WBPP Update

National Cooperative Highway Research Program

NCHRP

--- Research Needs Statements ---

	Effective Use of Duplex Coating Systems to improve Steel Bridge Structure Durability	
	Modeling the Performance of Vehicular Bridge Expansion Joints Under Notional AASHTO LRFD and Actual Traffic Loads	
	Characteristics of Decommissioned Bridges	

--- Upcoming Projects ---

2017-F-07	Costs and Performance of Bridge Deck Preservation Actions	Dev
12-107	Development of Guidelines for Full and Hybrid Use of Stainless Steel for Bridge Girders	Dev
12-108	Development of Guidelines for Uniform Service Life Design for Bridges. Dev.	Dev
20-07/Task 380A	Review and Update of the AASHTO Maintenance Manual for Roadways and Bridges	Dev
20-07/Task 387	Maintenance Actions for Fatigue Cracking in Steel Bridge Structures	Dev

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--- Active Projects ---

20-30/IDEA 179	A portable field instrument, based on ultrasonic technology, for in-situ measurement of total stress (both dead and live loads) in steel bridge members	Active
20-30/IDEA 189	A Novel Vision Sensor for Remote Measurement of Bridge Displacement	Active
Syn 47-01	Control of Concrete Cracking in Bridges	Active
Syn 47-03	Current Practices and Guidelines for the Reuse of Bridge Foundations	Active

--- Completed Projects ---

14-32b	Proposed Revisions to the AASHTO Movable Bridge Inspection, Evaluation, and Maintenance Manual	2015
18-16	Self-Consolidating Concrete for Cast-in-Place Bridge Components	2015
20-07/Task 348	Review of the AASHTO LRFD Movable Highway Bridge Design Specifications for future updates	2015
Report 816	Guide for the Preservation of Highway Tunnel Systems	2015

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--- Completed Soon ---

12-100	Guidelines for Maintaining Small Movement Bridge Expansion Joints	2016
12-87A	Fracture-Critical System Analysis for Steel Bridges	2016
12-91	Strand Debonding for Pretensioned Girders	2016
12-95	Connection Details of Adjacent Precast Concrete Box Beam Bridges	2016
12-96	Simplified Full-Depth Precast Concrete Deck Panel Systems	2016
12-97	Guide Specification for the Design of Concrete Bridge Beams Prestressed with CFRP Systems	2016
14-28	Condition Assessment of Bridge Post-Tensioning and Stay Cable Systems Using NDE Methods	2016
14-29	Assessing, Coding, and Marking of Highway Structures in Emergency Situations	2016
14-30	Spot Painting to Extend Highway Bridge Coating Life	2016
20-07/Task 377	Standardized Format for Bridge and Structure Information Models for Life Cycle Management	2016
20-07/Task 378	Assessing Risk for Bridge Management	2016
10-95	Toughness Requirements for Heat-Affected Zones of Welded Structural Steels for Highway Bridges	2017
12-102	Recommended AASHTO Guide Specification for ABC Design and Construction	2018
14-36	Proposed AASHTO Guide for Bridge Preservation Actions	2018

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Proposed AASHTO Guide for Bridge Preservation Actions

