

# Pavement Preservation Emulsion Task Force (ETF)

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Rhode Island DOT

**AASHTO TSP2 ETF**  
**THE HERITAGE CENTER**  
**Indianapolis**  
**June 29, 2023**



# Pavement Preservation AASHTO Emulsion Task Force (ETF)

- An **AASHTO TSP-2** sponsored program
- It is an all-volunteer stake holder working group
- 2008-Originally part of the FHWA Pavement Preservation Expert Task Group (ETG)



# ETF is part of AASHTO TSP2



## 9 Regional Bridge & Pavement Preservation Partnerships



# ETF – Original Mandate

## A. Develop Performance Based Stds and Specifications for Emulsions (SPG)

- 1) Develop a Surface Performance Grade Specification for **Emulsion Binders** (SPG)
- 2) Develop Performance Based Specifications for **Emulsion Treatments** in AASHTO Format
  - Materials (M) - Specifications and Tests
  - Materials (R) - Design Practices
  - Construction - Guide Specs
  - QA Specifications

# ETF – Original Mandate (Cont.)

## B. Encourage Adoption of Uniform National Standards by DOTs/Local Agencies

- 1) AASHTO -
  - TSP-2 Regional Partnerships
  - Committee on Materials and Pavements
  - Committee on Maintenance
- 2) FHWA – Pavement Preservation ETG
- 3) TRB (Webinars)
- 4) FP2-Industry / Academia (Workshops & Webinars)

# ETF Members

## States

Illinois DOT  
Minnesota DOT  
Montana DOT  
Ohio DOT  
Oregon DOT  
Rhode Island DOT

## Testing Labs

Heritage  
MTE Services  
PRI Asphalt

## Academia

Chico State University  
Colorado State U.  
NCAT  
Texas A&M University  
University of Texas

## FHWA

Direct Federal Lands  
Highway Division

## AASHTO

AASHTO Re:source

## Producers

Asphalt Materials  
Associated Asphalt  
Ergon  
Flint Hills Resource  
Husky Energy  
Kraton Polymers  
Marathon Petroleum  
MTE Services

## TSP-2

NCPP

# ETF Members

## Associations

- Asphalt Institute
- Asphalt Emulsion Manufacturers Association
- Asphalt Reclaiming and Recycling Association
- FP<sup>2</sup> (Foundation for Pavement Preservation)
- International Slurry Surfacing Association

Total ETF Members = 32

Total ETF Friends = 31

# Emulsion Task Force- ORIG. Organization

Reorganized

AASHTO TSP-2

ETF Co-Chairs  
Colin Franco, RIDOT  
Chris Lubbers, Kraton Polymers

Admin-NCPP  
Larry Galehouse

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Residue Recovery and Testing- Arlis K

