# Chip Seal Inspection

ISSA/CCSA Roundtable
Marriott Marquis
San Diego California

# Street Selection

- Condition
- Traffic
- Customer
- Climate
- Expectations

# Expectations?

- Structurally sound?
- Prep work?
- Residents?
- How many years?

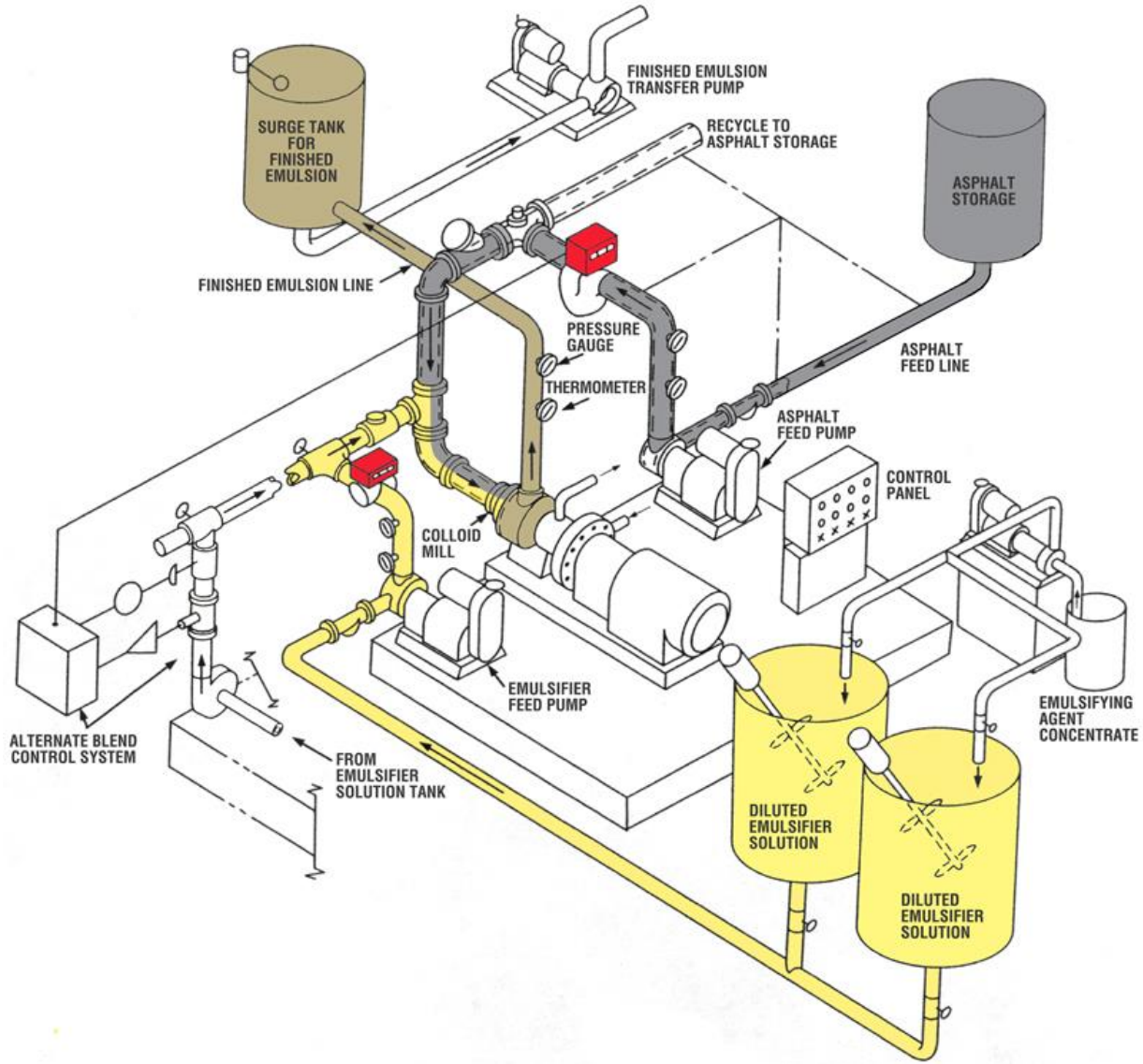
# Binder Selection
# Hot Applied or Emulsion?

