

# TPF-5(268) National Sustainable Pavements Consortium

WebEx Meeting  
September 29, 2016



# Agenda

- Welcome and TPF website update
- Discussion of new recycling project
- Update on ongoing projects
  - Pavement recycling synthesis
  - Other studies
- Discussion
  - Research needs of member states
  - Ways member states and/or researchers can help each other
- In-person meeting



# TPF Website

www.pooledfund.org/Details/Study/497

- 11 journal pre-prints
  - More forthcoming
- Up-to-date quarterly progress reports
  - Next QPR expected in October
- Presentations
- Meeting minutes
  - RNS

The screenshot shows the website for the Transportation Pooled Fund Program (TPF). The page title is "Study Detail View" for the National Sustainable Pavement Consortium. It provides general information, contact details for the lead agency and FHWA technical liaison, a financial summary, and a table of commitments by organization.

**General Information**

<b>Study Number:</b> TPF-5(268)	<b>Status:</b> Cleared by FHWA	<b>Contract/Other Number:</b>
<b>Lead Agency:</b> Virginia Department of Transportation	<b>Est. Completion Date:</b> Jun 30, 2018	<b>Last Updated:</b> Jul 14, 2015
<b>Contract Start Date:</b> Jul 1, 2012		<b>Contract End Date:</b> Jun 30, 2016
<b>Partners:</b> FHWA , MS , PA , VA , WI		

**Contact Information:**

**Lead Agency Contact(s):**  
 Ben Bowers  
 Ben.Bowers@VDOT.Virginia.gov  
 Phone: 434-293-1423

**FHWA Technical Liaison(s):**  
 Nadarajah Sivaneswaran  
 Nadarajah.Sivaneswaran@dot.gov  
 Phone: 202-493-3147

**Financial Summary:**

<b>Contract Amount:</b>	<b>Total Commitments Received:</b> \$665,000.00	<b>100% SP&amp;R Approval:</b> Approved
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**Commitments by Organization:**

Agency	Year	Commitments
Federal Highway Administration	2012	\$25,000.00
Federal Highway Administration	2013	\$25,000.00
Federal Highway Administration	2014	\$140,000.00
Mississippi Department of Transportation	2012	\$25,000.00
Mississippi Department of Transportation	2016	\$25,000.00



# Evaluation of Compaction Methodologies

- New vibratory compactor by Wirtgen
  - Supposed to better mimic field compaction
- Compare vs gyratory compactor
  - Performance testing
  - Image analysis
  - Compare to field project or APT



# Evaluation of Different Additives on In-Place Recycled Mats

- Often use bitumen as a primary stabilizing agent (~2% by wt)
  - What if cement was used?
- Often use cement or lime as secondary additive (~1% by wt)
  - Fly ash
  - Portland Limestone Cements
- Can you use a rejuvenating agent?