Spray & Mix Treatments-Jim M& Gary H

Certification & Quality Assurance-Larry G & Colin F

Recycling Emulsion- Steve C

Messaging & Implementation- Larry T

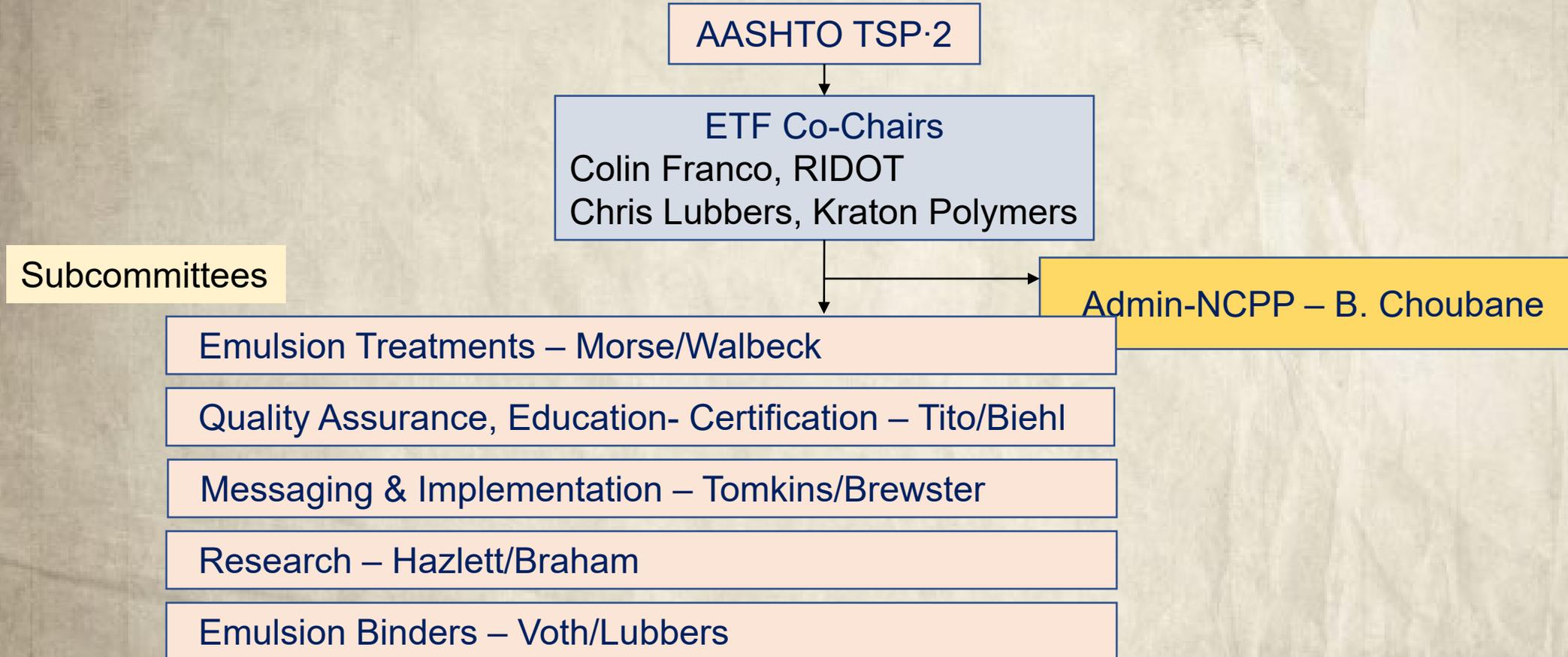
Rejuvenators- Hassan T

Research- Darren H

\*Special Working  
Group (SWG)  
PG Grading-Mike V



# Emulsion Task Force Organization



# ETF Subcommittee Realignment

**ETF Co-Chairs**  
Colin Franco  
Chris Lubbers

**ETF Administrator**  
B. Choubane

#1 Emulsion Treatments
Construction Guides and AASHTO Standards
Best Practices
Testing

#2 QA. Education, and Certification
QA Treatments Guides Working
-Education -Course Development for Treatment -Training
Certification

#3 Messaging & Implementation
Messaging
Outreach
Training Delivery
Demonstration

#4 Research
Materials
Equipment
Liase With Lee Rd & Mn Rd P.R. Research

#5 Emulsion Binders
Rejuvenator
Modifiers

# ETF Subcommittee Realignment - Treatments

**#1  
Emulsion Treatments**

**Construction Guides  
and AASHTO  
Standards**

**Best Practices  
Working Group**

**Testing Stds**

## Immediate Needs

- 1) Complete construction guides specs for rest of Emulsion treatments**
- 2) Develop best practices for each treatment**
- 3) Identify test methods that should be AASHTO Stds – Focus on Performance Testing**

# ETF Subcommittee Realignment – QA Education & Certification

<b>#2</b> <b>QA. Education, and</b> <b>Certification</b>
<b>QA Treatment Guides</b>
<b>Education Course</b> <b>Development</b> <b>Treatment</b> <b>Certification</b>
<b>Certification</b>