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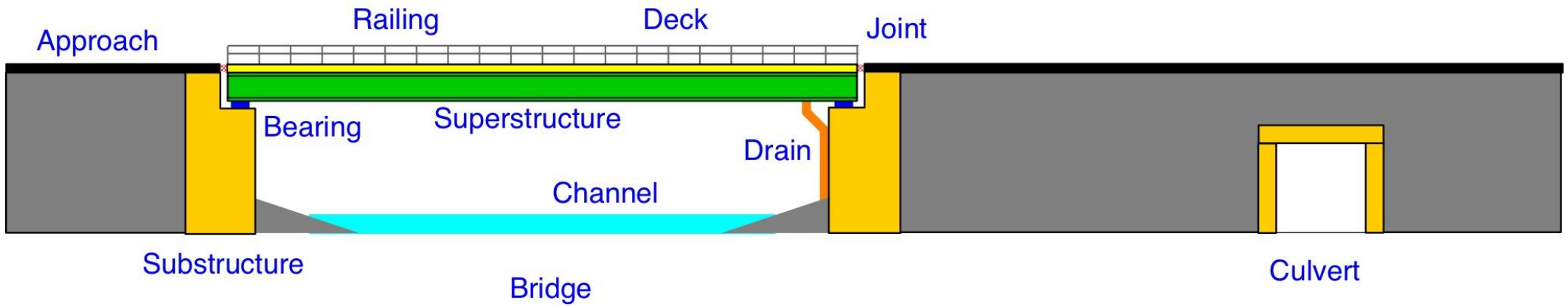
Bridge Preservation - Actions

Level	Sub-Level	Typical Actions
Preventive	*Scheduled* - Actions delivered at standard intervals	Clear, Clean, Wash, Flush Remove debris
	Evaluated - Evaluations at standard intervals. Actions delivered as-needed.	Seal surface, Seal cracks Healer/sealer, Polymer overlay Zone paint Replace joint seals Remove large debris
Corrective	*In-Kind* - Repair or replacement of portions of bridges or elements	Repair in-kind, Replace in-kind Straighten, Patch Complete paint Replace joint, Replace railing Dredge/re-establish channel
	Betterments and Retrofits - Improve durability. Reduce vulnerability.	Fatigue retrofit Improve drain systems Improve or modify channels or bank protection Modify continuity Eliminate expansion joints Install pavement relief joints
End-Of-Preservation (EOP)	Structures awaiting rehab or replacement	Minimal repairs to maintain safety of bridges

