



**Western Bridge Preservation Partnership
Annual Meeting
May 17 to May 19, 2016**

TSP2 Update on Bridge Preservation Research



Outline

- TSP2 Research Roadmap Database
- Identification of Research Needs by Partnership Members
 - NEBPP top priorities
 - SEBPP top priorities
 - MWBPP plans
- Filling the identified research needs

Unable to Sleep -



www.shutterstock.com · 75546448



TSP2 Preservation R&D Roadmap



The screenshot shows the NCPP website homepage. At the top left is the NCPP logo. To its right, the text reads "NATIONAL CENTER FOR PAVEMENT PRESERVATION" in large yellow letters, followed by "MICHIGAN STATE UNIVERSITY" in white, and "ENGINEERING EDUCATION RESEARCH & OUTREACH" in smaller white letters. Below this is a black navigation bar with white text: "Home About Us Partnerships FHWA Initiatives Links MSU UTC Library Site Map". The main content area features a video player on the left with the title "Changing Course to Preserve America's Roads". To the right of the video is a paragraph of text: "The National Center for Pavement Preservation (NCPP) was established by Michigan State University and FP2, Inc. to lead collaborative efforts among government, industry, and academia in the advancement of pavement preservation by advancing and improving pavement preservation practices through education, research and outreach." To the right of this text is a dark green button with yellow text that says "Research Roadmap Database". A red arrow points from the text area towards the button.

<https://www.pavementpreservation.org>





Research Roadmap

Homepage

Reference Files

Help

Home

Admin

User Form

Keyword Search

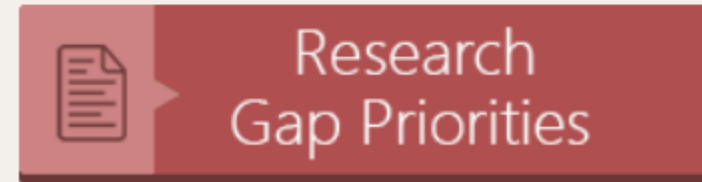
Under the "Reference Files" tab, click "Database"

Database

No Abstract View

Summary with Abstract

In the past, the highway preservation industries, do not have a central place for finding the most critical knowledge gaps in pavement and bridge preservation and the research necessary to fill those gaps. This Research Roadmap database identifies and documents completed and ongoing R&D projects in the area of bridge and pavement preservation. It will allow researchers and practitioners to (a) share research findings across the nation, (b) avoid duplicate efforts, (c) integrate separate research studies to address an overall research gap, and (d) build on the existing knowledge base.





Research Roadmap

Homepage

Reference Files

Help

Home

Admin

User Form

Key

Database

Add

Search

Filters

1 - 50 of Many



Agency

B or P

Title

Progress

Url



SHA - VT

Bridge

Evaluation of
Concrete
Bridge Mix
Designs for
Control of
Cracking,
Phase I

Complete

[http://vtransplanning.vermont.gov/sites/aot_poli/Cracking%2C Phase I.pdf](http://vtransplanning.vermont.gov/sites/aot_poli/Cracking%2C%20Phase%20I.pdf)

Click the "Database" down arrow; then select "Bridge" to separate the Pavement "chaff" from the Bridge "wheat"



