Tire Rubber Modified Chip Seals

Southeast Pavement Preservation Partnership
Charleston West Virginia 2019

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Over View

- History
- Types of Tire Rubber Processes
- How Tire Rubber is Incorporated Into Emulsions
- Projects

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A Little History

Remember the 90's?

- There was….
  - Ice-T
  - Ice Cube
  - Vanilla Ice
  - Then there was……

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A Little History

The Original ISTEA

- **ISTEA Tire Rubber Usage Mandate 1994**
  (Intermodal Surface Transportation Act)

- A certain percentage of Tire Rubber had to be used in your HMA or you did not get your Federal money
- Thought it was a great idea to do this over night!
  - The West had experience, most of the of the country did not.

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A Little History

A Little History

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A Little History

ISTEA Tire Rubber Usage Mandate 1994
(Intermodal Surface Transportation Act)

- Some processes were not well developed
- Lack of experience and little expertise
- Many of the projects went horribly wrong
  - When a new technology goes bad, you usually have to wait until people retire to try again!!!!!
- Big enough push back from the states, the mandate was reversed

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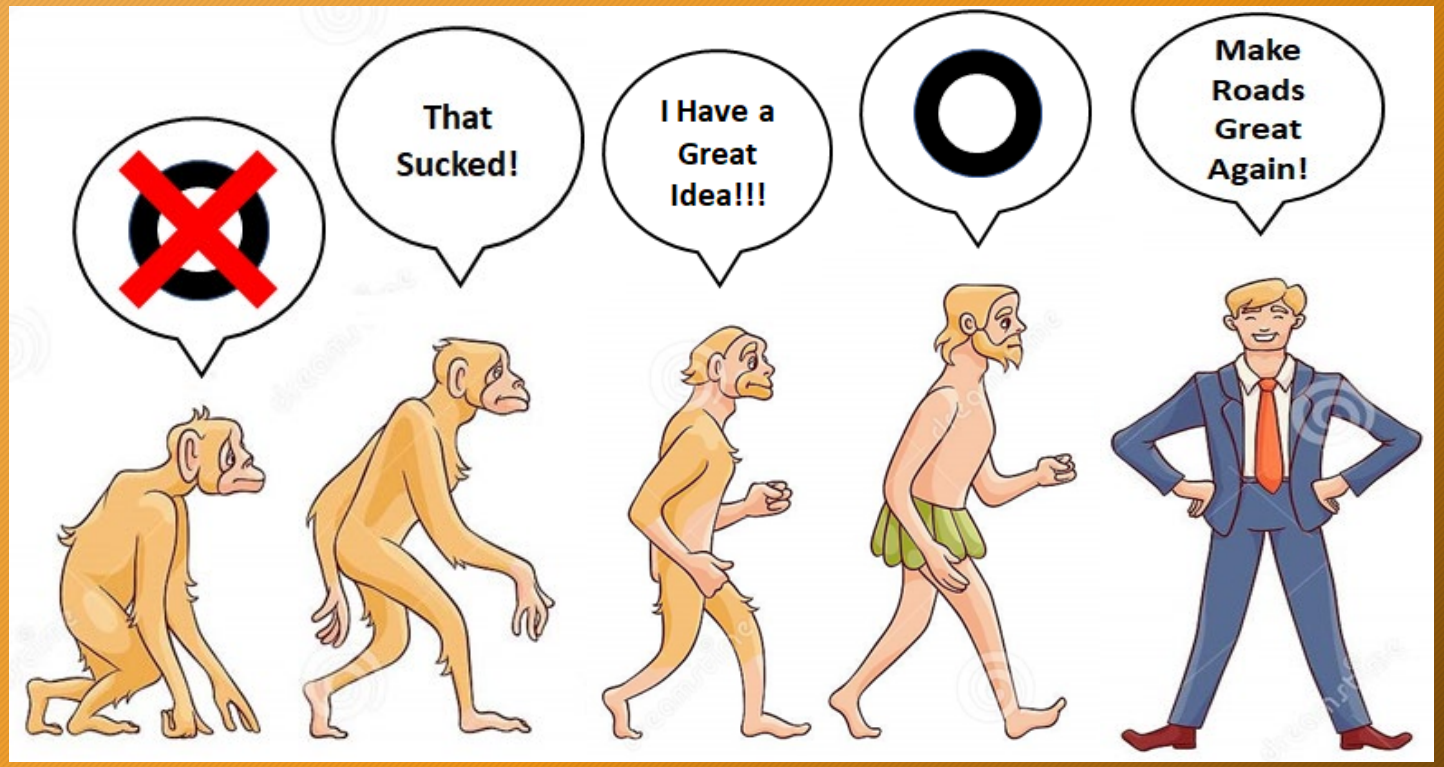
Time Passes



