CHIP SEAL BEST PRACTICES

HOT APPLIED AND EMULSION CHIP SEALS

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Doug Olsen - Western Emulsions
EXPECTATIONS

- THE KEY TO ANY SUCCESSFUL CHIP SEAL
  - GOOD WEATHER
  - GOOD MATERIALS
  - GOOD WORKMANSHP
CONSTRUCTION PROCESS

- Spreading Binder
- Spreading Screenings
- Rolling
- Sweeping
- Apply Flush Coat (Fog Seal)
BEFORE YOU BEGIN

- ENSURE PAVEMENT SURFACE IS CLEAN AND DRY AND NO RAIN IN THE IMMEDIATE FORECAST
- HOT APPLIED - PAVEMENT 55°F MINIMUM AND AMBIENT 60°F - 105°F
- EMULSIONS - PAVEMENT 80°F MINIMUM AND AMBIENT 65°F - 105°F
WEATHER ISSUES...
PAVEMENT TEMPERATURES

Ensure pavement temp is adequate in sun and shade
ROAD SELECTION

Pick the Right Road for the Right Treatment at the Right Time
ROAD PREPARATION

Prevent water from entering roadway

Protect utilities
ROAD PREPARATION

Repair pot holes and seal large cracks

Remove existing pavement markers and place temporary pavement markers
PROJECT ISSUES- SCREENINGS

Screenings should be crushed and cubical in shape for interlocking

Flat screenings increase the risk of bleeding and reduced friction course
MATERIALS - SCREENINGS

- Gradation varies daily or truck-to-truck
- Screenings not damp enough
- Screenings too damp
- Screenings too heavily coated
- Screenings not enough coating
- Application not modified to fit traffic pattern
BENEFITS OF POLYMERS

- Improved adhesion (less chip loss)
- Improved resistance to flow at high temps
- Improved flexibility at low temps
- Longer service life
PROJECT ISSUES - EMULSION

- Bleeding - Application not modified as needed
- Demulsibility - Breaking too fast or too slow
- Viscosity - Viscosity (running or ridging)
- Temperature - Emulsion is too cold to apply
- Penetration - Too soft or too hard
- Field Samples - Proper sampling and shipping for testing
EQUIPMENT ISSUES

Check spray bar nozzles and bar height

Check chip spreader gate openings
SPREADER TRUCKS

- HOT APPLIED - AGGITATION IS CRUCIAL.

- PROPER APPLICATION TEMPERATURE 385°F - 415°F FOR HOT APPLIED AND 130°F - 180°F FOR EMULSIONS.

- DO NOT USE NONCONTACT INFRARED TEMPERATURE GUNS.

- TEST SPRAY BAR ON TAR PAPER PRIOR TO APPLICATION.
SPREADER TRUCKS continued

- NOZZLES PROPERLY ALLIGNED.
- CORRECT NOZZLE SIZE.
- CORRECT HEIGHT OF SPRAY BAR 13” - 16”.
- CHECK THE FLOW GAUGE.
- TAKE A VISCOSITY READING PRIOR TO ANY APPLICATION OF ASPHALT RUBBER BINDER.
**STOP** IF SOMETHING DOESN’T LOOK RIGHT!
SPRAY BAR

Improper height will not provide uniform coverage of emulsion.

Can cause roping, ridging, or streaking.
SPREADER TRUCKS continued

- INITIAL TAKEOFF SHALL BE ON TAR PAPER.

- AFTER 1,000 FEET - STOP AND CHECK APPLICATION RATES. LENGTH $\times$ WIDTH $\div$ 9 = SY. DIVIDE THE GALLONS BY THE SY’S = APPLICATION RATE.

- HALFWAY THROUGH THE LOAD, PERFORM A CT339 TEST.

- PERFORM ONE CT339 TEST FOR EACH SPREADER TRUCK EACH DAY.
MATERIAL PLANT QUALITY PROGRAM

- CURRENT MPQP CERTIFICATION.
- ENSURE PLANT IS RUN AT PROPER SPEEDS.
- MPQP DATA MUST BE TURNED IN DAILY WITH VISCOSITY LOG.
MEASURING VISCOSITY

- Ensure the tester is properly certified.
- Current calibration certificates for the viscometer and the thermometer.
- Viscosity readings are very easy to check.
- Prior to application on the roadway surface, viscosity readings must be taken once per lot and the range must be between 1,500 - 2,500 cP.
FILL 1 GALLON CAN FROM SAMPLE VALVE AND DISCARD SAMPLE.

TAKE 2ND SAMPLE AND STIR UNTIL TEMPERATURE IS 375°F (+/-3°F)

STIR BINDER WHILE TAKING TEMP

ROTOR MUST BE SUBMERSED NEAR EDGE OF CAN FOR 1 MINUTE PRIOR TO STARTING TEST.

VISCOMETER MUST BE HELD LEVEL USING BUBBLE LEVEL AND SUBMERGED AT PROPER DEPTH.

MOVE ROTOR TOWARDS THE CENTER OF CAN AT PROPER HEIGHT, AND TURN ON VISCOMETER.

TAKE HIGHEST READING. REPEAT TWO MORE TIMES AND TAKE THE AVERAGE OF THE THREE READINGS.
PREPARATION FOR CT339 TEST

- Glue filter roll to steel plates, measuring 12” X 8”.

- Place each plate in Manila envelope.

- Weigh each plate and envelope individually, and record weight and number each envelope.

- Number the plates accordingly to the width of binder being applied to the roadway surface.