Pavement
R&D

Bridge
R&D

MICHIGAN STATE
UNIVERSITY



Edit this



Research Roadmap

Homepage

Reference Files

Help

Home

Admin

User Form

Keyword Search

Bridge

Add

Search

Filters

1 - 50 of Many



2

Show/Hide Columns

Abstract

Accession#

Agency

Assessment Criteria

Assessment Value

B or P

Date

Agency

B or P

Title

Progress

Url

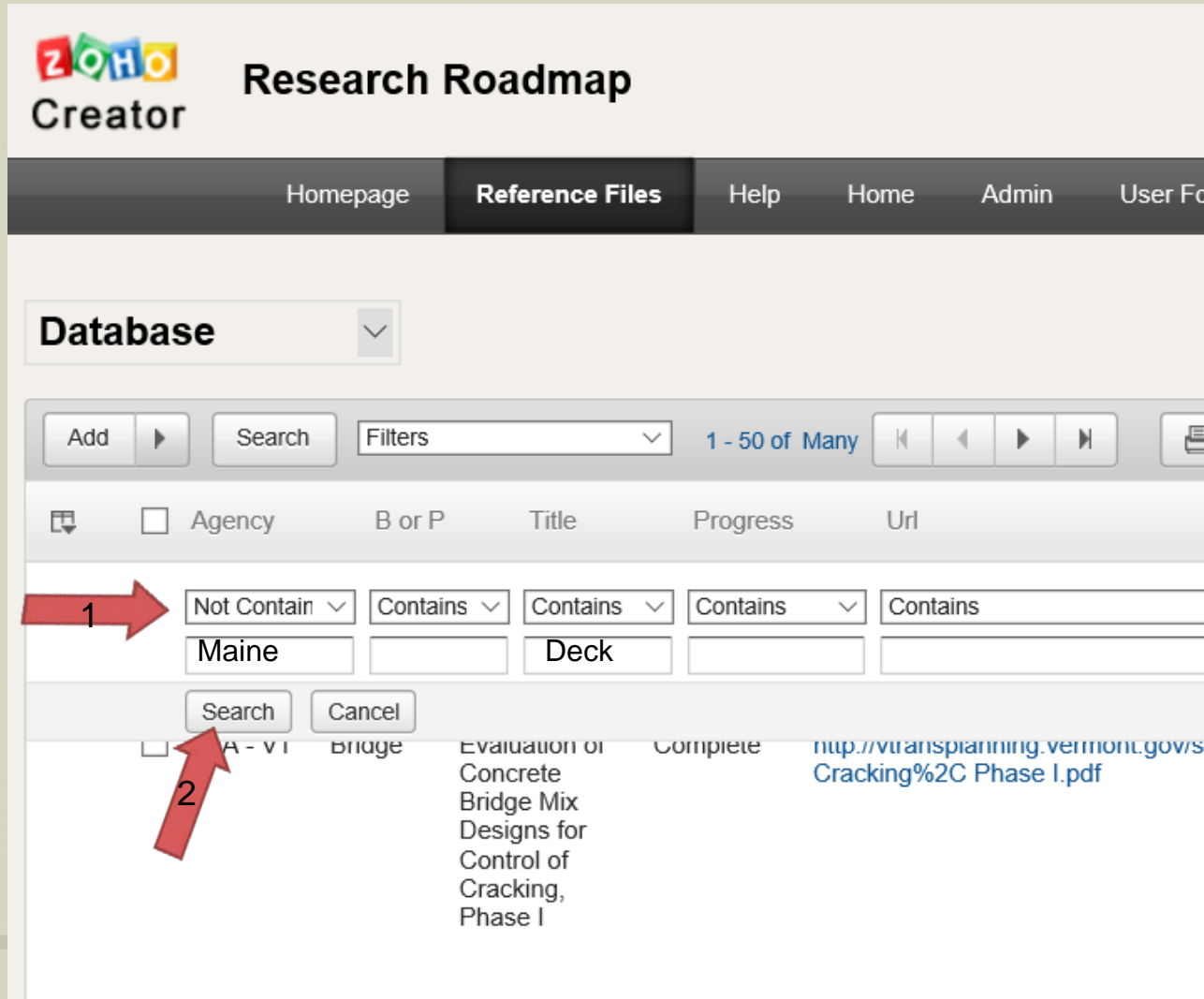
Evaluation of
Concrete
Bridge Mix
Designs for
Control of
Cracking,
Phase I

Complete

http://vtransplanning.vermont.gov/sites/aot_policy/files/documents/plaCracking%2C Phase I.pdf