Wright Tire Rubber Modified Asphalt Cement (TRMAC)

Technology Developed 1993 in Channelview TX

- Performance Based
- Ease of Handling and Storage
  - User Friendly
- Disposal of Tire Rubber Last
  - Not just a way to get rid of used tires

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Types of Tire Rubber Modification

Wet Method

Types of Tire Rubber Modification

Dry Method

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Types of Tire Rubber Modification

Terminal Blend Method

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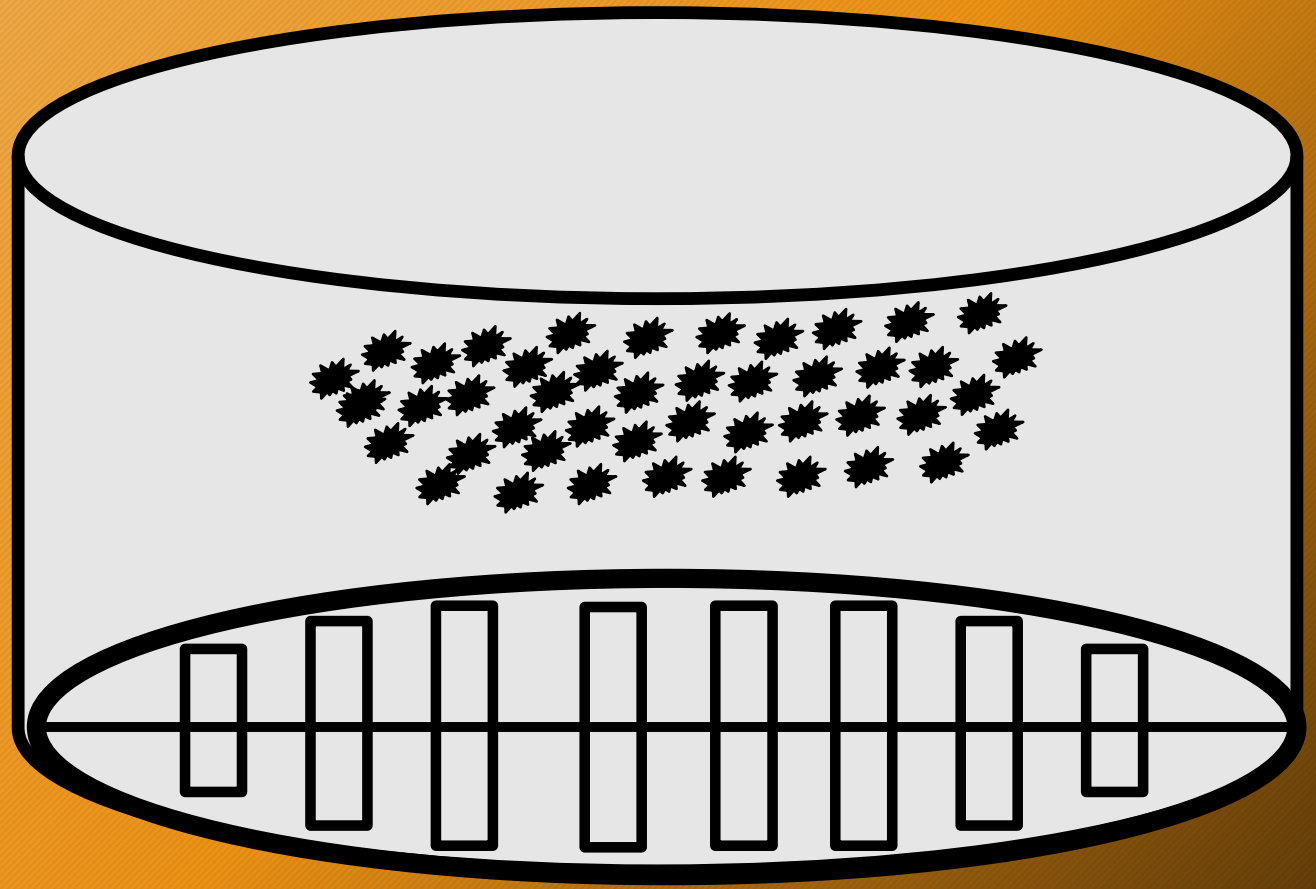
The Trick

