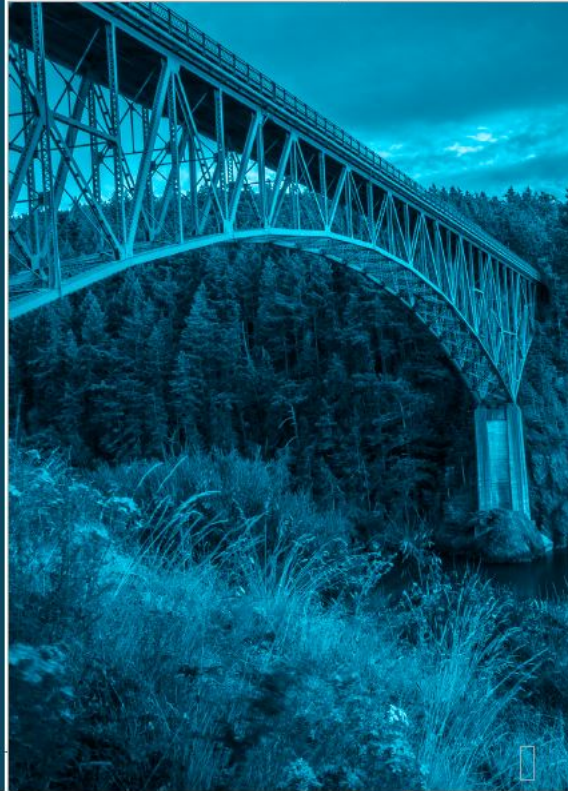


**Washington State
Department of Transportation**

Bridge Preservation Guide

*Maintaining a Resilient Infrastructure
to Preserve Mobility*

Spring 2018



U.S. Department of Transportation
Federal Highway Administration



Washington State
Department of Transportation



Source: GPI

Figure 15. Steps for establishing a bridge preservation program.

Goals and Objectives

Bridge Cleaning

1. Obtain permits to allow annual cleaning of bridges
2. Obtain funds to pay for cleaning all steel bridges.
3. Obtain funds to pay USDA for bird control.
4. Obtain funds to purchase two UBITs for bridge washing.
5. Annually clean all steel bridges. (Rule)
6. Remove FHWA letter of concern of inadequate fracture critical inspection due to debris build up on truss bridges

Goals and Objectives

7. Clean steel to allow for spot and area painting to extend paint life.
8. Reduce cost of future paint contracts.

Bridges to Preserve

- All steel bridges.
 - Start with truss bridges. (Then as bridges stay relatively clean and crews become more efficient)
 - Move on to bridges with in span hinges
 - Add in weathering steel bridges
 - Add in the rest of steel bridges

Preservation Actions with Bridge Cleaning

- Hand clean first
- High volume low pressure flush
- Seal all joints on the bridge.
- Spot and area paint as needed.
- Include cleaning decks, drainage and pier caps.
- Bird controls

Clean bridges for fracture critical inspections



Area Paint 507/114 (1943)



Preservation Actions - Contract

- Paint steel bridges.
- Back log of \$777 million
- Reasons for backlog
 - Inadequate funding for preservation.
 - Steel bridges have been over coated so many times that the underlying paint is brittle and requires complete removal at a much higher cost.

Contract Rules

- Paint steel bridge trusses every 20 years.
- Steel girders about every 30 years.
 - These are general rules. The actual condition of the paint governs. In addition the AADT is factored in. Interstate bridges, border bridges, and major arterials are prioritized ahead of the rest.

Performance Measures

- Percent of steel truss bridges cleaned annually.
- Removal of FHWA letter of concern.
- Contract with USDA
- Reduction in bird damage
- Purchased two UBITs
- Reduce paint backlog

Life Cycle Plans

- Clean annually
- Paint as needed

Bridge Paint Need Measurements

- Current WSDOT owned steel bridge painting due or past due in millions of dollars (Fiscal years 2017 & 2018)

Previous period \$460.8M, Current \$365.3M ☐

- Projected 10-year WSDOT owned steel bridge painting backlog in millions of dollars¹ (Fiscal years 2017-2026 & 2018-2027)
- 17-26 \$740.8 M, 18-27 \$657.5



Evaluation of Benefits

- Letter from FHWA praising our truss cleaning program
- Once cleaned, most trusses staying relatively clean.
- Efficiency improved from 2 weeks to two a day.
- Cleaning permit approved to include all public agencies.
- Paint backlog declining.
- Checking on spot painting efficacy.
- Checking on efficacy of panel joint seals. Hot HMA or backer rod and deck seal.

