Qualifying a Systematic Maintenance Program Report Out

2012 WBPP Conference
Vancouver, WA

Group number: 1

Discussion Highlights (note main discussion items)

- DOTs represented: AK, AZ, MT, WA (2); 3 industry, 1 NCPP
  - MT has SPM agreement
  - AK approved to use HBP funds for painting some selected bridges
  - WA has agreement from 2002 to use funds for many of the items mentioned in the Guide; has not been required to provide detailed documentation
  - AZ does not have an agreement;
- WI experience – neighboring districts provide comparison of effectiveness of bridge washing; no documentation available; same environment,
- WA currently doing research to quantify effectiveness of washing steel bridges
- MT using analysis that does not always show cost benefit of certain preservation actions such as deck sealing
- Different experiences of DOTS in negotiating approval of SPM agreement with FHWA
- Can DOT choose one preservation action generally accepted to be beneficial and develop prioritization process for that one type of action?
- Can preservation industry companies provide data and or case studies on successful preservation actions
- Design of joint systems to account for actual truck loads
- Challenges to implementing SPM process:
  - Recording accurate, useful data
  - Terminology in describing actions
- Unknown benefits of resetting bearings to original level of performance

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- WI (Wisconsin) anecdotal experience showing advantages of bridge washing
- WA currently doing research to quantify effectiveness of washing steel bridges
- Watson-Bowman working with ARTBA to document joint performance
- PennDOT designs of joint systems to account for actual truck loads
- Successful use of plug joints in some situations

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- FHWA provide more specific guidance on developing an SPM agreement and getting it approved
  - Provide specific examples of meeting the steps in the process (Guide, page 20)
  - List specific preservation actions that are known to be effective
  - Track and share results of studies on demonstrated extensions of life from preservation actions
  - Allow DOTs to choose one or just a few "proven" preservation actions and prioritize needs for those actions separately
- Foster consistency between FHWA divisions in review and approval of SPM agreements
- Identify data, case studies, other information that supports cost effectiveness of different preservation actions
- Analyze, estimate cost of typical maintenance, repair, rehabilitation actions that could be avoided if the equivalent sums were spent on early intervention
- Investigate uses of Pontis as the method for defining and prioritizing needs
  - Correlation of terminology between Pontis and maintenance record systems is a barrier to defining costs of actions
- DOTs include processes in inspection program to document effectiveness of preservation actions

Group number: 2	Discussion topic: SPM Program

Discussion Highlights (note main discussion items)

- DOT's represented AK, WA, OR, NM
- AK has limited approval – 5 items
- NM has had success with federal approval
- Once approved it becomes problematic to maintain for each project
- Have states not applied due to difficulties?
- If a state's program has been approved would that template be useful for other states to use?
- Have to rely on federal funds because the state funds are being used elsewhere
- Approval too long and cumbersome for federal dollars
- Are the federal dollars worth it?

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- To get federal funds for maintenance turning several bridge maintenance items into a full scale project
- Use federal funds for large ticket items

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Identify negatives for getting federal approval
- Devise a template that can be used by all – which states have approved programs that can be used as a starting point – post to TSP2 website
- Designate group of people to come up with a template for program approval – may require funding

Group number: Table 3	Discussion topic: Topic 1

Discussion Highlights (note main discussion items)

- NM –Approval for federal funding for preventive maintenance, primarily Epoxy overlays and joints. Recent tries with polyester overlays
- AZ – No application for use of funds for preventive maintenance. Preventive maintenance is limited to adding to preservation projects. Not good luck with polyester overlays. Preparation work is more important than the product. Need to have a great contractor. Prep work can be sacrificed on low bid. Specs that emphasize performance and preparation.
- OR – Seeking approval for federal funding for preventive maintenance.
- Environment is critical. Dry areas such as Arizona and New Mexico have much better history of keeping bridges in service for an extended period of time. They do not paint bridges often, the 1960's paint jobs are fine. After 1970's hardly any steel bridges.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Bid process, low bid or best value award. Scoring a technical proposal. Points broken down into QA/QC, environmental, team experience, physical plan (enough equipment, backup pieces), financial status.
- Specs can be tightened up, vendor will complain because they can not qualify. When contract is always low bid, there are quality issues. AZ had issues with 4 of 6 deck overlays using polyester.