Must Figure Out A Way to Keep Those Particles in Suspension



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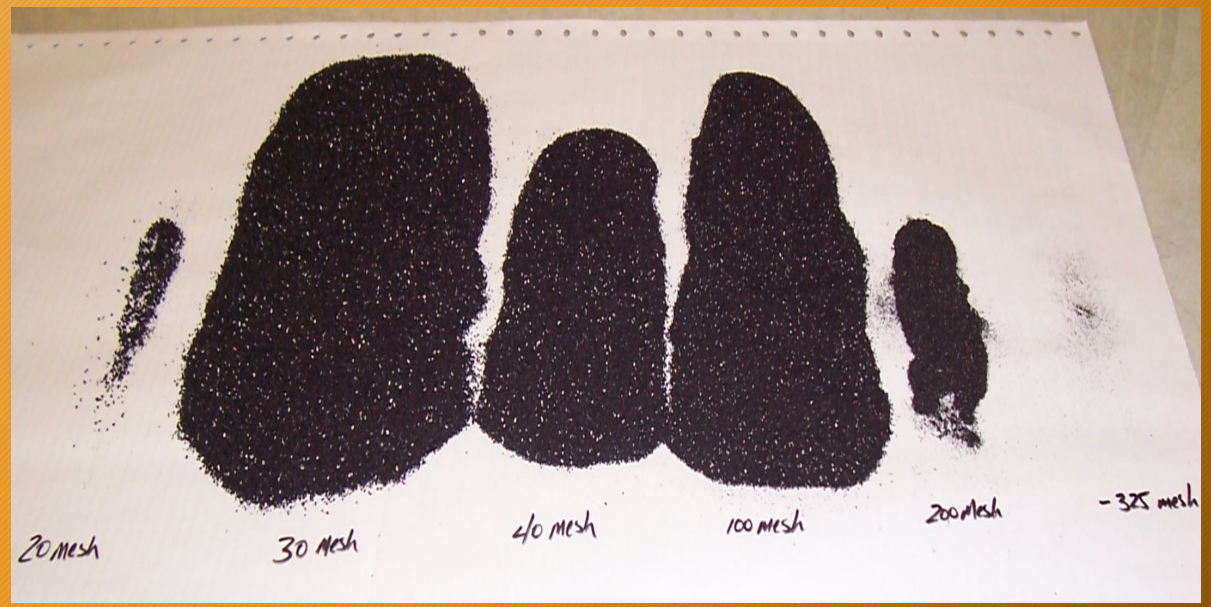
Wright Process

- Minus 30 mesh tire rubber
  - No Trash
    - Fabric, metal etc.