Funds

- Maintenance Funds:\$2 million/bien allocated to steel bridge cleaning.
- Preservation Funds for contract Painting 17-19 \$80.8
- Preservation Funds to Maintenance for Strategic Bridge Preservation. \$6 million per biennium.

Where Does the State Fuel Tax Go?

49.4¢ PER-GALLON • STATE FUEL TAX •



* Of the 9.5 cents, 8.5 cents is used by the state for highway projects, 1 cent goes to cities and counties for street and road improvements.

** The 11.9-cent gas tax increase will be phased in over the next two years. The first 7.0-cent increase occurred on August 1, 2015, followed by a 4.9-cent gas tax increase on July 1, 2016.

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The Reality

- WSDOT funded for 50% of preservation needs.
- WSDOT Bridge inventory increasing (800 new fish barriers)
- Bridge maintenance backlog increased 400% over last 10 years
- Over the next 10 years
 - A billion dollars needed for bridge decks.
 - \$711 M needed for bridge replacement or rehabilitation, (Increase in closed and restricted bridges)
 - \$777 M needed for bridge painting

Bridge Maintenance Increased Funding

- Bridge Washing
 - Maintenance funding \$2 M
- New Funding: Strategic Preservation P2 - \$6M, \$1M Eqpt (All State Funds)
 - 2 new crews w/ eqpt, facility, tools.
- Connecting Washington M Funds \$2 M/bien all maintenance needs

Practical Solutions

- The legislature recognized and incorporated anticipated savings from practical design into a fund for preservation projects and additional capital projects in the outer years of the package.
 - Lights scare away starlings
 - Tacoma Narrows Traveler
 - Cold expansion
 - Timber Bridge Life Extension
 - Joint replacements, Deck Seals, Spot Painting

StarlingsThe Problem



Top of stairwell looking down

Lights The \$200. Solution



TNB Travelers, Practical Solution

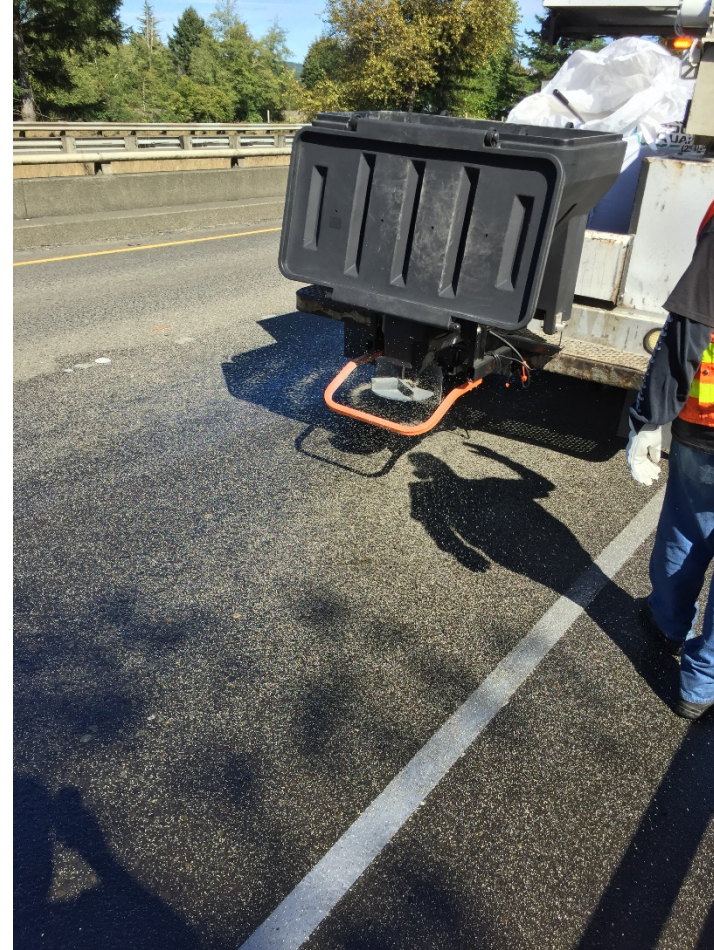
- \$12 Million programmed to build three mobile travelers
- Mobile travelers require a high level of maintenance
- Crew needed a paint platform.
- We had Safway Platform parts from the New Narrows Bridge construction.
- Cost for the additional parts, construction of the platform and certification: \$125,000.