- PMCRS 2-H(Polymer Modified Cationic Rapid Set/high viscosity-hard asphalt)
- PMRE (Polymer Modified Rejuvenating Emulsion)
- HFRS2 (High Float Rapid Set/high viscosity)
- CSS 1-H (Cationic Slow Set/ low viscosity-hard asphalt)

- Modified Binder (Terminally Blended) or (Field Blended)
- Asphalt Rubber

# Emulsion

Emulsions are mixtures of AC- or PG-type binders, water, emulsifying agents, and may contain other additives. They are suspensions of very small asphalt droplets in water. The emulsifying agent keeps the droplets suspended. This suspension allows the use of lower application temperatures, typically ambient to 180°F.



# Emulsions

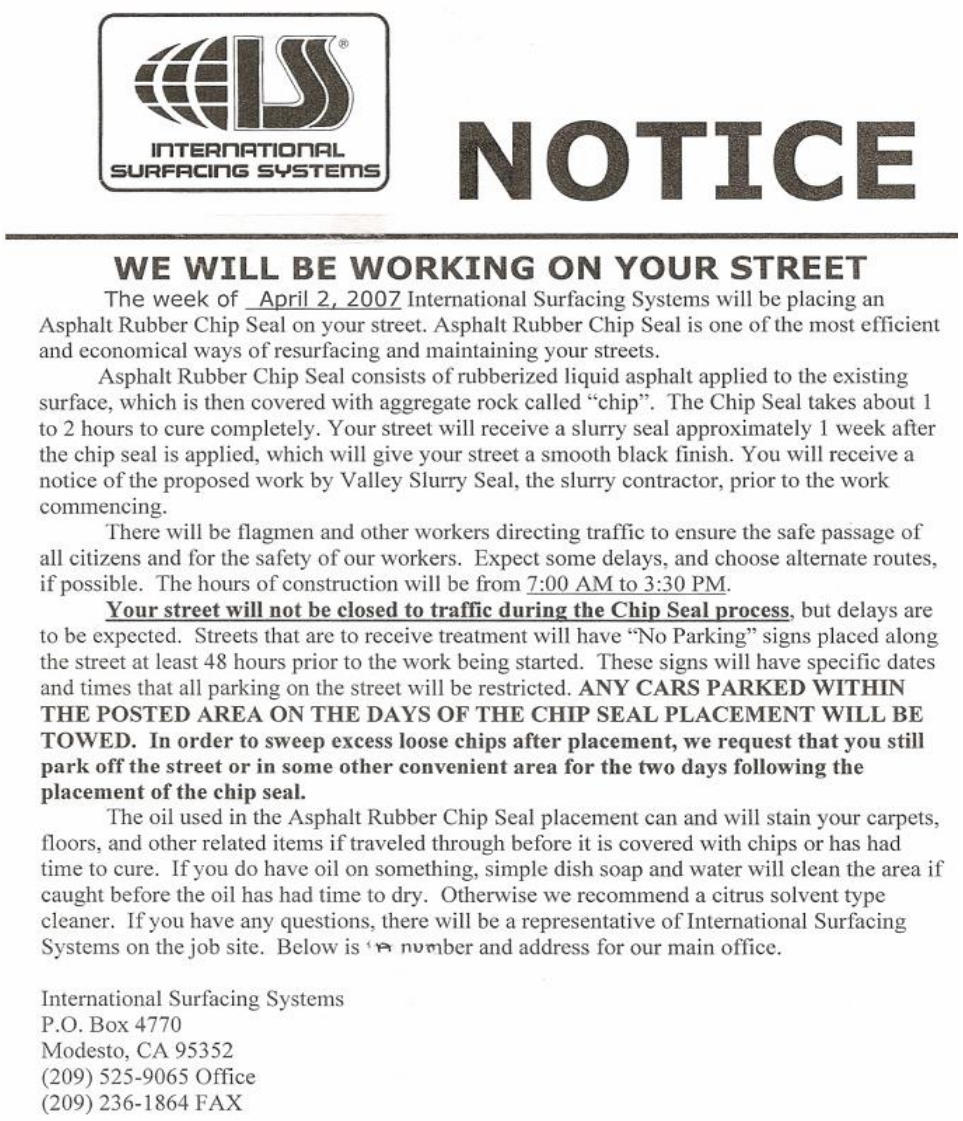
- Emulsion nomenclature describes the type, speed of break, viscosity of the emulsion, stiffness/hardness of the residue binder, and presence of any additives.
- A “C” is the designation for cationic (positive charge) emulsions. Emulsions not using a “C” are anionic (negative charge). An “HF” designation indicates “high float” which is a gelling property that prevents runoff after application. An “RS” for rapid set, “MS” for medium set, and “SS” for slow set describes the speed of emulsion break.