*Feedback?*



*Dr. Flintsch will now present some updates...*



# *National Sustainable Pavement Update on ongoing projects*





# New Projects

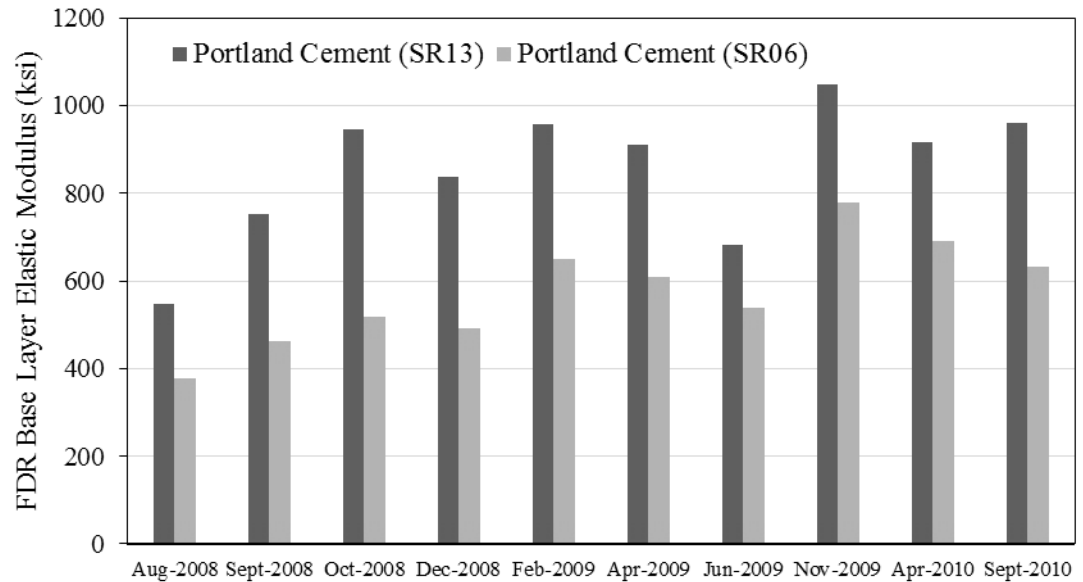
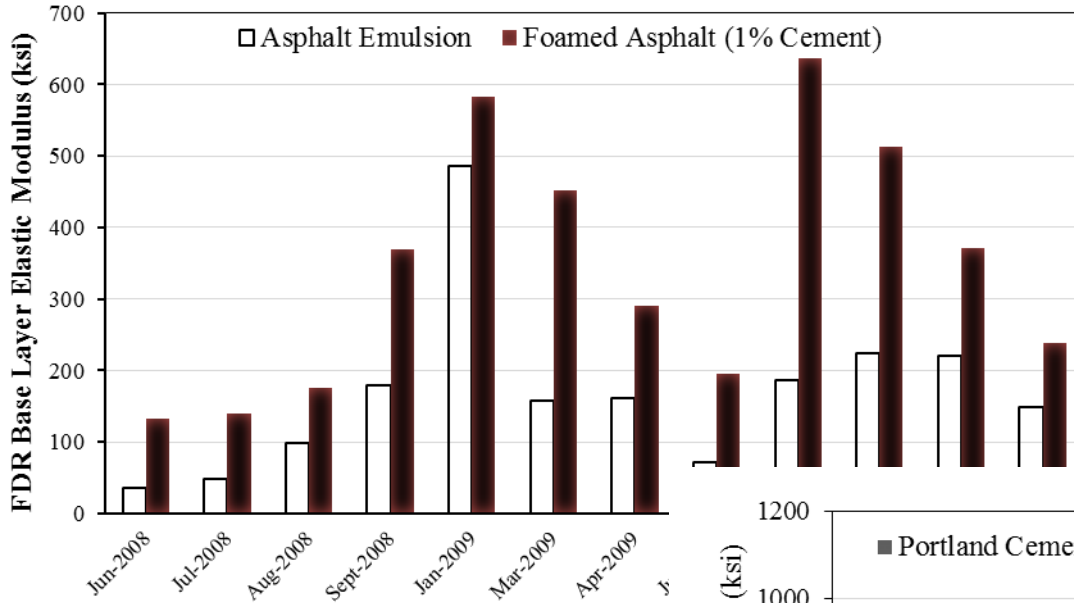
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- R5. Synthesize long-term performance data from states with active in-place recycling programs
- R6. Influence of compaction and additives on mix design of in-place recycled materials

