Update on Proposed FHWA LTPP Pavement Preservation (P^2) Experiments

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- Ben Worel (MnROAD)

Presentation

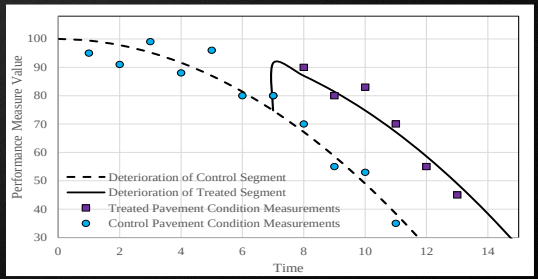
1. Experiment Design
2. Experiment Deployment
    a. Construction
    b. Materials Sampling & Testing
    c. Performance Monitoring
    d. Other Data Collection Requirements
3. Path Forward

1. Experiment Design

LTPP P^2 Experiment Objectives

Technology has been around for years, but use often based on anecdotal information

- Provide performance data on effects of preservation
- Verify preservation as viable technology
- Enable development of products and tools



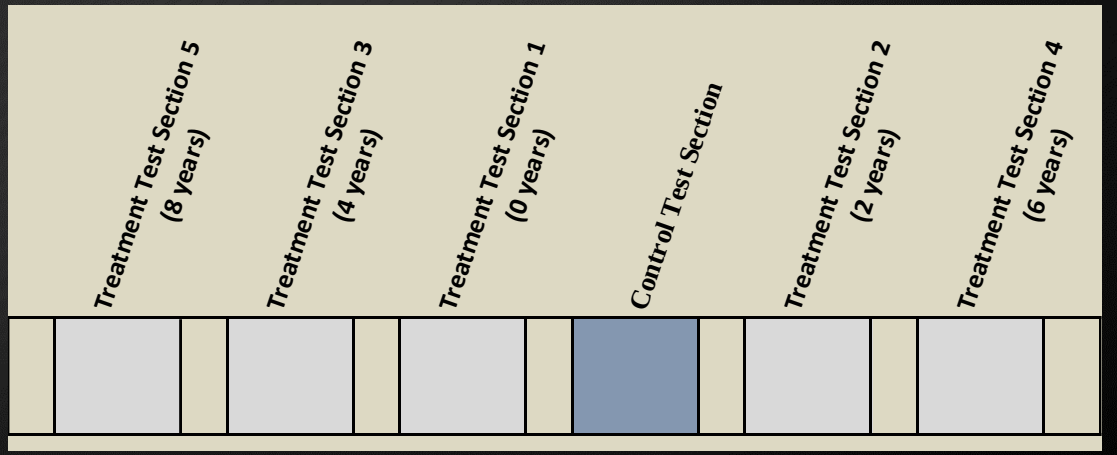
LTPP P^2 Treatments

- SPS-11:
  - Thin HMA overlays
  - Chip seals
  - Micro surfacings
- SPS-12:
  - Diamond grinding
  - Joint sealants
  - Penetrating sealers

Experiment Approach

- Segregate treatment types & project locations into discrete groups
- Apply same treatment, at different times, on same structure
- Focus is on timing/ distress propagation rates

Moist /Temp	Wet				Dry			
	Freeze		No Freeze		Freeze		No- Freeze	
Traffic	Low	High	Low	High	Low	High	Low	High