- Stop spreading binder within 2’ - 3’ after passing over the plates.

- Remove plates from the roadway and insert into predetermined numbered envelopes.

- Weigh each plate and enter data into spread sheet. Check data for accuracy across the entire spray bar.
CALIFORNIA TEST METHOD
339M

PLACEMENT OF METAL PLATES

PLACEMENT OF METAL PLATES
CALIFORNIA TEST METHOD 339M

REMOVAL AND COOLING OF METAL PLATES

PLACEMENT OF METAL PLATES IN MANILA ENVELOPE
### APPLICATION RATE SHEET FOR FIELD PLATE WEIGHTS

**TEST METHOD 339M**

- **Tester:** TB
- **Test No.:** 1
- **Date of Test:** 4/23/2016
- **Time of Test:** 10:00
- **Project:** 11-2M7804 Rt 8
- **Driver:** SB
- **Truck Number:** DR01
- **Targeted Application Rate:** 0.50 / 0.55 gal/sqyd
- **Test Viscosity @ 375°F:** 2000 cP

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<th>PLATE NO.</th>
<th>L</th>
<th>W</th>
<th>AREA (A)</th>
<th>WEIGHT (gr)</th>
<th>FACTOR (gr x sy/gal)</th>
<th>SPREAD RATE (Gal/sqyd)</th>
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**Factor Calculation:**

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**Equation #2**

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APPLICATION RATES

- DON’T RELY ON THE CT339 TEST AS THE GOSPEL.

- IF THE CT339 TEST RESULTS LOOK GOOD, DON’T STOP PERFORMING RANDOM SPREAD RATE CHECKS.
TRANSVERSE JOINTS
CHIP SPREADER

- GATE ADJUSTMENT / GATES CLEAN
- CALIBRATE THE CHIP SPREADER DAILY.
- CALIBRATE THE CHIP SPREADER USING A 3’ X 3’ CANVAS TARP.
- TRACK THE APPLICATION RATES CONSTANTLY.
- PULL OFF MAT WHEN WAITING ON MATERIALS.
ROCK TRUCKS

- DURING TRANSIT, LOADS MUST BE TARPED IF TEMPERATURE IS BELOW 65°F OR THE HAUL TIME EXCEEDS 30 MINUTES. NO EXCEPTIONS!

- CHECK TEMPERATURE WITH A PROBE ONLY!

- DIG DOWN AT LEAST 18 INCHES INTO THE AGGREGATE TO GET AN ACCURATE READING. TEMPERATURE OF THE AGGREGATE MUST BE 225°F - 325°F ON THE JOBSITE.

- DO NOT ALLOW DIRTY SCREENINGS TO BE PLACED.
BAG HOUSE FINES
ROCK TRUCKS continued

- PROPER COATING FOR HOT APPLIED CHIP SEALS.
- ONE TRUCK CHASING ON HOT APPLIED CHIP SEALS.
- ROCK TRUCKS SHOULD STAGGER THEIR WHEELS.
- MOVE OFF THE MAT WHEN SITTING IDLE!
ROLLING

- Ensure all tires are properly inflated or foam filled. No flat tires!

- Inspect equipment before you get on the road

- Proper overlap on the edges.

- A total of three passes are required.
ROLLING continued

- SELECT A RANDOM LANDMARK.
- THERE’S NO SUCH THING AS TOO MUCH ROLLING.
- ROLLING IS CRUCIAL FOR HOT APPLIED CHIP SEALS.
ROLLING

PROPER OVERLAP / PROPER OPERATOR POSITION
ROLLING (continued)

NEVER TAKE YOUR EYES OFF THE ROLLING!
SWEEPING OPERATIONS

- Avoid sweeping too soon with emulsion chip seals.
- Applied broom pressure not too light or too heavy, only remove excess chips.
SWEEPING

- Sweeping may begin as soon as binder and aggregate have cooled to existing surface temperature on hot applied.

- Steel or nylon gutter brooms?

- Perform at least two passes with the sweepers prior to applying the flush coat.

- Perform one more sweep after flush coat.
FLUSH COAT

- APPLY FOG SEAL DILUTED NO MORE THAN 50/50.

- DO NOT ALLOW FOG TO BE APPLIED WHEN PILOT LINE PRESENT.

- FOG SEAL IS GENERALLY APPLIED AT .10 - .12 GALLONS PER SQUARE YARD (DILUTED) FOR CHIP SEALS.

- IMMEDIATELY FOLLOWING THE FOG SEAL, APPLY SAND COVER AT A RATE OF 2 - 6 POUNDS PER SQUARE YARD.

- PERFORM ONE FINAL SWEEP PRIOR TO OPENING UP LANE TO UNCONTROLLED TRAFFIC.
FOG SEAL / FLUSH COAT

Typically slow-set emulsions diluted with water to control application.

Can be used with or without sand blotter.
WHEN THINGS GO RIGHT
WHEN THINGS GO BAD
REMEMBER

- READ THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS PRIOR TO THE WORK STARTING.

- STANDARD SPECIFICATIONS SHOULD BE A GENERAL GUIDELINE, NOT THE GOSPEL.

- TRACK MATERIALS AND APPLICATIONS RATES.

- DO NOT TAKE MATERIAL TEMPERATURE READINGS WITH A NONCONTACT INFRARED THERMOMETER.

- ROLLING IS MUCH MORE CRITICAL ON HOT APPLIED CHIP SEALS COMPARED WITH CONVENTIONAL CHIP SEALS.
QUESTIONS?

DIDN'T THINK SO!
THANK YOU!

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