# Emulsions Continued

- A number, usually a “1” or “2” designate the emulsion viscosity. The “1” is a low viscosity (resistance to flow usually measured at application temperatures) emulsion used for such applications as fog sealing where we want the emulsion to flow into cracks and crevices. The “2” is a high viscosity emulsion used for such applications as surface treatments. An “H” suffix indicates a stiffer/harder emulsion residue (the asphalt that remains after all the water evaporates). The designation for an additive may be a “P” for (polymer – either SBR or SBS)
- The addition of polymers and other modifiers is intended to increase adhesion, increase service life, and increase the chances of success of a seal coat.

# 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



INTERNATIONAL SURFACING SYSTEMS

**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 the 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

# 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 removed?
- Street clear of  parked cars , green waste, dumpsters, and trash bins?
- Pre Sweep complete?
- Utilities Protected?
- Temporary Markings in Place?

# Protect Utilities

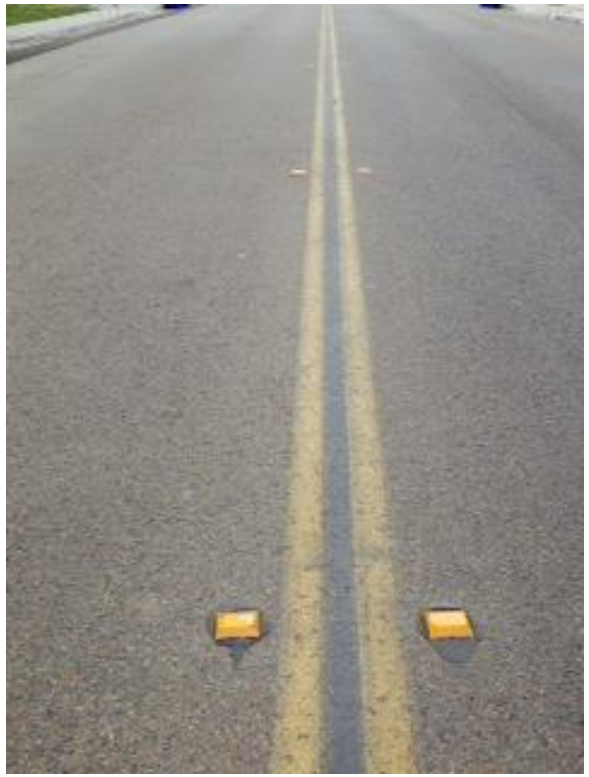
Pre Fabricated cardboard

Tar Paper

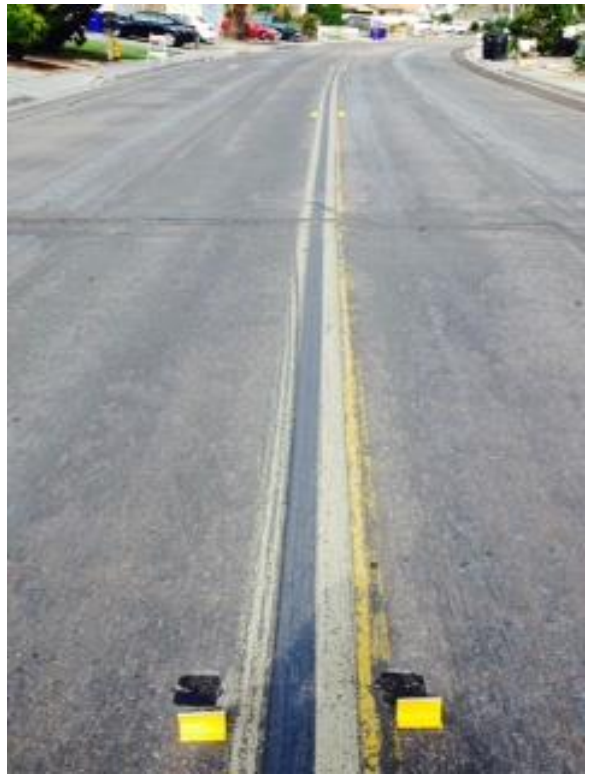
Do Not Use Plastic for Hot Applied

# Street Preparation

Remove Markers/Thermo?



High Heat?



# Barricades

Distance?

How far in advance?

Towing?

# Suitable pavement conditions

Check that surface temperature is at the minimum requirement  and rising

CRS-2p 80 degrees

PMRE  50 degrees!

Check forecast for rain

Make sure pavement is dry

Beware of temperature and moisture in shaded areas