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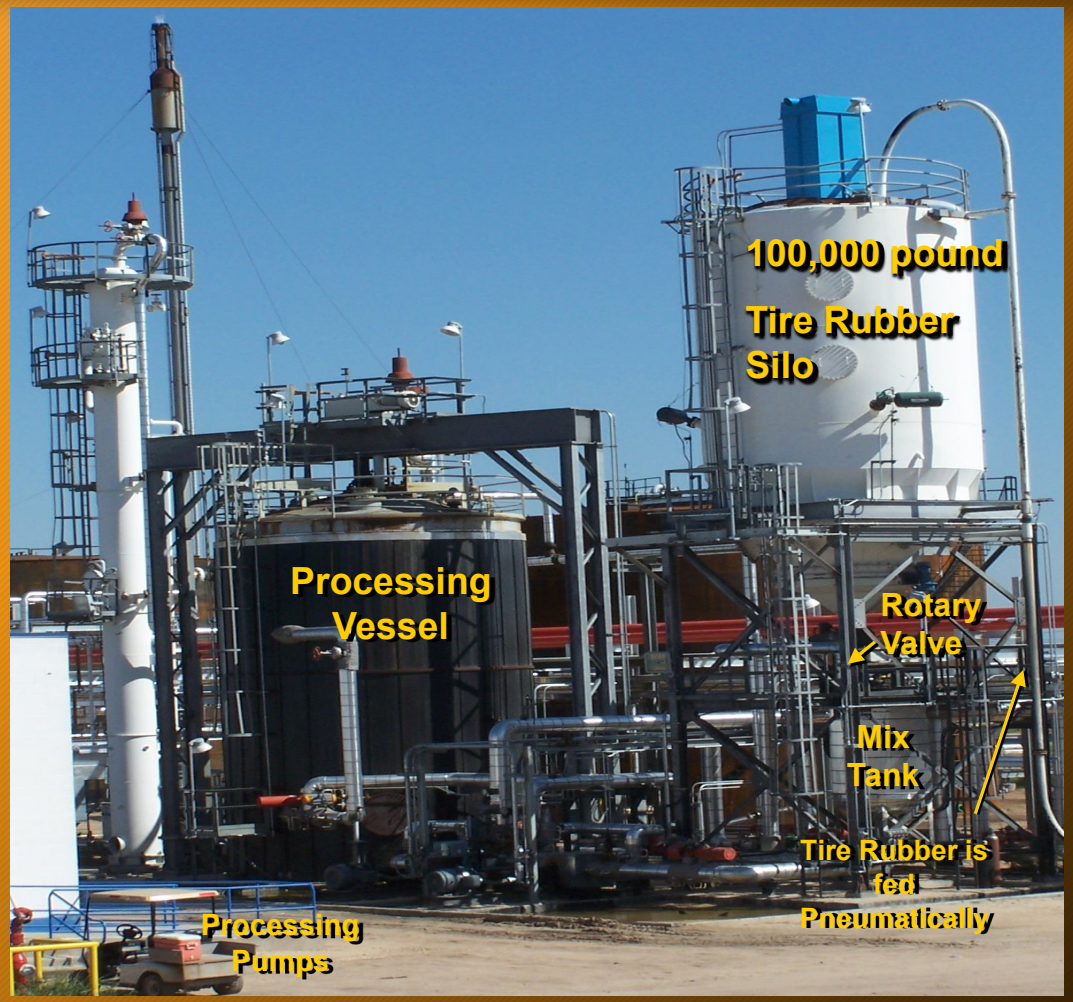
Wright Process

- Processing Plant Big Springs TX
  - Tire Rubber is Broken Down “IN” Asphalt
    - Comes out as concentrate



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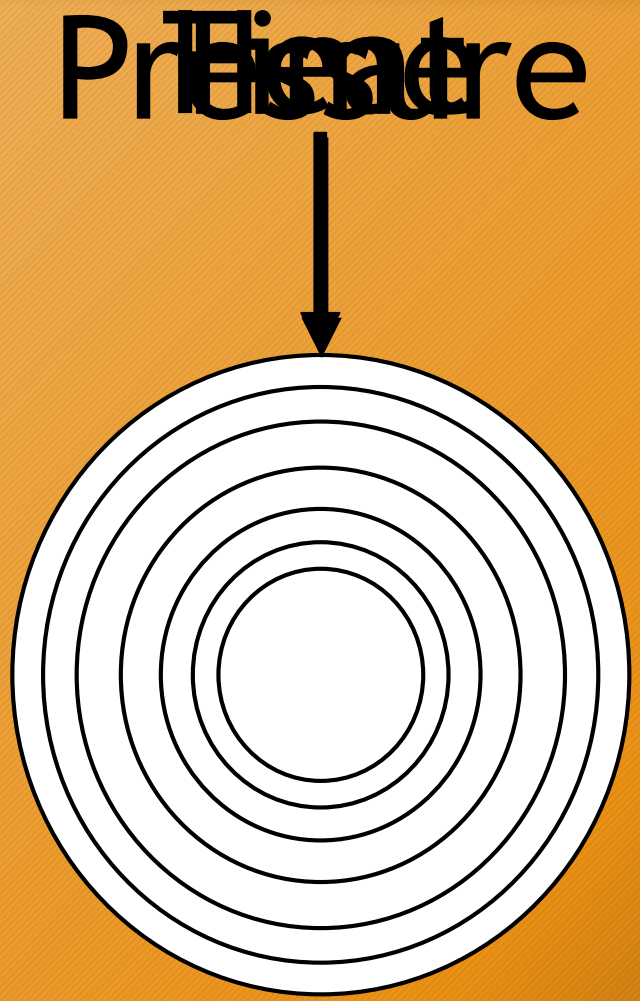
Wright Process