1. Click the icon below the "Add" button and check the information you want to show in results

2. Click "Search"



Zoho Creator Research Roadmap

Homepage Reference Files Help Home Admin User Fo

Database

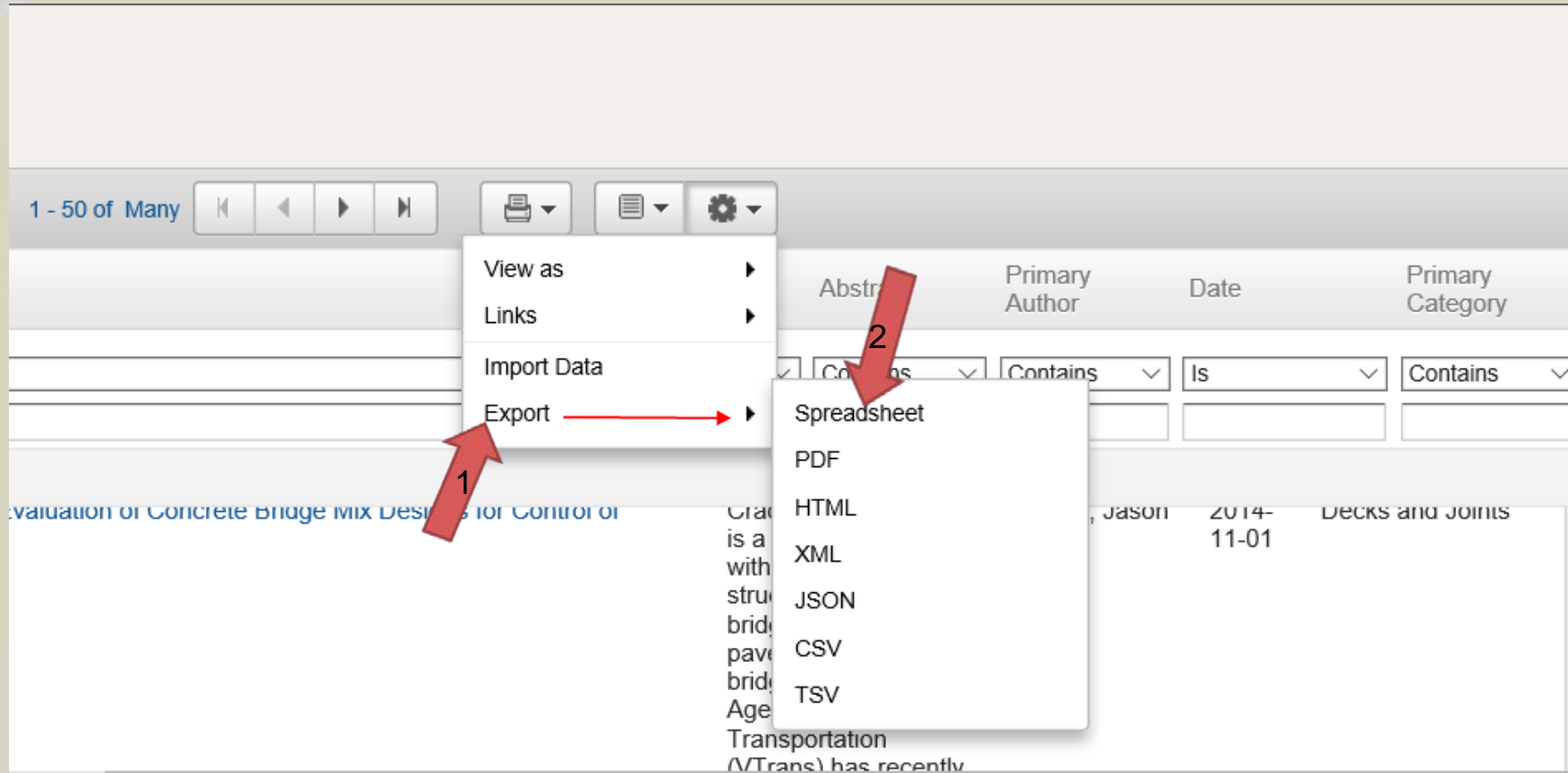
Add Search Filters 1 - 50 of Many

<input type="checkbox"/>	Agency	B or P	Title	Progress	Url
	<input type="text" value="Maine"/>	<input type="text"/>	<input type="text" value="Deck"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	A - VT	Bridge	Evaluation of Concrete Bridge Mix Designs for Control of Cracking, Phase I	Complete	http://vtransplanning.vermont.gov/s/Cracking%2C Phase I.pdf

1. Type in search term(s), e.g., State name under Agency and/or Keyword under Title;

2. Click "Search"

Export Results to Spreadsheet



1 - 50 of Many

View as
Links
Import Data
Export

Abstr Primary Author Date Primary Category

Contains Contains Is Contains

Spreadsheet
PDF
HTML
XML
JSON
CSV
TSV

valuation of Concrete Bridge Mix Designs for Control of Cracking is a with stru bridge pave bridge Age Transportation (VTrans) has recently

Jason 2014-11-01 Decks and Joints

















Report for Keyword “Deck”