Application of emulsion is not recommended when ambient temperatures exceed 110 degrees

# Pavement Repairs

Dig outs?


Crack seal?

# Fog Seal of Fresh Asphalt Patching

# PMCRS 2-H

Low traffic volume

Fair Condition

Low Cost

Readily Available

Compatible with most agg

Applied with conventional Equipment

No coating of aggregate required.

# PMRE Application

Scrub Broom benefits/challenges?

Cul-de-sacs/Irregular Shaped Areas

.25-.40 gallons per square yard

# PMRE Cont.

Can use with dirty aggregates

Helps dried out oxidized pavements

Works in foggy damp conditions

Can work in cold weather down to 40 degrees!

Can fill alligator, blocked, and oxidized cracks due to high polymer content and rejuvenator

Easier Constructability

# Aggregate Selection

Minimum ¼” to max ½”

Who is the customer?

Is there a final coat?

What is the street condition?

# Emulsion Application

Test nozzles on tar paper prior to start

Spray nozzles need to be free of plugs

Spray bar at height that allows even application of emulsion

Nozzle tips adjusted to allow proper overlap

Oil must be within specified temperature

# Oil Application

## Factors in Determining Rate

- Aggregate Gradation
- Pavement Condition
- Traffic Volume
- Weather Pattern

# Emulsion Application Rates

- ¼”  .20 - .28 gal per yd2
- 5/16”  .24 - .30 gal per yd2
- 3/8”  .30 - .42 gal per yd2
- ½”  .38 - .45 gal per yd2

# Sampling Emulsion

- Circulate asphaltic emulsion in the distributor truck before sampling. Take samples from the distributor truck at mid load or from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon.
- Utilize plastic 1 gallon jug, no metal cans. Sample must be submitted in insulated shipping container
- Samples should be tested within 72 hrs.