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- NM has approval, AZ does not have approval and is fine with it since they are focused on bridge replacements (due to dry environment) , OR would like to have approval.
- Communication between
  - States and FHWA for expectations on preventive maintenance
  - States and other states to learn from each other
  - States and contractors (Associations of contractors) to addresses equipment specifications (equipment size to do the job to do the deck prep). Paid technical representative on site during installation, quality control.
- Prequalification of contractors
  - Similar work history and other factors

Group number: 4	Discussion topic: Sys Prev Maint w/FA

Discussion Highlights (note main discussion items)

- Agencies need to specify and use materials correctly, and insure correct installation procedures.
- Federal projects receive a higher level or QC/QA than local funded projects.
- How can a vendor help prove a life extension using their products? Use data driven life projections or studies conducted on similar bridges.
- FHWA wants the demonstration of programmatic life increase.
- Hawaii approved their plan in 2005, after the 2004 memo, but before the 9 steps were specified. The priority was accepted as recommendations from Pontis, and cost effectiveness and life extension was shown subjectively, not using details data.
- It would be helpful to address life extension and cost effectiveness for specific maintenance actions on a national level.
- States should continue to share and adopt similar materials acceptance criteria, specifications and standard details.
- Division offices react differently to the same plans. AZ submitted a plan similar to CALTRANS and it was denied. OR turned in a plan similar to the old WSDOT plan and it was denied.
- Intuitively, some actions seem clearly cost effective and extend life, but it is difficult to meet FHWA expectations for proof that those good results will occur.
- The most challenging things implementing are prioritization, cost-effectiveness proof and life extension proof.
- FHWA should standardize data needs and methods of proving cost effectiveness and life extension.
- The problem with standardization is that conditions, environmental exposure is vastly difference in various agencies – deicing, coastal exposure, benign, heavy loads, etc.
- Decks, joints, paint are the big issues that need to be addressed. Corrosion and fatigue cracking are also big ones.
- There are lots of examples where joints have failed and caused accelerated deterioration of sub and super structures.
- It should be evident that joint sealing is cost effective and results in life extension.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Caltrans program works well.
- The CA Division office provided assistance to define requirements and get a plan meeting those requirements.
- Hawaii's plan met requirements in 2005. Hawaii Dev Office helped a lot to get an approved plan.
- The NE state are developing common materials and construction specs and standard drawings.
- The MidWest concrete consortium is sharing specs and details.
- CO is preparing to submit a plan for Federalizing preventive maintenance – hasn't submitted it yet.
- Industry warrantees, but need systems to monitor and administer.
-

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Work life cycle cost and life extension issues in an industry – State DOT group.... through the Regional Partnerships or other forum?
- State research can provide good answers, but need pooled funding and more than one state involved to make that research more universally accepted.
- Need more focused research specifically to answer preservation issues. (example: Caltrans study on deck performance using methacrylate and polyester overlays at Montana State U)
- FHWA should make individual state plans that meet the requirements available as examples.
- FHWA should provide acceptable examples to a state for any element of the state's plan that does not meet the requirements.
- Develop standardized test protocols agreed on a national or regional basis to make testing and practices more universally accepted.

Group number: 5	Discussion topic: Qualifying a Systematic Preventive Maintenance Program (SMP) for Federal Funds.

Discussion Highlights (note main discussion items)

- Table Panel is made up of 4 vendors, one County Agency, one Fed, One State.

- Utah is putting out a contract for preventive maintenance on a set of structures to be performed by contract. To be determined how effective. Not Federally backed.
- Panel members have seen this done on roadways, but not on bridges. Using an asset management program (like for roadways) on bridges would be interesting to see if it could be cost effective.
- How can the analysis of bridge inspection data be used towards applying to a PMP? How is the data mining performed? Not all agencies are using a BMS system. Tying to the NBI condition codes is difficult.
- How is the experience level of maintenance used to fold into a qualified Federal Preventive Maint. Plan?
- Agencies would like to have easier access to Federal Dollars for PM without a large amount of regulatory hoops needed to jump through.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- County and city agencies have a smaller inventory and pointed agendas for maintaining a small inventory of bridges.
- Seismic and structural rehabilitation work is nearly always performed after bridge elements are damaged, and after a preventive maintenance plan would have been effective.
- Line item single service repairs of bridges are more typical than a holistic approach to preventive maintenance.
- Locals are still looking for a means to access Federal Dollars for preventive maintenance. They will typically work towards projects that are easier to get Federal Dollars.