## Immediate Needs

- 1) Develop QA guides for remaining treatments**
- 2) Take existing treatment Best Practices & format training media by highlighting critical elements**
- 3) Promote the need for national ( pavement preservation treatment) certification/s**

# ETF Subcommittee Realignment – Messaging & Implementation

<b>#3 Messaging &amp; Implementation</b>
<b>Messaging</b>
<b>Outreach</b>
<b>Training Dev /Delivery</b>
<b>Demonstration</b>

## Immediate Needs

- 1) Direct support of NCHRP 20-44(26)**
- 2) Initiate training on new AASHTO Standards**
- 3) Develop an implementation primer for all treatments for additional AASHTO standards**

# ETF Subcommittee Realignment - Research

<b>#4 Research</b>
<b>Materials</b>
<b>Equipment</b>
<b>Liase With Lee Rd &amp; Mn Rd P.R. Research</b>

## Immediate Needs

- 1) **Develop RNS -Review the TSP research roadmap on the NCPP**
- 2) **Review pavement preservation related research that has been completed within the last 5 years**
- 3) **Review needs and enhancements for the construction equipment and pavement condition assessment vehicles**
- 4) **Updates on Mn Rd and Lee Rd (NCAT Research)**

# ETF Subcommittee Realignment - Binders

<b>#5 Emulsion Binders</b>
<b>Rejuvenator</b>
<b>Modifiers</b>

## Immediate Needs

- 1) Assist Comp with MI40, M208, M316**
- 2) Support of NCHRP 9-63 emulsion EPG spec**
- 3) Develop specific outcomes expected for NCHRP 10-114 for all mixing applications of petroleum and non-petroleum rejuvenators and surface spray applied rejuvenators**

# Accomplishments – Emulsion Treatment Standards

Status: AASHTO Emulsion STDs (2019)

## AASHTO STANDARDS

Emulsion Treatments	M / MP	T / TP	R	W/ COMP	Comments	Construction/QA Guide Specs	Best Practices
Chip Seal	MP27-16		PP82-16			☒✓ NCHRP 14-37	Published
Micro Surfacing	MP28-17		PP83-16			☒✓ NCHRP 14-37	Published
Tack Coat	MP36-18		PP93-18	✓		NCHRP 14-44	
Fog Seal	MP33-17		PP88-17			☒✓ NCHRP 14-37	Published
Asphalt Rejuvenators						NCHRP 10-114	
Scrub Seal	MP43-20		PP91-18	✓		NCHRP 14-44	
Sand Seal	MP34-18		PP90-18			NCHRP 14-48	
Slurry Seal	MP32-17		PP87-17			NCHRP 14-44	Published
Foam Asphalt Stabilization			PP38-18			*See CRM	
Bonded Surface Treatments (Nova Chip)	MP44-20		PP100-20	2019		NCHRP 14-48	
Cold Recycled Mixtures ( CRM )	MP31-17		PP86-17			NCHRP 9-62 NCHRP 14-43	

### Legend

M=Material Specs

T=Test Methods

R=Design Practices

P=Provisional

☒✓ = STD Approved by COMP

Emulsion Binder Standards	M / MP	T / TP	R	W/TRB
Emulsified Asphalt	M140-16			
Cationic Emulsified Asphalt	M208-16			
Polymer-Modified Cationic Emulsified Asphalt	M316-16			
Emulsion/Surface Performance Grades (E/SPG)				NCHRP 9-63



## Accomplishments – New Emulsified Asphalt PG Draft Specification

- The ETF Special Working Group ( M. Voth) developed a draft **Emulsified Asphalt Performance Grade (EAPG)** specification.
  - Based on work by DRs . A Epps, Texas A&M and R Kim, NC State
- This draft was the basis for project **NCHRP 9-63**, “A Calibrated and Validated National Performance-Related Specification for Emulsified Asphalt Binder”.
- PI is the Asphalt Institute & NCAT.
- The project will formally validate the EAPG specification.