	A	C	F	G
1	Agency	Title	Abstract	Primary Author
2	SHA - VT	Evaluation of Concrete Bridge Mix Designs for Control of Cracking, Phase I	Cracking of concrete is a common problem with concrete structures such as bridge decks, pavements and bridge rail. The Agency of Transportation (VTrans) has recently invested in higher performing concrete mixes that are more impervious and has higher early strength. VTrans has also begun to standardize on bare decks on bridge rehabilitation projects. Higher strength concrete is more	Tremblay, Jason
3	SHA - VA	Fatigue Assessment for the Failed Bridge Deck Closure Pour at Mile Marker 43 on I-81	Fatigue of reinforcing steel in concrete bridge decks has not been identified as a common failure mode. Generally, the stress range occurring in reinforcing steel is below the fatigue threshold and infinite fatigue life can be expected. Closure pour joints, however, may be vulnerable to fatigue if some specific design details are present. This research shows that fatigue was a likely contributor to the I-81	Rivera, Elias
4	SHA - VA	Evaluation of Ultra-High-Performance Fiber-Reinforced Concrete	Recently, a new ultra-high-performance fiber-reinforced concrete (UHPC) was introduced into construction. The fibers in UHPC provide tensile capacity across cracks, resulting in high shear capacity in bending members. Typically, additional reinforcement for shear is not required. The Virginia Department of Transportation (VDOT) is experimenting with UHPC to determine the possibility of using it in	Ozyildirim, Celik
5	SHA - VA	Condition of Concrete Overlays on Route 60 Over Lynnhaven Inlet After 10 Years	In 1996, 16 high performance concrete overlays were placed on two 28-span bridges on Route 60 over the Lynnhaven Inlet in Virginia Beach, Virginia. Thirteen concrete mixtures included a variety of combinations of silica fume (SF), fly ash, slag, latex, corrosion-inhibiting admixtures, a shrinkage-reducing admixture, and fibers; one overlay was constructed with a thickness of only 0.75 in. (19 mm), and	Sprinkel, Michael M
6	SHA - VA	Performance of a Bridge Deck with Glass Fiber Reinforced Polymer Bars as the Top Mat of Reinforcement	The purpose of this research was to investigate the performance of glass fiber reinforced polymer (GFRP) bars as reinforcement for concrete decks. Today's rapid bridge deck deterioration is calling for a replacement for steel reinforcement. The advantages of GFRP such as its high tensile strength, light weight, and resistance to corrosion make it an attractive alternative to steel. The deck of one end-	Phillips, Kimberly A
7	SHA - VA	A Bridge Deck Anti-Icing System in Virginia: Lessons Learned from a Pilot Study	The need for this project originated with Virginia Department of Transportation's (VDOT's) plans to widen and replace a number of bridges along Route I-95. Many of the bridge decks in the new facilities will be in the shade, which will increase the probability that maintenance crews will have to respond to icy conditions. Various anti-icing technologies have shown promise, but most still require	Roosevelt, D S
8	SHA - VA	Proof Testing a Bridge Deck Design with Glass Fiber Reinforced Polymer Bars as Top Mat of Reinforcement	The primary objective of this project was to test a full-scale prototype of a bridge deck design containing glass fiber reinforced polymer (GFRP) bars as the top mat of reinforcement. The test deck mimics the design of the deck of one span of the new bridge over Gills Creek on Rt. 668 in Franklin County, Virginia. The purpose of the tests was to verify the deck design and provide assurance that the deck	Cawrse, J K