# Aggregate Spread Rates

¼” 14 – 18 lbs per yd2

5/16” 16 – 22 lbs per yd2

3/8” 20 – 27 lbs per yd2

½” 23 -30 lbs per yd2

# Aggregate Sampling in Field

- Must be taken from belt prior to entering the front hopper of the chip box
- Split samples recommended
- Gradation results need to be shared with contractor immediately

# Chip Box Calibration

Apply over yd2 canvas mat


Weigh and verify rate

# Aggregate Application

Aggregate may be “surface damp” do not allow excessive  water or dusty aggregate

Apply  within 1 to 2 minutes after oil application

Gates must be free of debris allowing an even application of material

Verify Rates

# Rolling

Minimum of two Pneumatic Rollers should be operating at all times that the application exceeds 5ft in width

Minimum of  three passes

Compaction should occur within 5 minutes of application

Back up alarms  should be mandatory on all equipment

Starts and stops must be slow to prevent scarring of the mat

# Meet line broom

Meet line is cut utilizing a kick broom

4” to 6” inches should  be enough

Meet line often exposes oil on the joint

Contractors may leave the oil joint free of aggregate  on short pulls  to expedite process

Sweeping of  the meet line  typically occurs after compaction

# Final Sweeping

Sweeping typically can begin as little as 1 hr or as long as 2 hours after compaction of the aggregate

Emulsion must be fully cured prior to sweeping

Kick brooms or Pick up brooms may be utilized depending of environmental restrictions and  limitations of work area

Water  for dust control is typically required while sweeping uncoated chips

# Chip Seal clean up

Blow sidewalks

Pick up any remaining tar paper

Clean  any overspray

Be sure all drainage inlets are uncovered and free of loose chips

Remove loose gravel signs  and barricades after final sweep is complete and accepted

Complete all punch list items if available

# Hot Applied Binders

# Suitable pavement conditions

Check that surface temperature is at the minimum requirement  and rising

Hot applied binder requires 60 degrees and rising

Can place hot applied binder if rain is in forecast

# Oil/Application

**Viscosity/Temperature**

**Optimum Viscosity**
**1800-2200 @ 375°F, Pa**

**Test Spray Bar On Tar Paper Prior to Initial Application**

**Verify Shot Rates?**

# Terminal Blend/ 76-22TR/R18 application rates/Temperature

- .32 to .40 gal per yd2 for 3/8 aggregate
- .40 to .50 gal per yd 2 for ½ aggregate
- Application temperature 340 degrees to 375 degrees

| | |
|---|---|
| Asphalt | PG 76-22tr / |
| Rubber | R18 |

# 76/22tr

- Terminally manufactured
- First used in the mid 1980's in Texas.
- Introduced to Ca in the 2000's
- heated under a controlled environment in a tank to an elevated temperature fully digesting rubber
- 0-18% rubber content
- No Specialized Equipment Needed!

# Asphalt Rubber (wet process)Plant

- Manufacture binder on or off site
- Customized Binders
- Can supply both Hot Mix and Chip Seal Process
- On site quality control
- 0-22% rubber content
- Agitation Required

# Asphalt Rubber Application rates

- .55 gal to .65 gal yd2 for 3/8 aggregate
- .60 to .70 gal yd2 for ½ aggregate
- Application Temp. 375 degrees to 410 degrees