# New EAPG Draft Specification

**Table 1 - Performance Graded Emulsified Asphalt Specification**

Performance Grade	EPG 49				EPG 55					EPG 61				
	-25	-31	-37	-43	-19	-25	-31	-37	-43	-19	-25	-31	-37	-43
Average 7-day max pavement surface design temperature <sup>a</sup> , °C	< 49				< 55					< 61				
Min pavement surface design temperature <sup>a</sup> , °C	> -25	> -31	> -37	> -43	> -19	> -25	> -31	> -37	> -43	> -19	> -25	> -31	> -37	> -43
<b>Tests on Residue Recovered Using AASHTO R 78, Procedure B</b>														
High Temperature Performance Parameter														
Dynamic shear, T 315: G*/sinδ, min 0.65 kPa, test temp @ 10 rad/s, °C	49				55					61				
Low Temperature Performance Parameter														
Critical phase angle, δ <sub>c</sub> , degree	45	42	39	36	48	45	42	39	36	48	45	42	39	36
DSR Temperature Frequency Sweep, NCHRP Report 837	5°C, 15°C, and 25°C													
Low <sup>b</sup> traffic max G* at δ <sub>c</sub> , MPa	30	30	30	30	30	30	30	30	30	30	30	30	30	30
High <sup>c</sup> traffic max G* at δ <sub>c</sub> , MPa	20	20	20	20	15	20	20	20	20	15	20	20	20	20
OPTIONAL: polymer identification parameter														
Max. phase angle <sup>d</sup> (δ) @ temp. where G*/sin δ = 0.65 kPa	-	-	84°	84°	-	-	84°	84°	84°	-	84°	84°	84°	84°
<p><sup>a</sup> Temperatures are at the surface of the pavement structure. These may be determined from experience or may be estimated using equations developed by SHRP or LTPP, but modified to represent surface temperatures. Surface-grade high temperatures are generally 3°C to 4°C greater than those determined for Superpave PG binders.</p> <p><sup>b</sup> Low traffic is defined as any roadway with an AADT between 0 and 1000 vehicles.</p> <p><sup>c</sup> High traffic is defined as any roadway with an AADT between 1001 and 20,000 vehicles.</p> <p><sup>d</sup> Phase angle is determined at the temperature where G*/sin δ = 0.65 kPa. For routine testing and quality assurance, the phase angle can be interpolated from testing at two temperatures, one above and one below where G*/sin δ = 0.65 kPa</p> <p><sup>e</sup> If required by the buyer, change to 80° for SBS/SB modified emulsions.</p>														

# Remaining Work- (Cont)

1. Keep progressing the state of the Science in Emulsion Technology through Research to Create new and better Emulsion Products.
2. Encourage state DOTs and local agencies to use the new PP AASHTO Standards for Emulsion Treatments:-
  - Pavement Preservation Materials AASHTO Standards
  - Construction Guides and Quality Assurance Standards
  - New Test Methods

## Remaining Work (Cont.)

3. Work with state DOTs and local agencies to host demonstration projects where treatments are constructed using the new AASHTO specifications.

[ NCHRP Project 20-44(26) ]