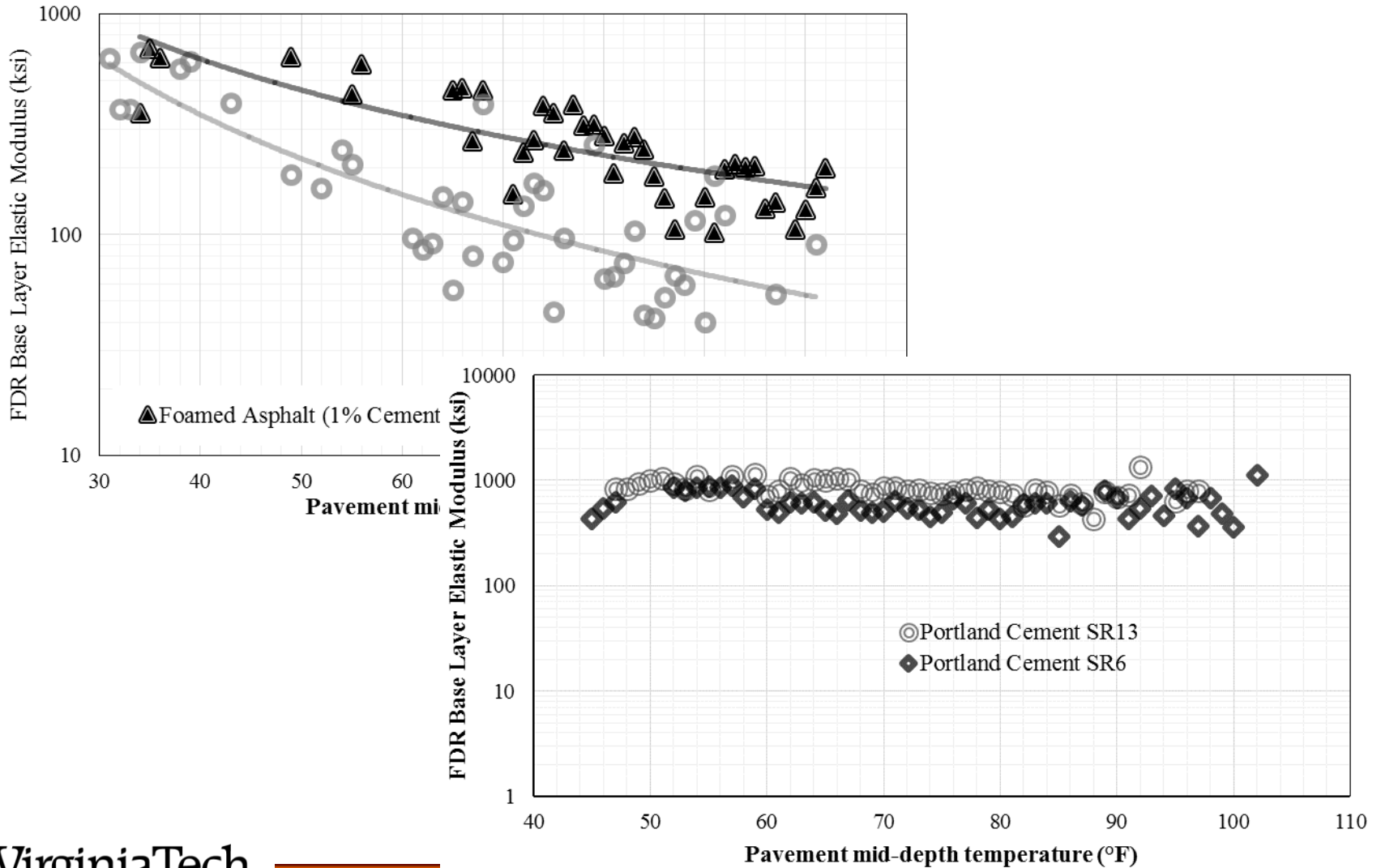
# R5. Synthesis of long-term performance of in-place recycling

- Working a Pilot using VA data
  - ✓ Non-destructive In Situ Characterization of Elastic Moduli of Full-depth Reclamation Base Mixtures, TRB 2017 (submitted)
  - ✓ Performance Evaluation Of Full Depth Reclamation - Stabilized Base Mixture, WCMPPA 2017 (working paper)
- Planned Activities
  - ✓ Preparing data collection form
  - ✓ Reaching out to other states in 2017