# Shot Verification

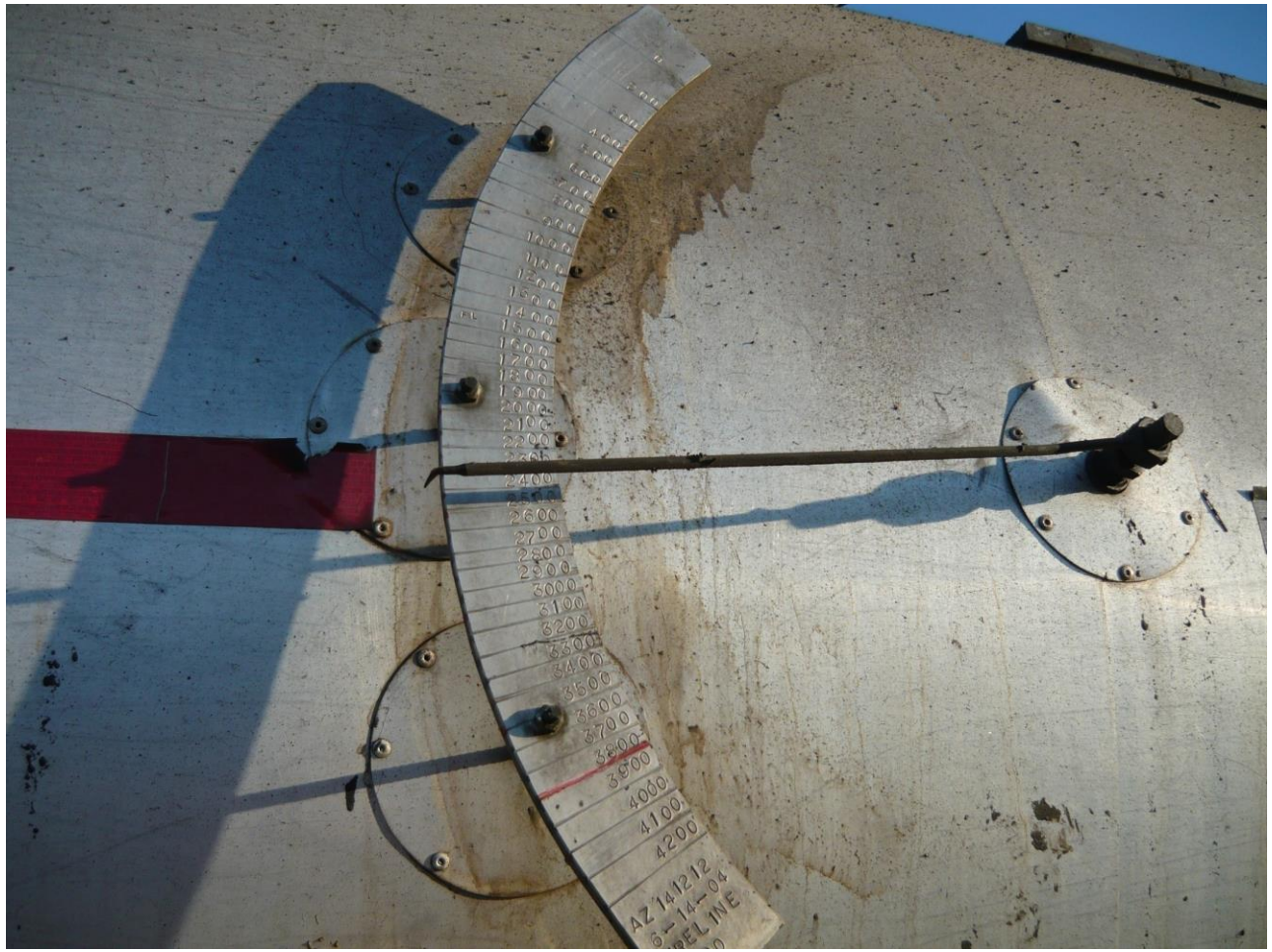
## Stab Tanks

## CT 339

## Float Gauge

Gallons used/yd2

Emulsion is 240 gallons per ton.