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Need better public (and legislative) awareness of what a PM Program actually does for the infrastructure.
- Free up Federal Dollars with fewer hoops needed to qualify.
- Allow small agencies to "piggy back" on approved state PMP.
- Remove legislative constraints to contracting
- Allow the use of innovative technologies for PM.
- Access to standard templates for bridge analysis for Life expectancy ect. for getting a systematic process in place.
- There are more PM options for concrete than what is listed in the Preservation Guide.

Group number: 6

Discussion Highlights (note main discussion items)

- About half the group had at least scanned the BP guide.
- ODOT does not have an approved SPM.
- WSDOT has one from 2002?
- CDOT has an approved SPM from
  - Performance measures
    - Fair and below are addressed

Question within the group: How long does the SPM last once it is approved? Indefinitely

Challenges in creating a SPM include:
$$$
Bureaucratic red tape
Internal education
Enough of the correct data to support cost effectiveness
- Forecasting
- Good baseline comparisons
- The right reports

Group felt that the BP guide was compact yet informative (efficient use for size). The guide provides several examples for states to use in their model. It provides a good baseline for state specific preservation programs.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Colorado SPM includes:
  - Expansion jt rehab
  - Paint
  - Scour
  - Bearings
  - Sealing decks
  - Essential structural repairs
  - Bridge washing yet to be resolved
- WSDOT SPM includes
  - Bridge Painting
  - Scour Countermeasures
  - Bridge Deck Overlay
  - Special Repairs(suspension cable replacements, larger exp bearings, strengthening posted fatigued damaged bridges, moveable M/E bridges

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- BP Guide –
  - Update to include the new AASHTO elements.
  - Go beyond NBI & SR
  - Create a new calculation for a Preservation Score
- Educate legislators on priorities
- Set aside money to preserve infrastructure and don't let anybody touch it for other needs.
- How do we make Bridge Preservation more Sexy? Develop a method to alert the public that money can be better spent on preserving existing bridges and get the attention of their representatives with this.
- Continual education process for new legislators to bring everyone to level understanding of what is needed.

Group number: Table 7	Discussion topic: Qualifying A SPM Program for FHWA

Discussion Highlights (note main discussion items)

- Ten year rule- stay away from major reconstruction then it doesn't trigger the rule.
- AZDOT has not applied. Reason: don't feel they have enough funds in the program to warrant the action. Utilizing the pavement program to fund deck prevention unless it gets too big.
- WSDOT has been prior commitment approval as other states for painting, scour, special repairs and bridge deck overlays. Has a bridge program manager that allocates funds to prioritized projects within the allocated programs. (deck, painting, replacement etc)
- CDOT- prior approval joints, painting, girder (new Inspection engineer). BR funds are allocated to section of state for prioritizing. Focus on essential repairs. So they incorporate SPM with projects. Regions apply funds at their discretion. Funds allocated by deck area in poor condition. Program is bigger than the funding. Dealing with the worst of the worst. While establishing a SPM to get ahead.
- Accountability is credibility.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Quality assurance review to assist in funding to get upper management by-in on project. "QIC"?
- NY washes bridges every two years. Let it drop where it lands. Except sidewalks get clean off.
- Not bridge washing but "rinsing"
- Best management practice (BMP) for hydraulic permitting for bridge cleaning. Open to locals too.

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Funding – to get started on SPM along with continuing the repair. SPM needs to get a good piece of the total allocation. Need to be on two tracks keeping the system repaired and pursuing the SPM.
- Man power/Resources position that is setup dedicated to establish program, collectively apply the program (Bridge Program Manager, WSDOT) with access to the NBI and BMS data.
- Reduce the impact of environmental control. BMP's
- Negative incentive to "do nothing" and get a new bridge mentality needs to stop.
- Difficult to let go of maintenance repair funds and let the system go in place of SPM. Need dedicated SPM funding.
- Marketing SPM- Preservation program that is a "green initiative".
-

Group number: table 8	Discussion topic: Systematic Process

Discussion Highlights (note main discussion items)

- Foundation of systematic process is systematic inspection process
- Utah deploys PM to decks with condition codes of 6 to 7
- Utah does further refinement using CoRe Elements to determine PM work
- How prioritized? Utah looks at age of bridge and coordinating with other work and matching up funding
- Distinction between maintenance and rehab work is not clearly defined.

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Utah – each region inspection group is required to maintain top ten list for preservation, rehabilitation, and replacement and correlated with BMS results
- Utah metropolitan structures weighted more heavily using ADT and ADTT and environment
- Idaho and WSDOT have in-house crews which are considered very cost effective. Utah wishes they had in-house crews.
- Utah inspectors seeing results of inspections being used, provides buy-in to conduct better inspections.