Peel The Onion

Wright Process

- Tire Rubber 100% Dispersed in Asphalt
  - Heat, Time, and Pressure
    - No toxic chemicals or material (recycling)
    - Is 100% recyclable
  - 20-25% concentration in asphalt

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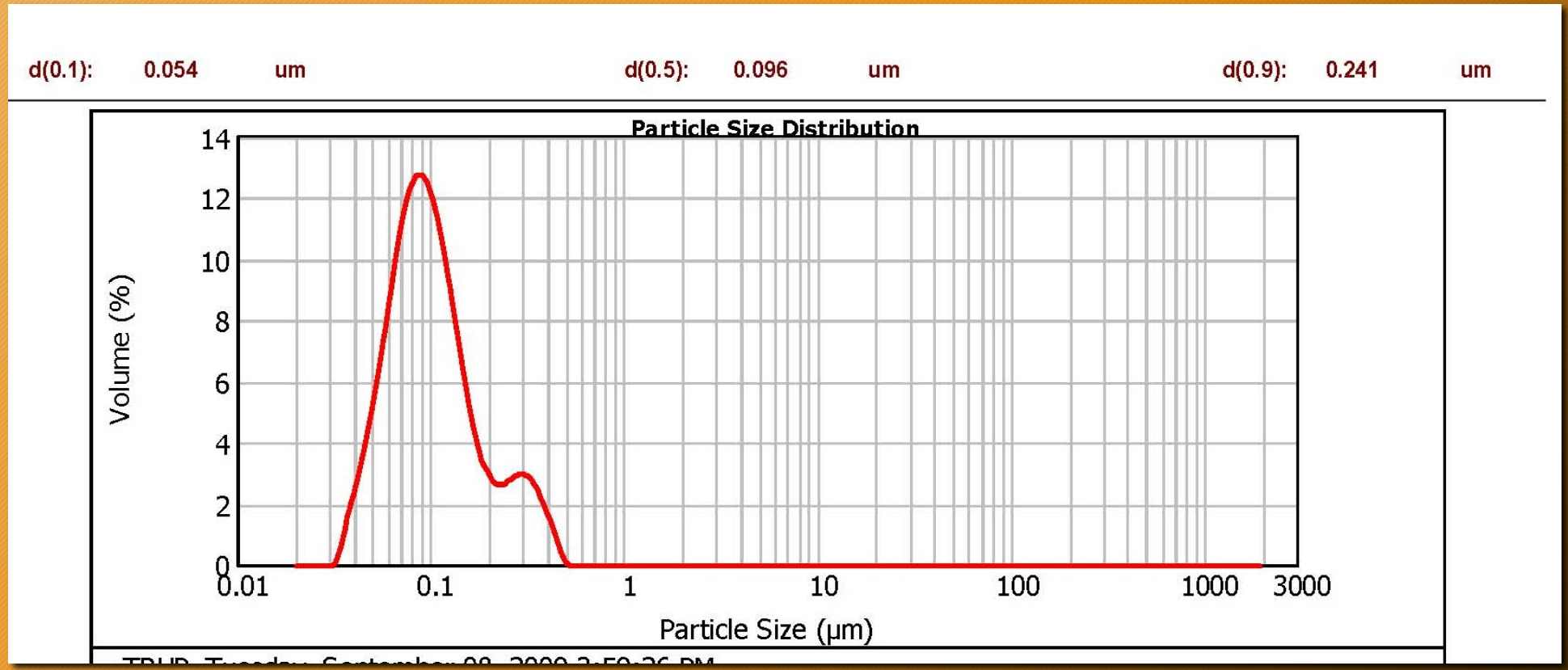
Wright Process



Wright Process

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Wright Process

As a Result It Can Be Emulsifed

- Chip Seal
- Fog Seal
- Slurry/Micro
- Cutbacks

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Chip Seal Emulsions

- Transports like conventional emulsion
  - Ships in tankers
- No special testing requirements
- Stores like conventional emulsion
- Conventional Equipment is Used
  - Distributors/nozzles/distributor pressure

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Chip Seal Emulsions

- Tire rubber is “hydrophobic”
  - Drives out water for faster set time
- Improved early and long term aggregate retention
- Consumes waste tires
  - For every 1,000 gallons, 19 tire kept out of landfill