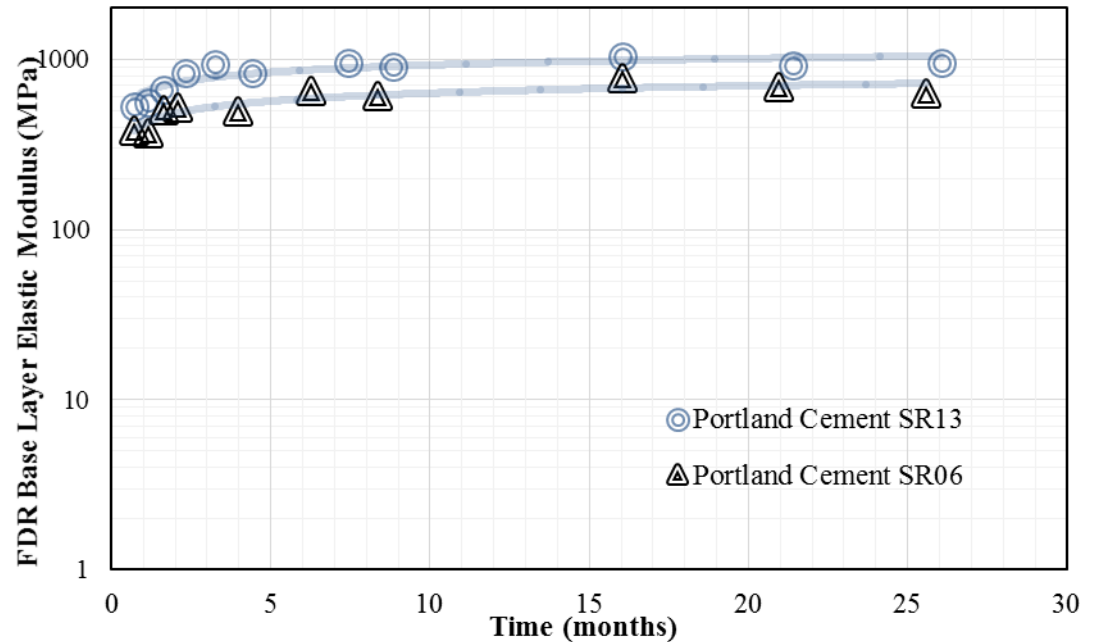
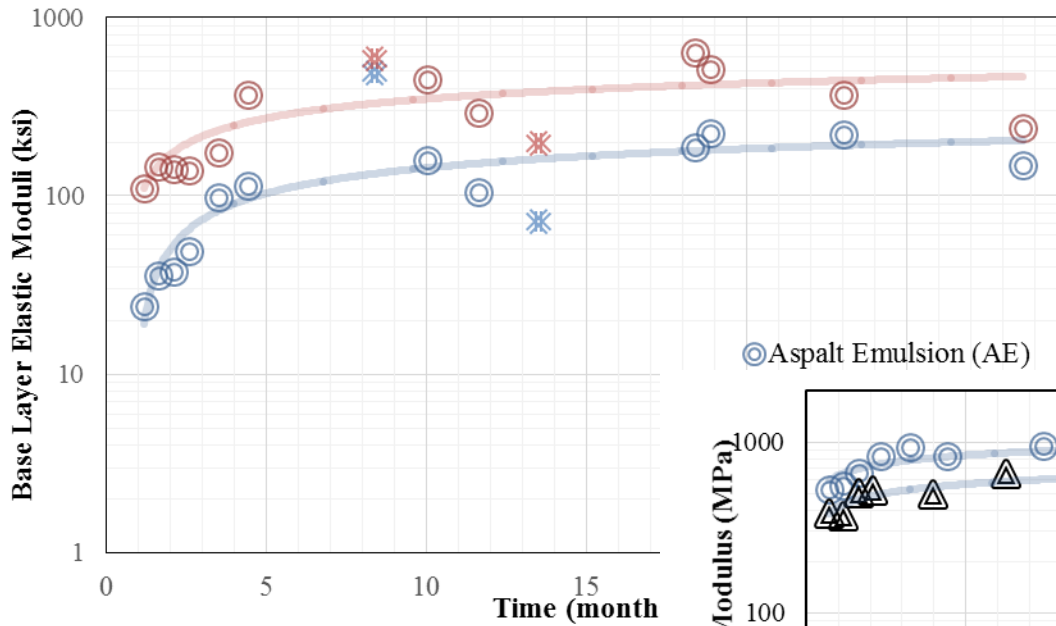
# Elastic Modulus Trends