Sample Database Keyword Searches

<input type="checkbox"/>	Name	Date modified	Type	Size
<input type="checkbox"/>	 Keyword - Best Practices	11/26/2015 2:28 PM	Microsoft Excel 97...	50 KB
<input type="checkbox"/>	 Keyword - Conditions	11/26/2015 12:31 ...	Microsoft Excel 97...	186 KB
<input type="checkbox"/>	 Keyword - Cracking	11/28/2015 2:43 PM	Microsoft Excel 97...	304 KB
<input type="checkbox"/>	 Keyword - Deck	1/3/2016 8:15 AM	Microsoft Excel 97...	346 KB
<input type="checkbox"/>	 Keyword - Design Practices	11/26/2015 12:27 ...	Microsoft Excel 97...	28 KB
<input type="checkbox"/>	 Keyword - LCCA	11/26/2015 11:52 ...	Microsoft Excel 97...	34 KB
<input type="checkbox"/>	 Keyword - Measures	11/25/2015 3:42 PM	Microsoft Excel 97...	109 KB
<input type="checkbox"/>	 Keyword - Nondestructive	11/26/2015 4:33 PM	Microsoft Excel 97...	86 KB
<input type="checkbox"/>	 Keyword - Paint	11/27/2015 2:09 PM	Microsoft Excel 97...	34 KB
<input type="checkbox"/>	 Keyword - Preservation	11/25/2015 8:36 PM	Microsoft Excel 97...	68 KB
<input type="checkbox"/>	 Keyword - Prestress	11/26/2015 2:00 PM	Microsoft Excel 97...	100 KB
<input type="checkbox"/>	 Keyword - Prestressing	11/26/2015 1:50 PM	Microsoft Excel 97...	47 KB
<input type="checkbox"/>	 Keyword - Seal	11/25/2015 6:55 PM	Microsoft Excel 97...	118 KB
<input type="checkbox"/>	 Keyword - Strand	11/26/2015 1:35 PM	Microsoft Excel 97...	97 KB



R&D Needs Brainstorming Sessions

Northeast BPP September 2015
Southeast BPP March/April 2016
Midwest BPP October 2016

- Broad Topic Areas**
- Preservation of Bridge Decks**
- Preservation of Bridge Joints**
- Preservation of Bridge Superstructures**
- Preservation of Bridge Substructures**
- Asset Management Incorporating Bridge Preservation**



Objective of Research Needs Breakout Sessions

- Identify one or more issues where research could produce a result or product that would enhance owners' ability to preserve bridges.
 - a) A new/improved material or technology
 - b) New design with preservation in mind
 - c) Validation that a preservation treatment is cost-effective
 - d) Guidelines for preservation actions
 - e) Performance measures
 - f) Etc.
- Give the broader partnership a voice in what get considered for action/funding for preservation research.





Top Research Priorities - NEBPP

Topic Area	# of Topics	Top 2 Priorities
Decks	4	# 1 Decks: Guide for best management practices– including design, construction, inspection, and maintenance of bridge decks
Joints	5	
Superstructure	6	
Substructure	10	# 2 Joints: A comprehensive program for testing and evaluating joints.
Asset Management	4	

#3 Joints - Life cycle cost analysis of various types of joints

#4 Superstructure - Stopping corrosion on prestressed strands

#5 Asset Management - Bridge preservation activity documentation



Top Research Priorities - SEBPP

Topic Area	# of Topics	Top 2 Priorities
Decks	7	# 1 Asset Management: Integrated Data Systems – Bridge Inspection (Synthesis)
Joints	5	
Superstructure	7	
Substructure	7	# 2 Decks: A comprehensive program for testing and evaluating joints.
Asset Management	2	

#3 Joints - Joint Elimination & Retrofit (Best Practices)

#4 Substructures - Compilation and synthesis of best practices from state to state

#5 Asset Management - Standardized maintenance & preservation best practices (Synthesis)



Top Research Priorities - MWBPP

- TBD – October 2016



What's Next

- Remember – at this point, these are mainly just raw ideas;
- Identify what research has been done recently, is being done now, or is being contemplated that relates to each topic –
 - Search the **TSP2 Research Roadmap Database** on the NCPP website
 - Review projects previously submitted SCOM & SCOBS, but not yet funded
- Findings will aid in drafting research problem statements for the top high priority topics



What's Next

- Determine the best research approach to achieve the desired objectives – e.g., synthesis, testing program, data gathering, etc.
- Identify the best avenue(s) for conducting the research –
 - NCHRP project or synthesis,
 - TSP2 working group – single partnership or national group
 - Small research project funded by one or more partnerships,
 - FHWA LTBP,
 - Pooled fund study



What's Next

- One or more regional Research working groups
- Possible national working group
- Objectives and tasks for the working group(s) being defined “as we speak”
 - Further evaluate priority needs
 - Draft research needs statements
 - Promote topics to other groups – SCOM, SCOBS, TRB, FHWA, etc.



One Last Note

- The FHWA BPETG has proposed an action related to the strategic objective of “fostering a collaborative environment that encourages research and innovation”
- ACTION 4 – Identify Underutilized Research Results – certainly the roadmap database will be an important resource here