

# Hot Applied Chip and Cape Seals

NWPMA Seattle Marriott 2014

# Hot Applied Binders

- PG graded asphalt of all varieties modified with polymers and/or rubber.
- No water in the system and applied at elevated temperatures at higher application rates is the major difference between hot applied binders vs emulsion binders.
- Used on a variety of roads from residential, highways, to arterials.
- Can be manufactured on site or in terminal
- Applied with specialized and conventional equipment

# Why do we modify asphalt?

- Unmodified asphalt can be sensitive to temperature variations or adverse conditions such as vehicle loading.
- Brittle in the Cold resulting in thermal cracking.
- Soft in the Heat resulting in rutting, flushing, and surface deformation at elevated temperatures.
  
- Also doesn't hurt that we can use recycled tires to modify asphalt and increase performance! Asphalt Rubber can use 600 recycled tires per lane mile at a 12" width!!

# Why Put Rubber In Asphalt?

- The purpose is not to get rid of tires but to enhance the performance of the binder and mix.
- Tires have great engineering properties, they don't crack in the cold or melt in the heat. They have a wider range of performance temperatures than asphalt.
- Make asphalt pavements that perform like tires.

# Why Put Rubber In Asphalt?

Tire rubber is an engineering tool used to:

- Reduce cracking
- Increase asphalt content and asphalt film thickness
- Prevent bleeding, flushing, and drain-down
- An aid to increase performance life
- Save Money in reduced maintenance
- Increase safety and reduce noise



How does it work?





**Tires Collected and Shredded into 2" chips**

# Multi Stage grinding and removal of all fabric continues





# Bagging and Loading of Finished Product



# Product Shipped to Blend Site in 2000 lb sacks for incorporation into PG asphalt



# Asphalt Rubber Binder Components & Blending

- 15%-22% Ground Recycled Tires
- 0%-6% Asphalt Modifier such as Raffex 120
- 0-3% SBS Polymer
- 78%-85% PG Graded Asphalt
  
- PG Asphalt brought to 375-440 degrees Fahrenheit prior to incorporation of rubber
- Asphalt modifier typically added to PG asphalt prior to incorporation of rubber
- Polymer added to rubber in pellet form if milled and ground form if incorporated without mill \*PG should not exceed 400f
- Finished product requires 45-60 minutes of “reaction time” prior to use.

# Asphalt Rubber Blend Site



# Rubber is loaded into Hopper



Rubber and Asphalt metered into “mix drum” and delivered to finish/reaction vessel



# On Site QC through Viscosity Testing



# Time to Chip!





# Public Notification

- Communication
- Media Notification?
- Bilingual?
- How Many Days of Work?
- Information on Entire Process
- Transit and Garbage?
- Three Day No-Park
- Advance placement of cms boards



## NOTICE

### WE WILL BE WORKING ON YOUR STREET

The week of April 2, 2007 International Surfacing Systems will be placing an Asphalt Rubber Chip Seal on your street. Asphalt Rubber Chip Seal is one of the most efficient and economical ways of resurfacing and maintaining your streets.

Asphalt Rubber Chip Seal consists of rubberized liquid asphalt applied to the existing surface, which is then covered with aggregate rock called "chip". The Chip Seal takes about 1 to 2 hours to cure completely. Your street will receive a slurry seal approximately 1 week after the chip seal is applied, which will give your street a smooth black finish. You will receive a notice of the proposed work by Valley Slurry Seal, the slurry contractor, prior to the work commencing.

There will be flagmen and other workers directing traffic to ensure the safe passage of all citizens and for the safety of our workers. Expect some delays, and choose alternate routes, if possible. The hours of construction will be from 7:00 AM to 3:30 PM.

**Your street will not be closed to traffic during the Chip Seal process**, but delays are to be expected. Streets that are to receive treatment will have "No Parking" signs placed along the street at least 48 hours prior to the work being started. These signs will have specific dates and times that all parking on the street will be restricted. **ANY CARS PARKED WITHIN THE POSTED AREA ON THE DAYS OF THE CHIP SEAL PLACEMENT WILL BE TOWED.** In order to sweep excess loose chips after placement, we request that you still park off the street or in some other convenient area for the two days following the placement of the chip seal.

The oil used in the Asphalt Rubber Chip Seal placement can and will stain your carpets, floors, and other related items if traveled through before it is covered with chips or has had time to cure. If you do have oil on something, simple dish soap and water will clean the area if caught before the oil has had time to dry. Otherwise we recommend a citrus solvent type cleaner. If you have any questions, there will be a representative of International Surfacing Systems on the job site. Below is our number and address for our main office.