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Get interaction between inspectors and BMS to develop PM and rehab priorities.
- Provide defined list of treatments that you use for specific circumstances – list of best management practices
- More flexibility from Feds on how states can use money.
- Provide systematic way to evaluate PM treatments over time within region – more research needed.
- Work to develop standardized material and construction specifications across states based objectively determined systematic best practices.

Group number: 9	Discussion topic: Qualifying a Systematic Preservation Program for Federal Funding

Discussion Highlights (note main discussion items)

- Idaho, -
- Washington –
- FHWA –

Keep building the case for PM
Find a way to engage industry
Look at available or develop new research for cost effective operational PM activities

Notable Practices (Note practices, strategies, policies, products, etc that are working well)

- Paul J referenced SD program
- Grouping of activities as part of the Bridge Preservation plan
- Montana did joint and bearing reset work as PM
- Canadian practices for quantifying PM activities

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Keep building the case for PM
- How to determine cost effectiveness
- Quantify the benefits of PM activation
- Quantify Life extension
- Find/develop related research?
- See if industry can help with this info
- Check with Canada on their efforts
- Ensure consistency at FHWA level
- Engage design community

Group number: 10	Discussion topic: Qualifying a Systematic Preservation Program for Federal funding.

Discussion Highlights (note main discussion items)

- Introductions
- Wyoming is in the initial stages of their bridge preservation program
- Dave Johnson from Montana stated that their program is underway with Level I and II projects, approved since 2005. Redoing (rehabilitations and overlays) decks is a part of their program. Bridge management database to screen for projects. Montana is 90% federally funded. Uses the Pontis database to prioritize bridges, considering rating values and cracking smartflags. Latex modified concrete and silica fume overlays. Joints, railing and bearings has also been a big part of the Montana preservation program.
- Functionally obsolete bridges don't necessarily have to come off of the list after the work has been completed.
- Chris Keegan, Washington DOT; Designating each and every bridge to be federally approved can be a real hurdle in getting the program off of the ground. Interested in extending the program for maintenance needs such as scour mitigation and expansion joints. Spending legislated funding on bridge repairs. Cleaning bridges has become a focus for Washington. Spot painting and area painting is on the horizon, starting with steel trusses over water. Washington hasn't been interested in going further with the program so far.
- The timeframe for approvals can take so long that the condition of the bridges potentially changes significantly during the process.
- Showing work/proving work to be cost effective is a major hurdle. Nearly impossible to justify some of the cost-benefits. Decks that are deteriorating have to be addressed for public and political reasons. Algorithms can't replace the engineer's judgment in deciding what work needs to be done.
- Washington – percentages of patches drive the bridge into the overlay category.
- Washington's program is 86% federally funded.
- Wyoming's total program is 90% federally funded.
- STPs and FTPs are a hurdle.
- Showing work to increase the bridge longevity is a major hurdle. How do you do this without historical data?
- Keeping bridges clean should increase the longevity of bridges. Pigeons and nesting birds are a maintenance problem. Poisoning and bird spikes have been used effectively in controlling these birds. Screening has worked. These ideas need to be approved for the federal program.
- Washington University has been involved in researching ways to increase bridge longevity.
- Environmental permitting is a challenge. Getting one permit that is in effect for multiple projects has been effective in Colorado and Washington.
- Adequate resources to continue preservation work is a major hurdle. You lose cost effectiveness if the program is inconsistent.
- The lack of state funding to match the federal funding is a problem with the preservation program.
- Having the preservation program in place at least designates the funding so that it has to be spent on bridges and not diverted to other fires.
- Every state handles federal funding differently, dividing the funding between the states and local agencies.
- If preservation activities are identified in the Bridge Preservation Guide, why do they require further approvals?
- TRB presentation last year that identified effective maintenance activities – see TRB website.
- States should share data as to what activities are cost effective and improve bridge longevity.
- Proving preservation activities are cost effective to legislatures is a hurdle when there are high-publicity and political issues involved. Washington has had some success in presenting problems to the legislature using pictures, what constitutes a "C" versus conditions constituting on "F".
- How do we implement the right treatments at the right time once the federal program is underway?

Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)

- Get program approved and re-educate legislature
- Get fhwa approval
- Activities list in bp book should be preapproved