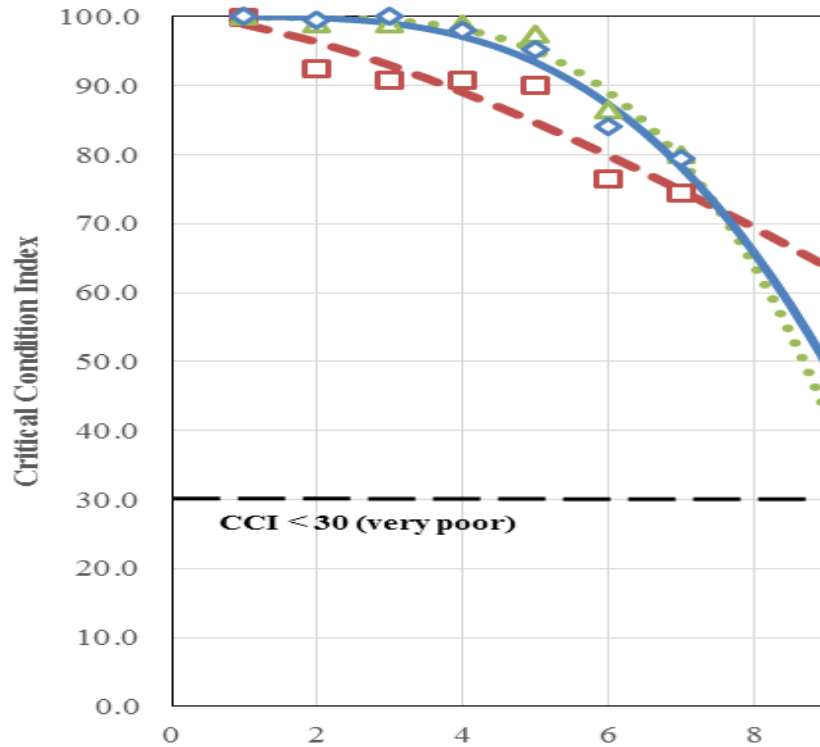
# Elastic Modulus Trends



# Elastic Modulus Trends



# Distress Curves



○ Ongoing

# Ongoing Projects

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R1. How to measure the benefits of emerging materials and processes?

R2. Incorporating use-phase into LCA for pavements

R3. Use of LCA in pavement-type selection

✓ Twining with LCE4Roads

R4. Integration of sustainability into network-level PMS

# Recent Products

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- Santos J., Ferreira, A., Flintsch, G. and Cerezo, V., “A multi-objective optimization approach for sustainable pavement management.”
  - ✓ Fifth International Symposium on Life-Cycle Civil Engineering, Oct 16-19 2016, Delft, The Netherlands.
- Two presentations at the 11<sup>th</sup> National Transportation Asset Management Conference.
  - ✓ Flintsch, G., Santos, J., and Ferreira, A., “Multi-objective Optimization Approach for Sustainable Pavement Maintenance and Rehabilitation Programming.”
  - ✓ Flintsch, G., and Qiao, Y., “Impact of Climate Change on the Performance, Maintenance, and Life-Cycle Costs of Flexible Pavements.”



# Recent Products (cont.)

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- Santos J., Flintsch, G. and Ferreira, A., “Environmental and economic assessment of pavement construction and management practices for enhancing pavement sustainability”
  - ✓ Resources, Conservation and Recycling 116 (2017) 15–31
- Santos J., Cerezo, V., Flintsch, G. and Ferreira, A., “Environmental and economic assessment of pavement construction and management practices for enhancing pavement sustainability ”
  - ✓ TIS Roma

# Main Twinning Activities

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- Compared US and European LCA methodologies.
  - ✓ Santos, J., Thyagarajan, S., Keijzer E., Fernández Flores, R., Flintsch, G., “Comparison Of Life Cycle Assessment Tools For Road Pavement Infrastructure”
- Outreach
  - ✓ Session at 2016 TRB
  - ✓ Session at the 1st European Road Infrastructure Congress, Oct. 2016
- Pending
  - ✓ Development of PCR/ EPD of a Recycling US case study in collaboration with LCE4Roads

# Other discussion

- Are there any other potential projects of interest to the states?
- Are there ways the states and/or researchers can help answer sustainable pavements related questions?
  - Questions about RAP use?
  - In-Place recycling?
  - LCA?



# Next Meeting

- Would like to hold an in-person meeting in Blacksburg, VA at VTTI
  - Discuss the ongoing projects and future needs
  - Presentations about completed projects
  - Tour labs and/or the Heavy Vehicle Simulator test facility
- Approximately 1.5 days
- When would work the best?