International Surfacing Systems  
P.O. Box 4770  
Modesto, CA 95352  
(209) 525-9065 Office  
(209) 236-1864 FAX

# Barricade Spacing and timeline





# TRAFFIC CONTROL

# Traffic Control

- Traffic patterns
- Chip seals allow one way traffic during construction
- Sufficient amount of flaggers with communication needed to guide traffic safely through project
- Loose Gravel signs at all entry points of street or placed periodically through out highway projects

# Street Preparation

- Weed Removal complete?
- Thermo striping 8" or larger removed?
- Street clear of parked cars , green waste, dumpsters, and trash bins?
- Pre Sweep complete?
- Utilities Protected?
- Temporary Markings in Place?

## Suitable pavement conditions

Check that surface temperature is at the minimum requirement and rising

Asphalt Rubber 55 degrees and rising

Can place Asphalt Rubber if rain is in forecast

Sprinklers off, pavement clean!



# Oil Application



# Application of Asphalt Rubber Binder

- Applied at .55 to .70 gallons per square yard.
- Application Temperature of 375 to 400 degrees fahrenheit

Rates Determined By

Pavement Condition

Traffic Patterns

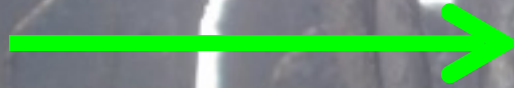
Climate

Binder Profile

Expectations?



POSITIONING  
OF TIPS IS  
VITAL



# KNIFED TIPS MAKE A DIFFERENCE!!



# Handwork is Required



# Handwork

- Squeegee Out all Oil Joints
- Paper all Starts



# Aggregate Application



# Aggregate Source

- Gradation
- Cleanliness
- Coating .5%-1% of any grade PG Asphalt
- Temperature if required
- Hardness

# Chip Box Calibration

Apply over yd2 canvas mat

Weigh and verify rate



# Hot Applied Aggregate Application



- 24 lb yd<sup>2</sup> - 35 lb yd<sup>2</sup>
- Distance Between Spreader and Chip-box





## **DIRTY AGGREGATE**

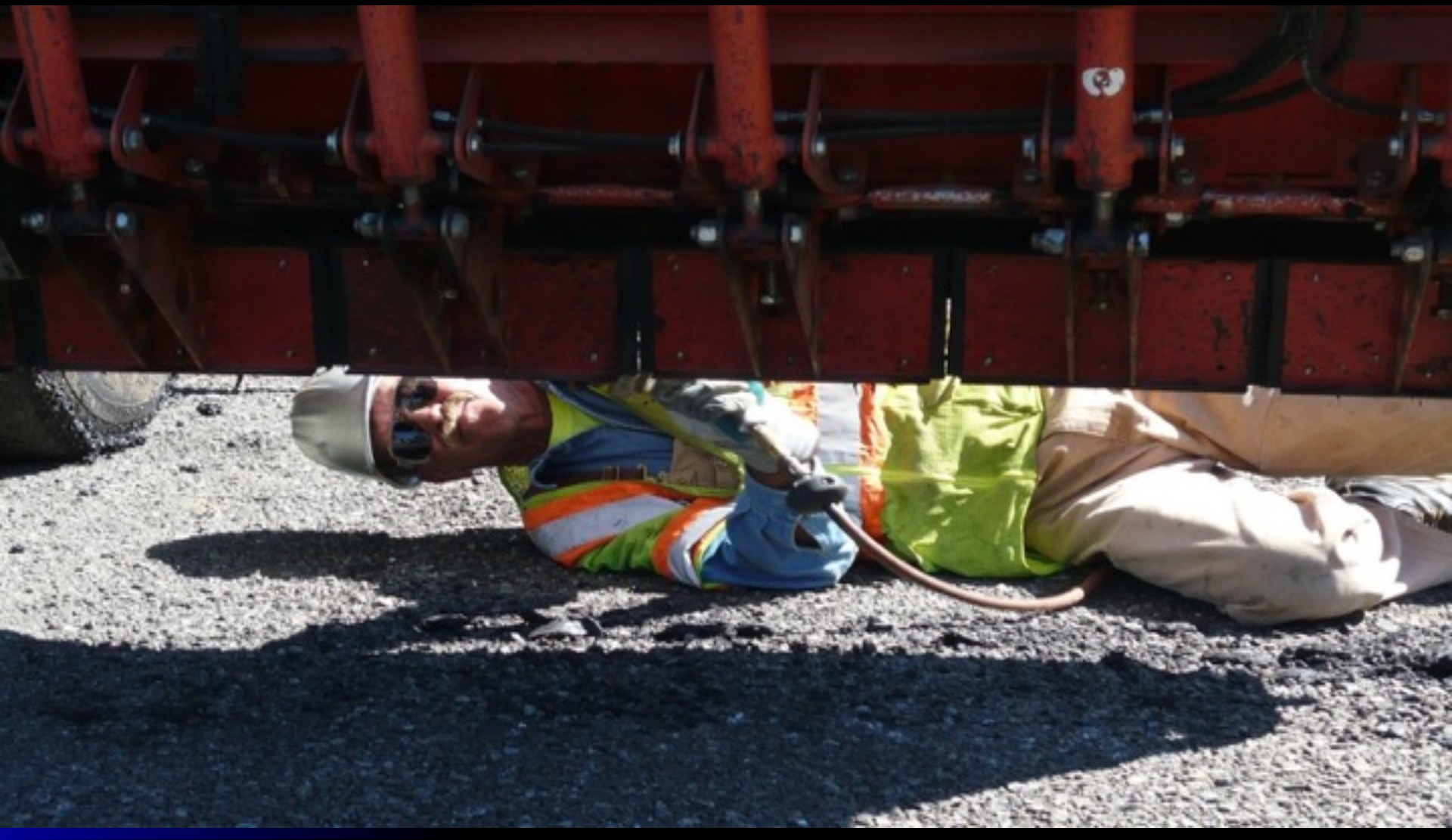
**DO NOT ALLOW THE BAGHOUSE FINES TO BE INTRODUCED INTO THE LOADS . BAGHOUSE FINES MUST BE REJECTED**