2. Experiment Deployment

a. Construction

Nomination Guidelines

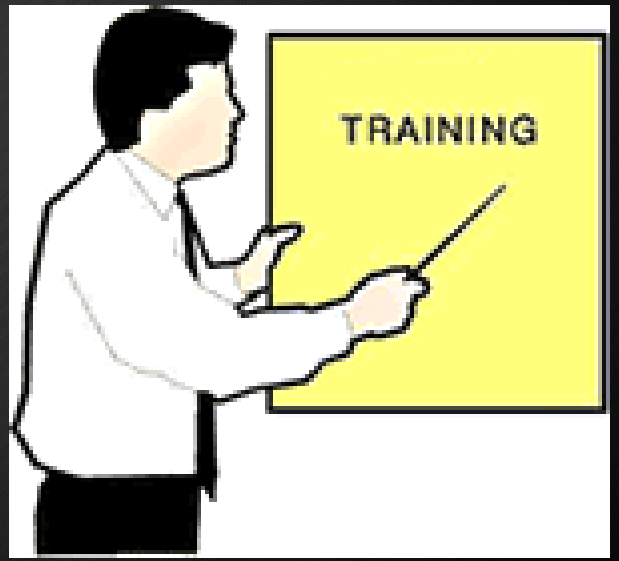
- Nomination and acceptance process
- Agency participation requirements
- Selection criteria
- Nomination forms

Agency Participation Requirements

- Assist with project site information
- Prepare plans/specifications and construct test sections
- Provide/maintain signs & markings
- Materials sampling, drilling & coring
- Periodic traffic control
- Provide traffic data
- Inform FHWA of M&R activities

Construction Guidelines

- Minimize variability
- Use best available guides
  - AASHTO, NAPA, NCHRP, ISSA, IGGA, NCPT specs
  - FHWA P^2 check lists
  - Draft FHWA-ETF guides for chip seals and micro surfacing
  - General guidelines for penetrating sealers
- Just in Time Training



Construction Data Requirements

- Before construction
  - Plans, specifications, mix designs, surface condition, etc.
- During construction
  - Daily logs, surface preparation work, weather data, photos, etc.
- After construction
  - Surface smoothness/friction, rock loss, shedding, etc.

Construction Report Guidelines

Chapters:

1. Introduction
2. Project Description
3. Construction Details
4. Key Observations
5. Summary

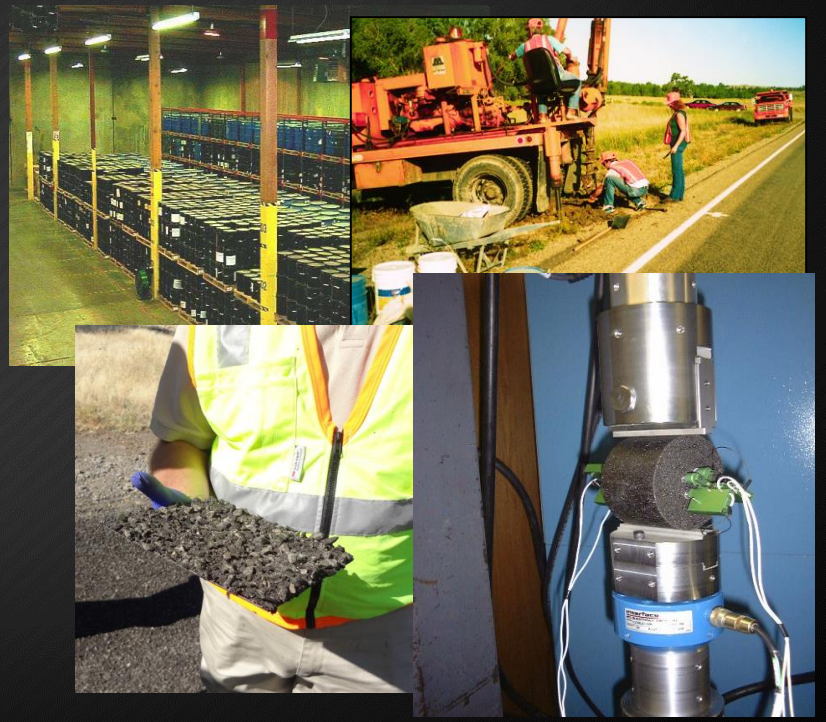
Appendices:

A. Construction Photos
B. Mix Designs
C. MS&T Layouts
D. Other Construction Documents
E. Construction Forms
F. Deviation Report