4. Develop New 'Performance related' tests to support the new Emulsion Treatment standards

# ETF – Research Initiatives

## A. NCHRP – New/Ongoing/Completed research projects submitted by ETF

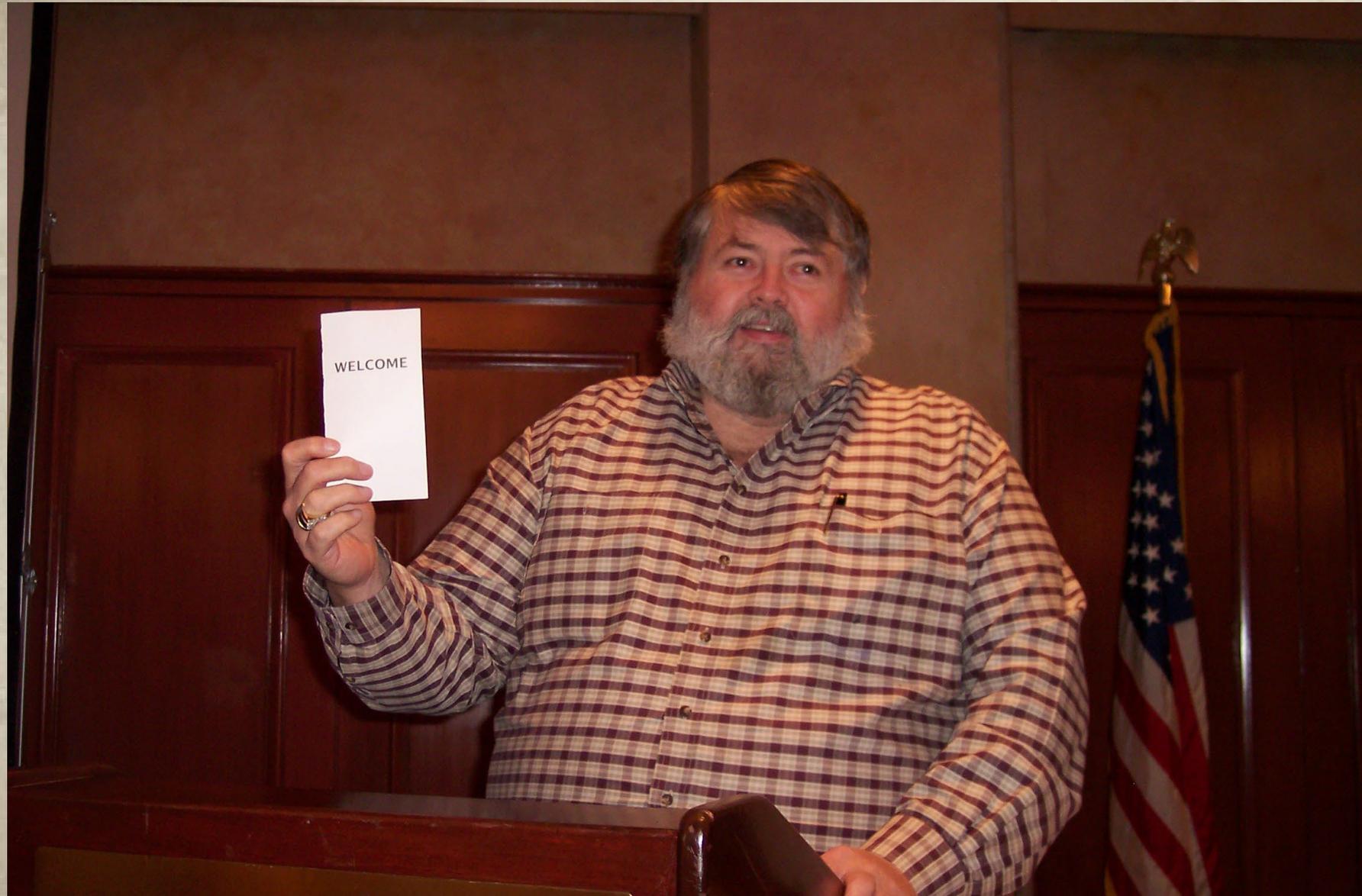
### . ETF- RESEARCH INITIATIVES

#### A. NCHRP – Ongoing/Completed research projects submitted by ETF

1. NCHRP 14-37, Construction guide specs for Chip seal, Micro Surfacing and Fog seal. (Shuler Consultants; Completed 7-13-2018)
2. NCHRP 20-50(18)- CIR, FDR and CCPR reclamation specifications and test methods.
3. NCHRP 9-62, Rapid Test and Specifications for Construction of Asphalt Treated Cold Recycled pavements (VTRC; Completed 8-31-2022)
4. NCHRP 9-63, Performance Grade Specification (EPG) for Emulsion Binders. (Asphalt Institute; Estimated Completion 3-20-2027)
5. Construction Guide Specs for CIR; (NCHRP 9-43) (NCAT; Completed 8-31-2022)
6. Implementing Guide Specifications for Construction of Chip seals and Micro Surfacing NCHRP-20-44(26) (NCPPI; Estimated Completion 9-23-2023)
7. NCHRP 14-44, Guide Specifications for the Construction of Slurry Seals, Scrub Seals, and Tack Coats; (University of Arkansas, Completed 3-1-2022)
8. NCHRP 10-114, Performance and Safety Specs for Rejuvenating Seals (Auburn University, In Progress)
9. NCHRP 10-124, Development of Field Test to determine Actual Percent Embedment of Chip Seal Aggregate (Auburn University, In Progress)
10. Construction Guide Specifications for Slurry Seals, Scrub Seals, and Tack Coats NCHRP 14-44 (University of Arkansas; Completed 3-1-2022)
11. Performance Based Test for Asphalt Emulsion Treatments for Agency Acceptance and Incentive Programs (NCHRP 10-134) NEW

A. **Special Research Project:** Testing of Asphalt Emulsion was conducted by several Emulsion Labs to Calibrate/validate certain tenets of the EAPG specification. This effort was coordinated by the Asphalt Institute and funded by Husky Asphalt of Canada.

# ETG & ETF – Founding Father ( 19xx-2009 )



**Jim Sorenson - FHWA**

# ETF- Future Considerations

- 1)Emulsion Surface Treatments -Surface Functional Characteristics:
  - Take a Look at the surface Characteristic ( positive and Negative) of all Emulsion Treatments and how they can be utilized and/or improved . Characteristics such as:
    - a) Friction – this directly affects safety- improving friction numbers and slowing friction loss