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Chip Seal Process

- Distributor
- Chip Spreader
- Rollers

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Projects

- Lamar County
- Progress Trail, Sumrall MS

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Projects

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Projects

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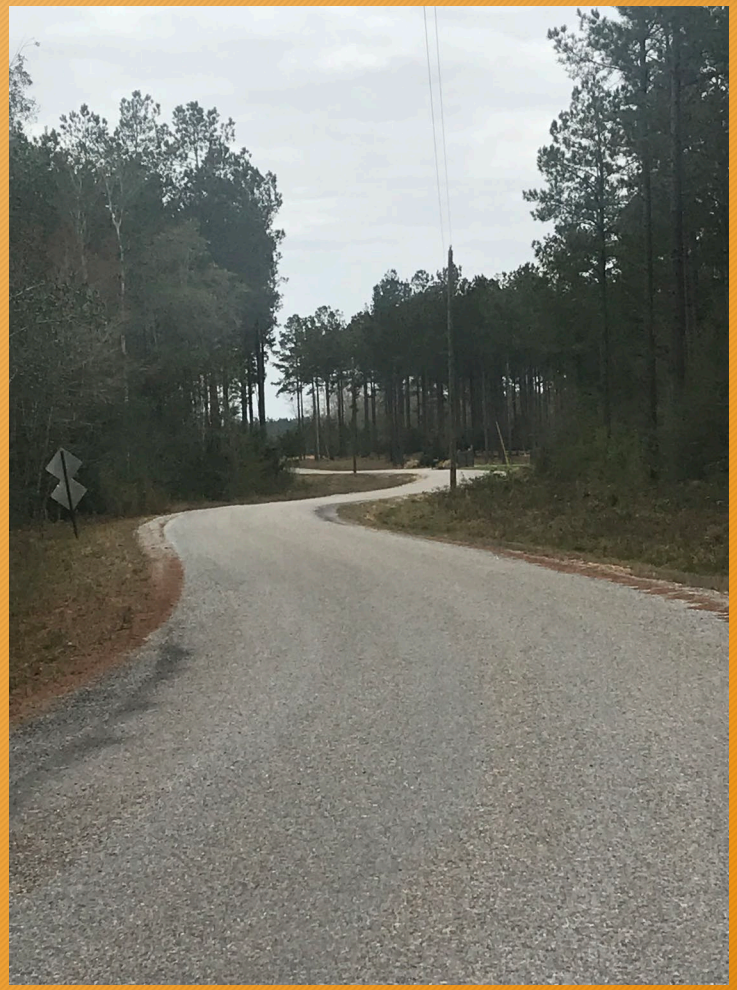
Projects



- Lamar County
- Progress Trail, Sumrall MS
  - 4 Years Later

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Projects

- Side by Side Hwy 489 Conehatta MS

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Mississippi Department of Transportation District 5
Tire Rubber Modified Chip Seal
MS Hwy 17

- The department historically uses CRS-2P
- The project applied a local #7 limestone.
- Used CRS-2TR in place of the CRS-2P
- CRS-2TR is a tire rubber modified emulsion contains 5% tire rubber.

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Emulsion Application Rate

- The emulsion was applied at 0.32 Gal/yd^2

Aggregate Application Rate

- Aggregate target rate from past experience with CRS-2P was 22 lbs/Yd^2

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Material Saving

- District 5's historical experience with local aggregate and emulsion used in the past, aggregate application rate was 22 lbs./Yd^2
- Operator field adjusted and lowered application rate for new emulsion
- After project was finished, they calculated how much aggregate was used. The actual aggregate application rate was 16 lbs./Yd^2. This reduced the aggregate materials cost by 28%.

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Environmental Savings

- The tire rubber modified emulsion used on this project incorporates 5% rubber.
- For every 1,000 gallons of emulsion use on a project, 19 tires are consumed.
- The project used 84,468 gallons of emulsion. This kept approximately 1,605 tires out of a land fill.