Cold Expansion

<p>1/2" DIAM. STOPCRACKEX™ BUSHING</p>	<p>GRIND SMOOTH AND POLISH EXPOSED SURFACES 3/16" MIN DIAMETER</p> <p>ROUND CORNERS TO 3/16" DIAMETER</p>														
<p><u>FOR CRACKS > 1/4"</u> <u>USE STOPCRACKEX™ BUSHING</u></p> <ul style="list-style-type: none"> LOCATE CRACK TERMINATION BY DYE PENETRANT TESTING. INSTALL STOPCRACKEX™ BUSHING ALONG THE CRACK TRAJECTORY LEAVING 1/8" BETWEEN CRACK TIP AND BUSHING. A 1/2" BUSHING WOULD BE CENTERED AT 3/8" FROM THE TIP OF CRACK (REFER TO INSTALLATION MANUAL). PAINT <p>* CRACKS LONGER THAN 3" REQUIRE ADDITIONAL REVIEW. CONTACT BRIDGE REPAIR SPECIALIST AT 360-570-2560.</p>	<p><u>FOR CRACKS ≤ 1/4"</u> <u>GRIND AND POLISH</u></p> <ul style="list-style-type: none"> GRIND OUT CRACK TO 3/16" MINIMUM DIAMETER (GRIND MIN. 1/8" BEYOND IDENTIFIED TIP) REMOVE ALL SHARP CORNERS IN VICINITY OF REPAIR (3/16" MIN. DIAMETER) POLISH EXPOSED SURFACES PAINT 														
	<table border="1"> <tr> <td>Date: 3/25/2013</td> <td rowspan="4"> <p>Washington State Department of Transportation bridge and structures</p> </td> <td>STRINGER COPE</td> <td>1</td> </tr> <tr> <td>Drawn By: J. S. MARTIN</td> <td>CRACK REPAIR</td> <td>of</td> </tr> <tr> <td>Checked By: N/A</td> <td>REPAIR PROTOCOLS</td> <td>1</td> </tr> <tr> <td>Reviewed By: G. C. SCROGGINS</td> <td>Repair #: STANDARD</td> <td></td> <td></td> </tr> </table>	Date: 3/25/2013	<p>Washington State Department of Transportation bridge and structures</p>	STRINGER COPE	1	Drawn By: J. S. MARTIN	CRACK REPAIR	of	Checked By: N/A	REPAIR PROTOCOLS	1	Reviewed By: G. C. SCROGGINS	Repair #: STANDARD		
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Deck Seal Satsop River 12/51S



Use of borate rods

- Low cost means to prevent rot by killing the fungus that causes the rot.
- In use by the log home industry, railroads, utility companies
- Activated at 25% moisture content same as when fungus activates.
- Protection lasts about ten years.
- Insert rods 6 to 8 inches apart, for quick activation, squirt liquid borate in hole prior to inserting rods. (Not for in-water piles)

Inserting the rods





P-2 Strategic Preservation 18 months Results

- \$3,723,831 of \$6 Million expended
- 231 projects completed
- 6533 feet of joint replaced
- 5619 square feet of deck repaired
- 539,382 square feet of deck sealed
- 135 repair list projects completed with P-2 funds
- Program extended through 2027.

Lessons Learned

- It is difficult to hire train and equip new crews and have them be effective and efficient from day 1.
- We needed more time to develop our lists of projects.
- Projects should be in well defined units.
- All regions should have made the Preservation fund expenditures their first priority.
- There was a reduction in expenditures in other funding budgets due to lack of resources. (Time and equipment)

Questions?