    - b) Ride Quality- Smoothness which includes mitigating wash boarding , delamination's , and shelling
    - c) Noise- Internal to the vehicle
    - d) Sealing of Pavements – especially smaller cracks < 1/8 inch
    - e) Visual – Improve overall pavement visibility especially nighttime /wet condition visibility
    - f) Spray/ splash reduction under wet conditions.
    - g) Pavement marking affinity
    - h) Aging protection/ mitigation for HMA pavements

# ETF- Future Considerations –(2)

- ) Progressing the state of the Science.
- a) Good Adhesion with substrate ( Asphalt or concrete)
- b) Additives to enhance properties that effect performance and durability
- c) improved adhesion for aggregate in emulsion mixes -Agg Pretreatment?
- d) Reliable predictability/ control for Emulsion breaks/set
- e) Performance tests for a Emulsion Treatments
- f) Modernize Construction equipment( Sensors) to better control and apply the treatments

# ETF- Future Considerations (3)

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- 3) Special Non-Traditional Uses for Asphalt Emulsions.
  - a) Surfacing of Concrete roads to reduce noise and joint rideability
  - b) Surfacing for concrete bridge decks to “flex” seal cracks , stop corrosion.
  - c) Light Weight solution for Bridge deck overlays/Suspension Bridges
  - d) Bike paths preservation treatments.
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# ETF – Closing Thoughts

## MOVING FWD ON IMPLEMENTATION:

- The growth of emulsion use is still in the early stages though it is encouraging to see that more agencies are beginning to use these treatments. To expand the use of Emulsions Treatments there must be a concerted , continuing and relentless effort by all stake holders to work together and Partner to achieve this end .
- Partnering between FHWA , AASHTO,AWPA , Industry ( FP2) and Academia will be critical. The message to be broadcasted , is that Emulsions treatments have progressed to the point that they – Do a good job; Have QA standards that ensure Quality job; Construction operations/ applications are expeditious ; are cost effective , and environmentally friendly.
- Quality Assurance plays a huge part in building credibility and confidence in getting owners to use these treatments , with training and certification being the cornerstones.

# Questions