# Transfers

- One in, One Chasing
- Stagger Wheel Path



**CLEAN GATES DAILY!**



# SAFETY SLIDE!! Blind Spots



# Hot Applied Longitudinal Joint

- “Meet Line”

- 12” Min



# Compaction

- 3 Pneumatic Rollers
- Immediate!
- 3 Passes!
- Any Extended Stops Remove Box and Compact



**SAFETY SLIDE!!!!**



**10 FEET FROM FRONT OF  
ROLLER**

# Compaction

- Optional
- Steel Drum





# Hot Applied Sweeping

**15 Minutes**

- **Additional Sweeping may be required up to Two Days after Application**



# AR Candidate after 3 years



# Other Hot Applied Binders

- Hot Applied with rubber
  - AC 15-5tr AC 20-5tr
  - PG 76-22tr or R18
  - Type 4 or RAB (field blended with traditional AR equipment)
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- Hot Applied without rubber
  - AC 20XP
  - PGM

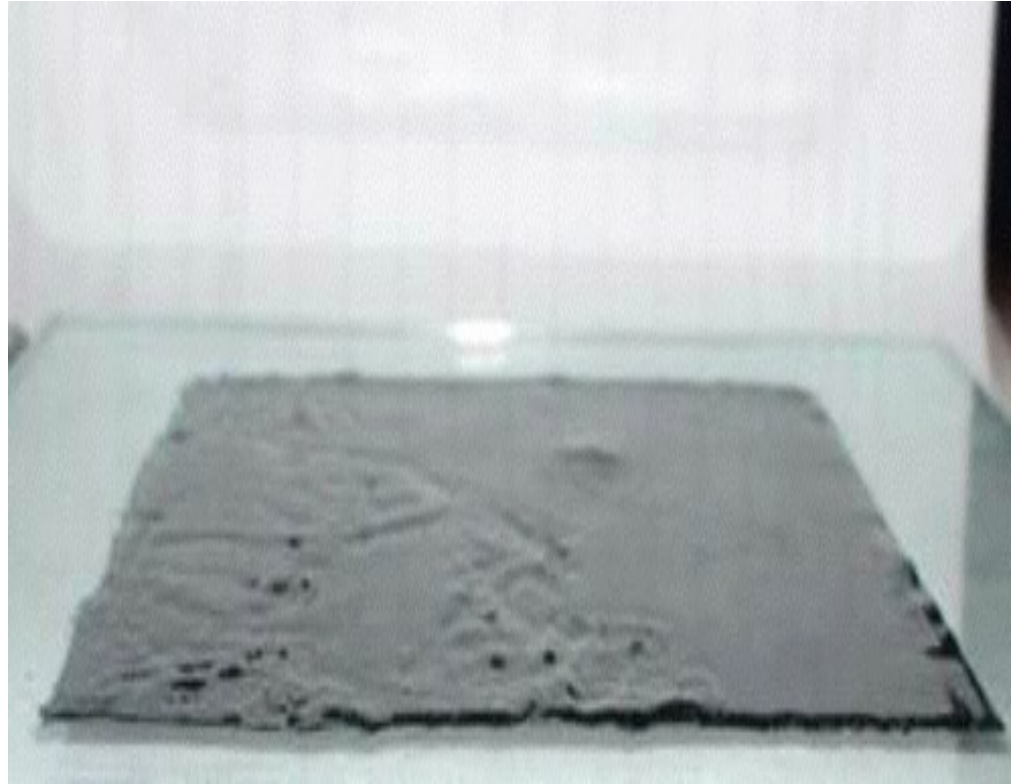
## AC 15-5 TR & PGM

- ❖ Terminally manufactured
- ❖ First used in the mid 1980's in Texas.
- ❖ Introduced to the NW in the 2000's
- ❖ heated under a controlled environment in a tank to an elevated temperature fully digesting rubber when tires utilized