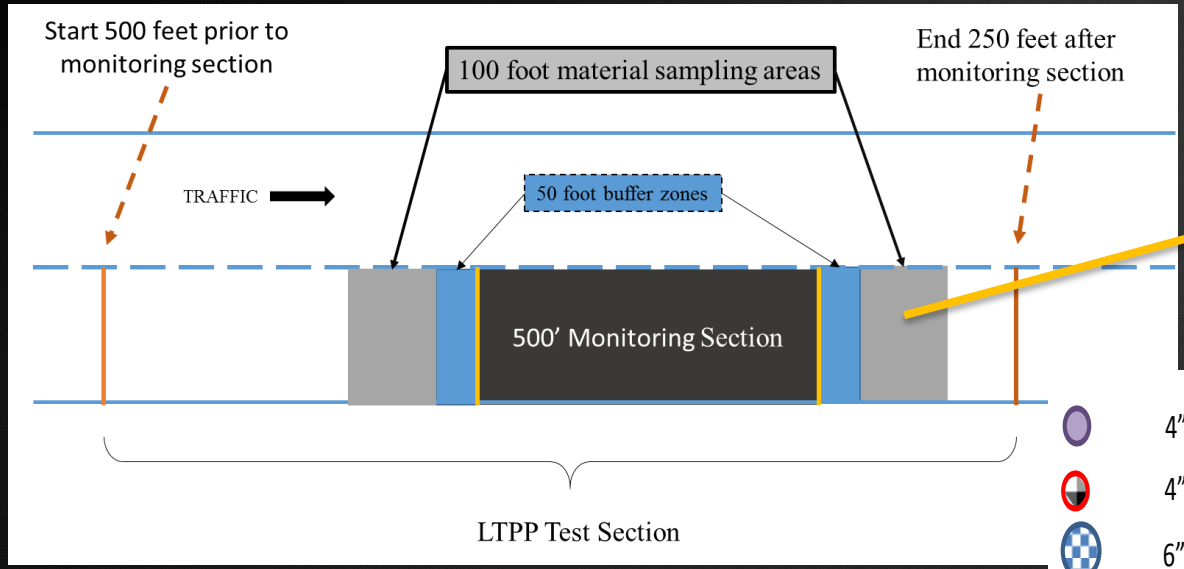
b. Materials Sampling & Testing Plans

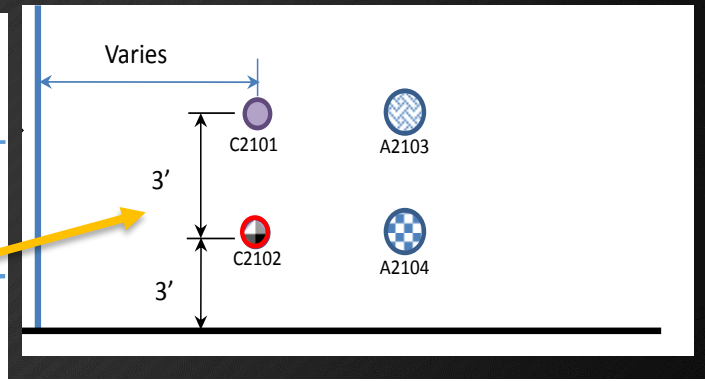
Materials Sampling &Testing Plans

- Subgrade/embankment
- Base/subbase layers
- Existing surfacing materials
- Preservation Treatments



Materials Sampling





- 4" diameter core of all bound layers
- 4" diameter core of all bound layers + DCP test
- 6" diameter core for PCC layers, DCP test, unbound layer bulk samples
- 6" diameter core for PCC layers, unbound layer bulk samples

Subgrade Laboratory Tests

Sample Type	Test Type	LTPP Designation	Min. No. of Tests for each layer
150 lb Sample	Sieve Analysis	SS01	3
	Atterberg Limits	SS03	3
	Classification	SS04	3
	Standard Proctor	SS05	3
	Resilient Modulus	SS07	3
1 qt. Mason Jar	Natural Moisture Content	SS09	3