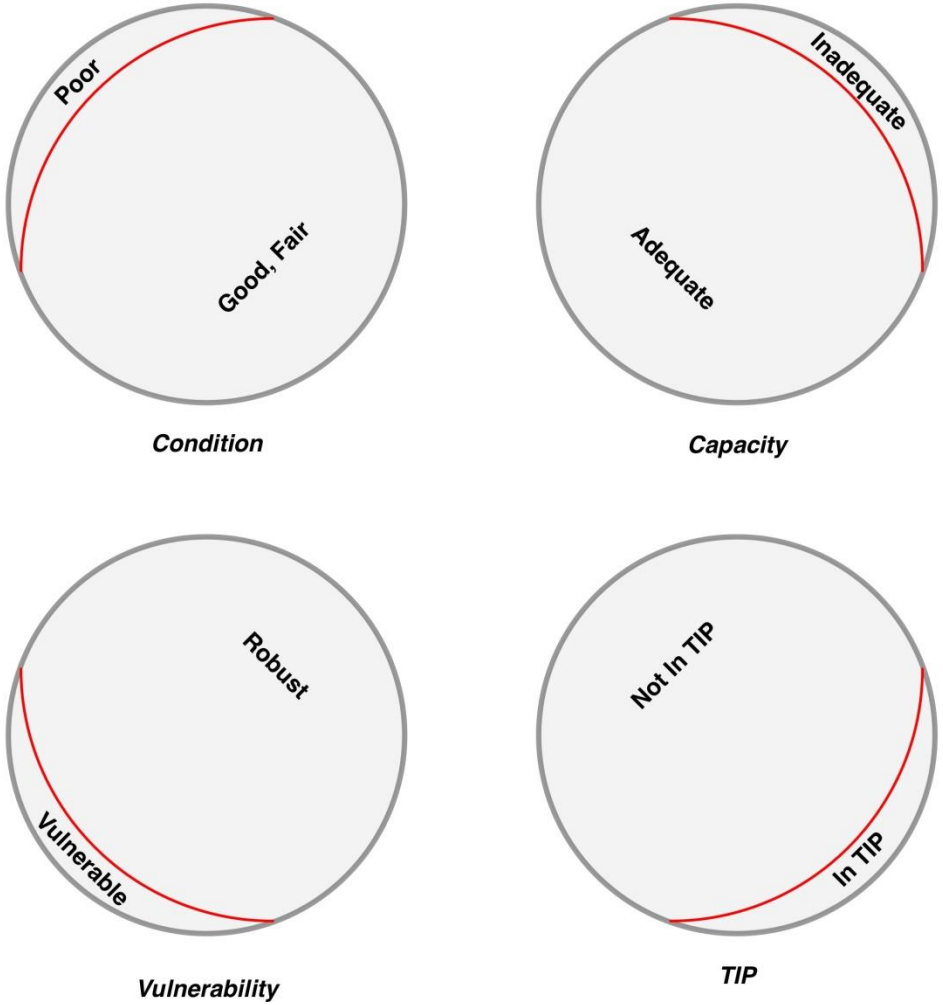
Bridge Preservation – Actions for Decks

		All	RC	Steel	Timber
Prev.	*Sch'd*	Sweep Power wash	Maintain cathodic protection		
	Evl'd	Seal cracks in wearing surface	Healer/sealer Polymer overlay Chip seal Seal cracks in deck Seal surface	Paint Bolt deck to stringers	Bolt deck to stringers Tighten rods (stress laminated) Replace wheel-path running boards
Corr.	*In-Kind*		Replace wearing surface Repair spalls Repair cracks in structural deck Install rigid overlay Remove loose concrete, soffit Rebuild portion	Replace panel/section	Replace broken boards
	Bt & Rt	Improve drainage	Install cathodic protection Add AC + membrane		Add wearing surface

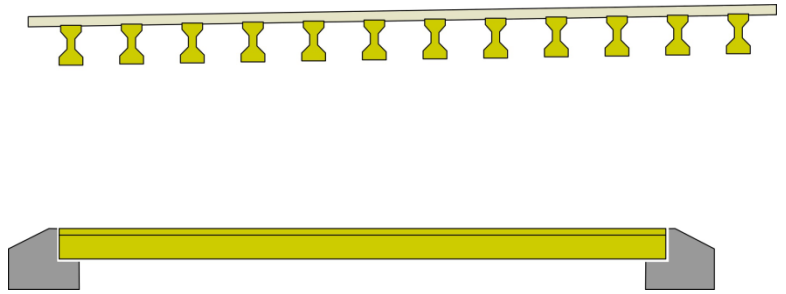
Bridge Preservation – Action Sets



Bridge Population to Preserve



Benefit-Cost Analysis



- Anticipate replacement. Estimate replacement cost, RC
- Identify preservation actions and costs

$$A_0$$
$$A_1, MC_1$$
$$A_2, MC_2$$
$$\dots$$

- Estimate reminding service life for each preservation action

$$L_0$$
$$L_1, \sum MC_1$$
$$L_2, \sum MC_2$$
$$\dots$$

- Amortize costs

$$RC\ /\ L,\ \sum MC\ /\ L$$

- Compute annual benefit

$$B_1 = RC/L_0 - \left(RC + \sum MC_1\right)/L_1$$

$$B_2 = RC/L_0 - \left(RC + \sum MC_2\right)/L_2$$

$$\dots$$

Current Practice – US State DOTs

Data Collection

Policy • Definitions • Programs for Bridge Preservation • Criteria for Selection of Actions	**Action** • Actions in state DOT terms • Intervals for Actions • IDs and Data Systems for Actions • Costs of Actions
Performance • Performance standards • Performance measures	**Other information**

Guide for Bridge Preservation Actions

1. Overview. Bridge preservation programs
2. Preservation actions
3. Programming
4. Delivery of actions
5. Costs and Benefits
6. Evaluation of actions and programs
7. Data systems
8. Performance measurement. Reporting.
9. Appendices. Glossary & references

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Proposed AASHTO Guide for Bridge Preservation Actions

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