- ❖ Polymers utilized in both PGM and AC 15-5tr
- ❖ 0-18% rubber content



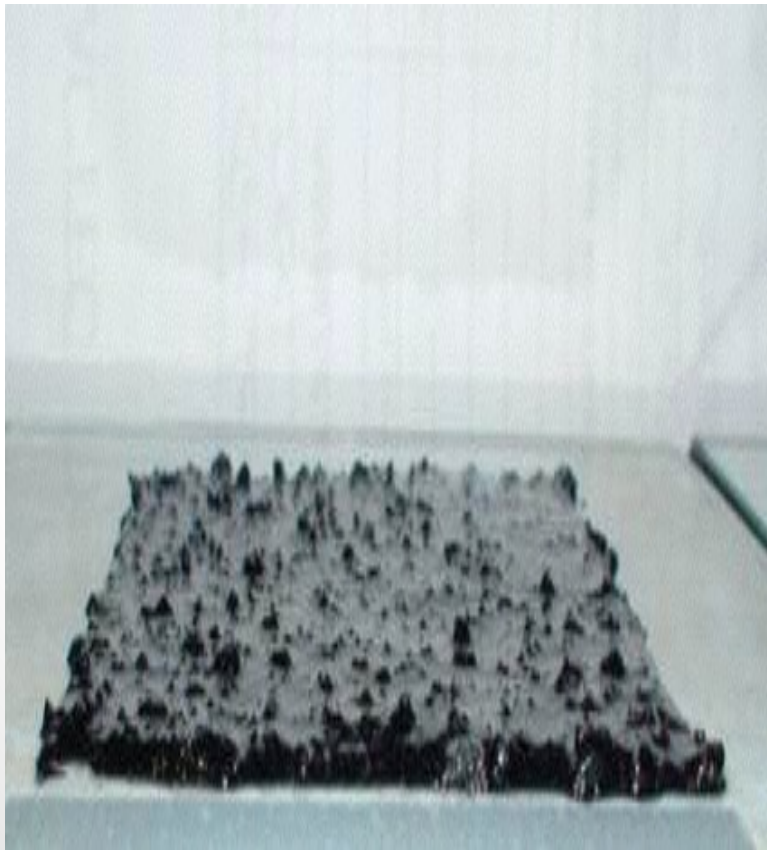
## AC 15-5tr or PGm application

- ❖ .30-.50 gallons per yd<sup>2</sup>
- ❖ Aggregate Applied at 18-24lbs per yd<sup>2</sup>
- ❖ Application temperature of 350 to 375 degrees fahrenheit.
- ❖ Applied with conventional (non agitated) distributors
- ❖ Boot Crew Optional



# Visual Comparison

**Asphalt Rubber**



**AC 15-5tr or PGm**



# Summary

- Asphalt Rubber
- Higher Application Rates of aggregate and oil
- Specialized Equipment necessary
- Manufactured utilizing “field blend” portable plant
- AC 15/5tr & PGM
- Lower application rates of aggregate and oil
- Conventional Equipment
- Manufactured and available at some terminals

# Summary

- Both may utilize WMA
- Both hot applied binders have similar construction practices
- Different manufacturing process
- Multiple contractors bidding work and performing work
- Should not be specified as same product
- Both valuable tools in the pavement maintenance tool box