Chip Seals

Material	SHRP test method	AASHTO test method	Quantity of materials needed
Emulsion tests	HF01	T 40, M-316-14	1 gal
Chip seal Aggregate	HF02	T 2	5 gal
Aggregate moisture	HF 27	T 217	1 gal
Emulsion application rate	HF 05	Not a standard	In field
Aggregate application rates	HF06	Not a standard	In field

New Testing Protocols

- SPS-11 AC treatments:
  - WRI sampling and testing procedure for aging
  - Field Vialit test
- SPS-12 PCC treatments:
  - Mohs hardness test
  - TTI camera test
  - TTI permeability test
  - Joint damage test

c. Performance Monitoring Requirements

Performance Monitoring Elements

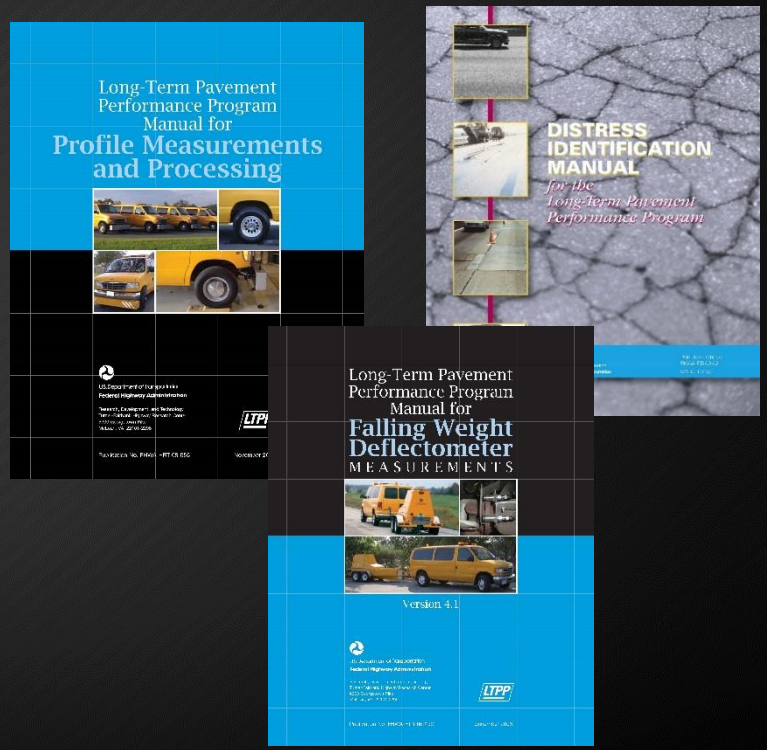
- Standard LTPP monitoring
  - Deflection testing
  - Distress surveys
  - Profile & texture surveys
- Additional monitoring
  - Joint condition surveys
  - Surface friction surveys

Performance Monitoring Frequency

Data Element	Monitoring Frequency		
	Pre-Treatment	Post-Treatment	Routine Monitoring
Standard LTPP Monitoring			
Deflection Testing	Within 1 month prior to treatment	Not Required	3 to 5 year intervals
Distress Surveys		1 week to 6 months after treatment application	Annual
Profile & Texture Surveys		Within 1 week after treatment application	
Additional Monitoring			
Joint Condition Surveys	Not required	Within 1 week after treatment application	Annual
Surface Friction Surveys	Within 1 month prior to treatment		