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Projects in the East

- Kentucky
  - Green County
  - Marion County
  - Trigg County
  - Flemming County

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Projects in the East

- Mississippi
  - Lamar County
  - Scott County
  - Pearl River County
  - MDOT

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Projects in the East

- Ohio ODOT
  - Defiance County
  - Wyandot County
  - Paulding County
  - Hardin Count

Projects in the East

- Tennessee
  - Weakley County (demo)
    - SH 190

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Thank You

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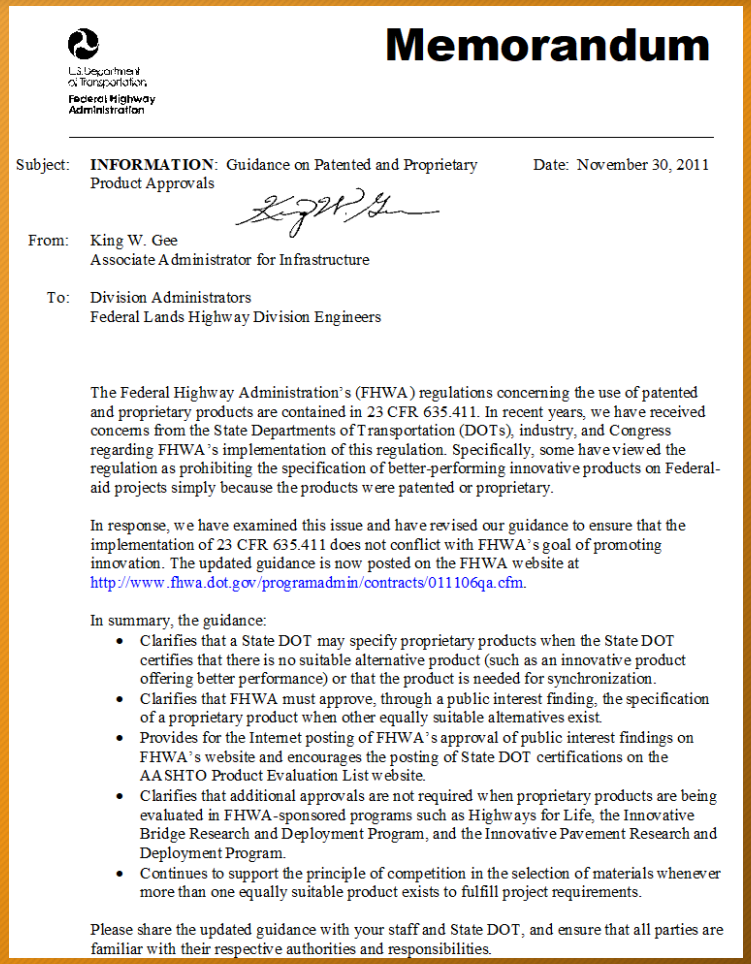
FHWA Proprietary Products Statement



U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **INFORMATION**: Guidance on Patented and Proprietary Product Approvals

Date: November 30, 2011

From: King W. Gee
Associate Administrator for Infrastructure

To: Division Administrators
Federal Lands Highway Division Engineers

The Federal Highway Administration's (FHWA) regulations concerning the use of patented and proprietary products are contained in 23 CFR 635.411. In recent years, we have received concerns from the State Departments of Transportation (DOTs), industry, and Congress regarding FHWA's implementation of this regulation. Specifically, some have viewed the regulation as prohibiting the specification of better-performing innovative products on Federal-aid projects simply because the products were patented or proprietary.

In response, we have examined this issue and have revised our guidance to ensure that the implementation of 23 CFR 635.411 does not conflict with FHWA's goal of promoting innovation. The updated guidance is now posted on the FHWA website at http://www.fhwa.dot.gov/programadmin/contracts/011106qa.cfm.

In summary, the guidance:

- Clarifies that a State DOT may specify proprietary products when the State DOT certifies that there is no suitable alternative product (such as an innovative product offering better performance) or that the product is needed for synchronization.
- Clarifies that FHWA must approve, through a public interest finding, the specification of a proprietary product when other equally suitable alternatives exist.
- Provides for the Internet posting of FHWA's approval of public interest findings on FHWA's website and encourages the posting of State DOT certifications on the AASHTO Product Evaluation List website.
- Clarifies that additional approvals are not required when proprietary products are being evaluated in FHWA-sponsored programs such as Highways for Life, the Innovative Bridge Research and Deployment Program, and the Innovative Pavement Research and Deployment Program.
- Continues to support the principle of competition in the selection of materials whenever more than one equally suitable product exists to fulfill project requirements.

Please share the updated guidance with your staff and State DOT, and ensure that all parties are familiar with their respective authorities and responsibilities.

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