# Final Coat if desired

## Cape seal

- Consists of application of a slurry seal or micro on top of chip seal
- Typically will require a minimum of five days cure time on chip seal prior to application of slurry
- Streets must be clean of all loose chip prior to application

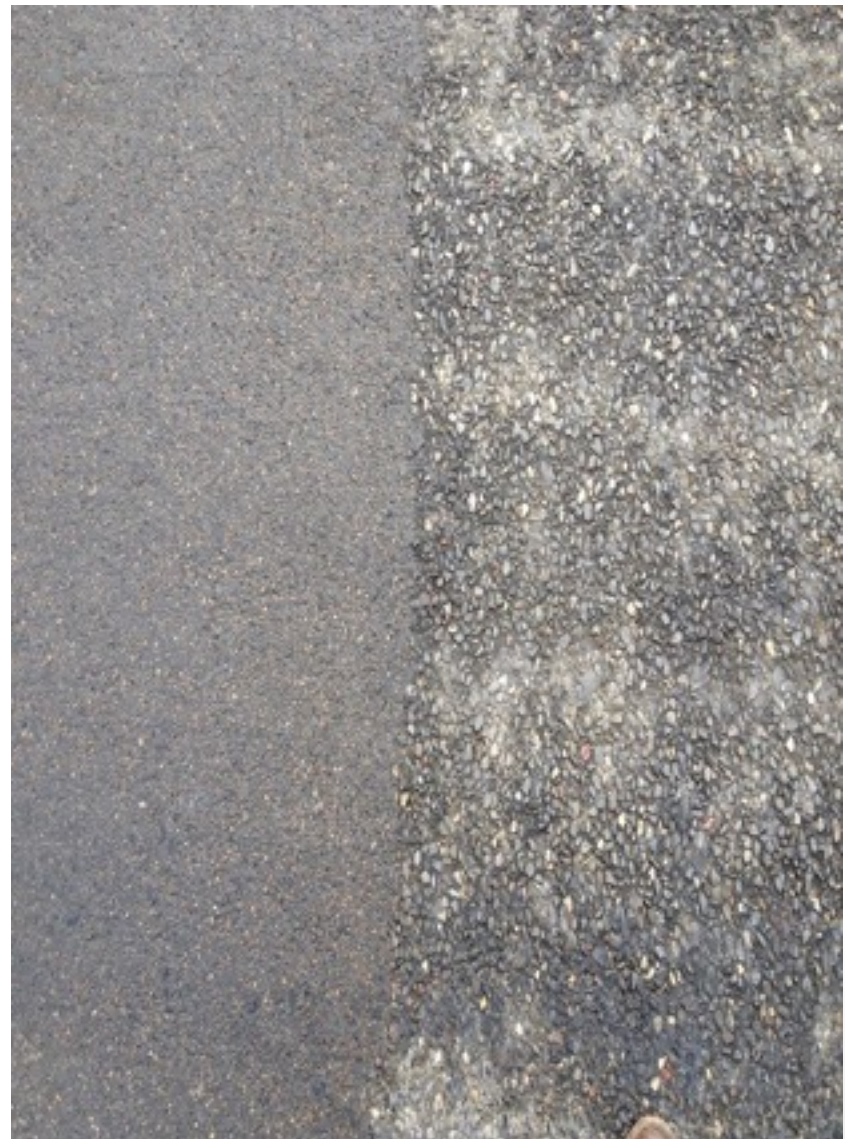
## Flush coat “fog seal”

- Consists of application of css or ss emulsion diluted with 40% to 50% water at an average of .08 to .12 gal per yd<sup>2</sup> followed by an optional sand blotter at an average of 4lbs per yd<sup>2</sup>
- Typically occurs immediately following sweeping operation

# Cape Seal




# Cape Seal Finish



# Cape Seal

- Can reduce raveling
  - Aesthetically more pleasing!
  - Extends life of seal
- 
- Expect higher application rates of closer to 15lbs per yd
  - May use Micro or Slurry
  - Can be applied over any chip seal



3541 Burson Rd SB  
Valley Springs, Calaveras Co.  
Before AR Chip Seal  
September 2005

No Prep Work Was Done  
Prior To Chip Seal



3541 Burson Rd SB  
Valley Springs, Calaveras Co.  
AR Chip Put Down Sept 2005  
Picture Taken July 2008

Field Blended Asphalt Rubber Chip

# Tracy: Granada Way in 2007 Before Asphalt Rubber Cape Seal application





**Tracy: Granada Way in 2012  
After Asphalt Rubber Cape Seal application  
Done in 2007**

11/19/2012



# Questions???