Performance Monitoring Protocols

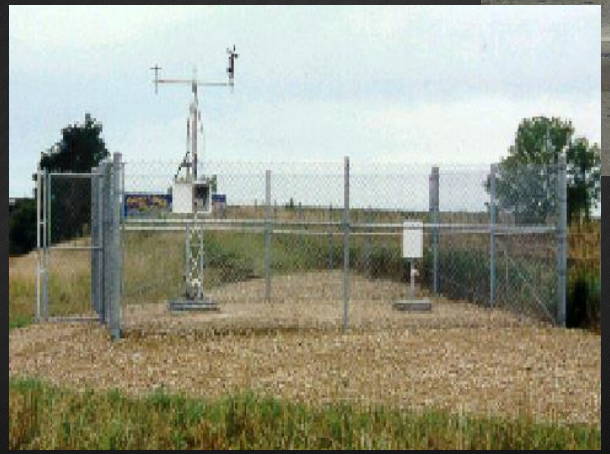
Data Element	Protocols/References
Routine LTPP Monitoring	
Deflection Testing	LTPP Manual For FWD Measurements
Distress Surveys	LTPP Distress Identification Manual
Profile & Texture Surveys	LTPP Profiler Manual
Additional Monitoring	
Joint Condition Surveys	AASHTO JS-14, FHWA Report RD-99-146, LTPP SMP Guide
Friction Surveys	ASTM E2340



d. Other Data Collection Requirements

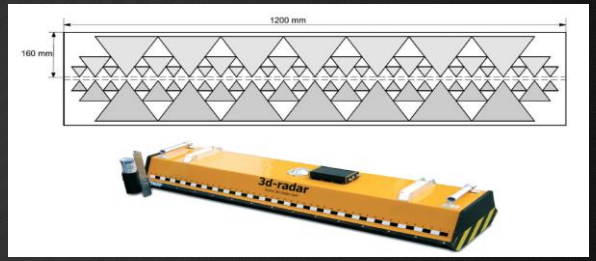
Other Data Elements

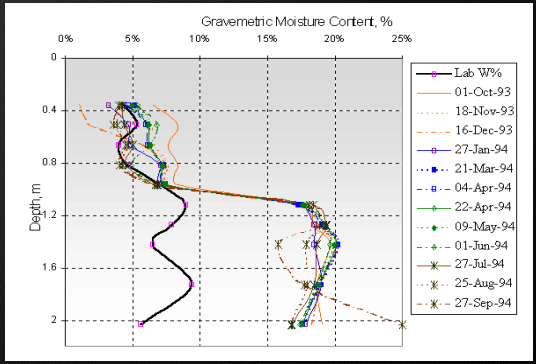
- Standard LTPP data
  - Traffic
  - Climate



Other Data Elements

- Monitoring data
  - Subgrade moisture data
  - Snow removal & deicing data
- Pre-Treatment testing data
  - Ground penetrating radar (GPR) data
  - Magnetic Imaging Tools (MIT) Scan-2 data





Data Collection Frequency

Data Element	Data Collection Frequency	
	Pre-Treatment	Routine Data Collection
Standard LTPP Data		
Traffic	Not Required	3 years WIM plus continuous classification
Climate	Not Required	MERRA and VWS
Additional Data Collection		
Pre-Treatment Testing Data		
GPR MIT Scan-2	Within 3 months prior to treatment application	Not Required
Monitoring Data		
Subgrade Moisture	Within one week prior to treatment application.	3 to 6 months
Snow Removal & Deicing	Not Required	Monthly or more frequent (freeze areas only)

Other Data Protocols

Data Element	Protocols/References	Protocol(s) Changes/Deviations
Standard LTPP Data		
Traffic	LTPP SPS and FHWA TMG for classification	3 years of WIM using piezo quartz sensors
Climate	LTPP MERRA and VWS approaches	None
Additional Data Collection		
Pre-Treatment Testing Data		
GPR	AASHTO R-37-04	Supplemented by other ASTM standards and FHWA/ TX-92/1233-1
MIT Scan-2	FHWA Report IF-06-006	None
Monitoring Data		
Subgrade Moisture	ASTM D5220-02	Use of NCAT moisture tubes
Snow Removal & Deicing	Not required; data sheet	Not applicable

3. LTPP P^2 Path Forward

LTPP P^2 Path Forward

- Finalize experiment documents (2016)
- Explore/pursue funding options (2016- 2017)
- Recruit and identify projects (2017 to 2018)
- Implement projects and begin monitoring (2018)

Funding LTPP P^2 Experiments

- Projects will be funded via six pooled fund studies – one for each treatment
- FHWA will manage pooled fund studies

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