POSITIONING
OF TIPS IS
VITAL

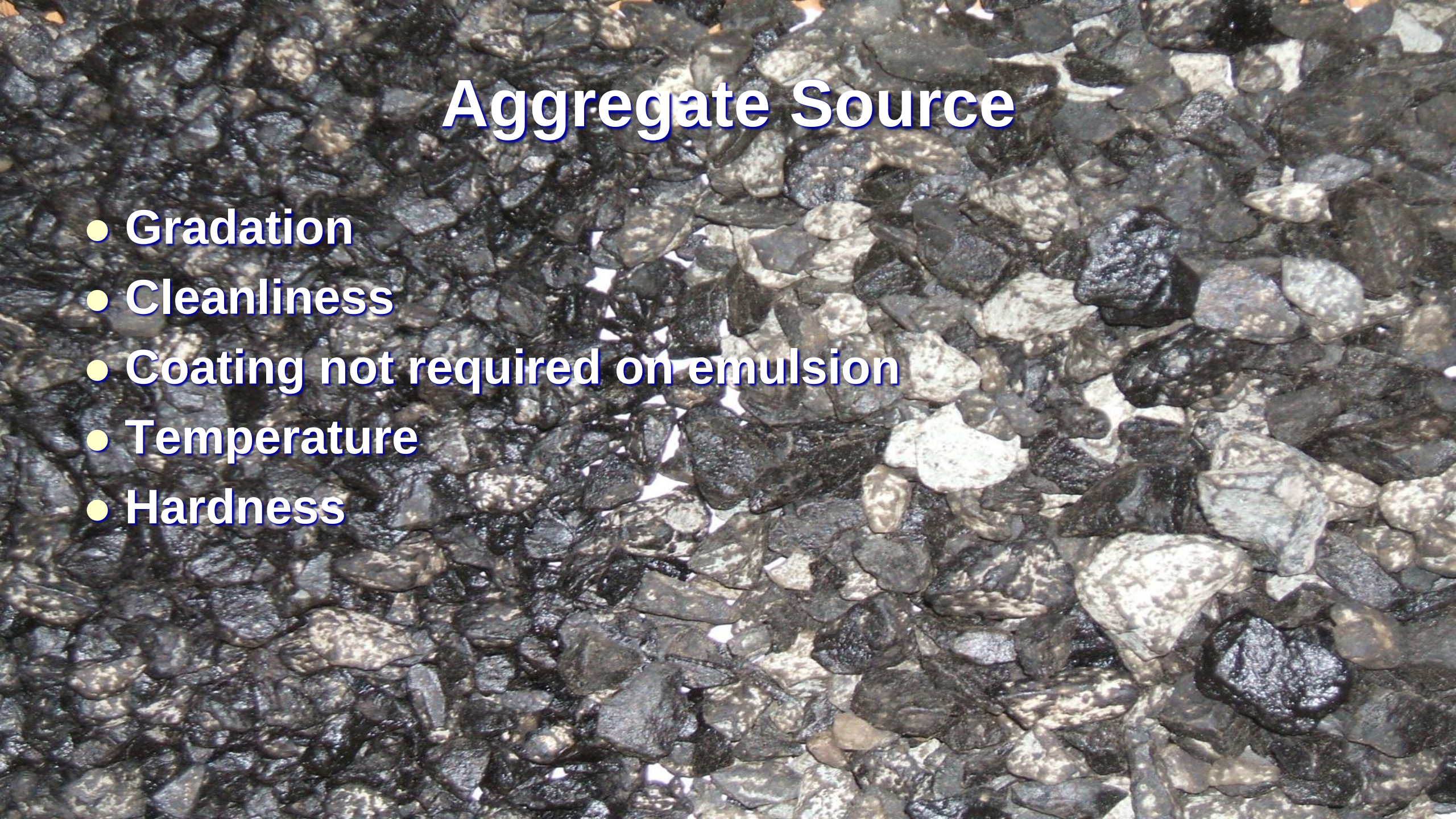
# KNIFED TIPS MAKE A DIFFERENCE!!

# Handwork

Radii and Other Irregular Areas

# Handwork

- Squeegee Out all Oil Joints
- Paper all Starts



# Aggregate Source

- Gradation
- Cleanliness
- Coating not required on emulsion
- Temperature
- Hardness

# COATING CHIPS

- SALT & PEPPER APPEARANCE
- .5% TO 1% ASPHALT COATING
- ANY GRADE OF ASPHALT IS ACCEPTABLE
- HELPS REDUCE FINES
- REDUCES DUST DURING POST SWEEP
- Tarp Loads?/Stockpile?
- 225f to 300f delivered

# Hot Applied Aggregate Application

- 24 lb $yd^2$ - 35 lb $yd^2$
- Distance Between Spreader and Chip-box

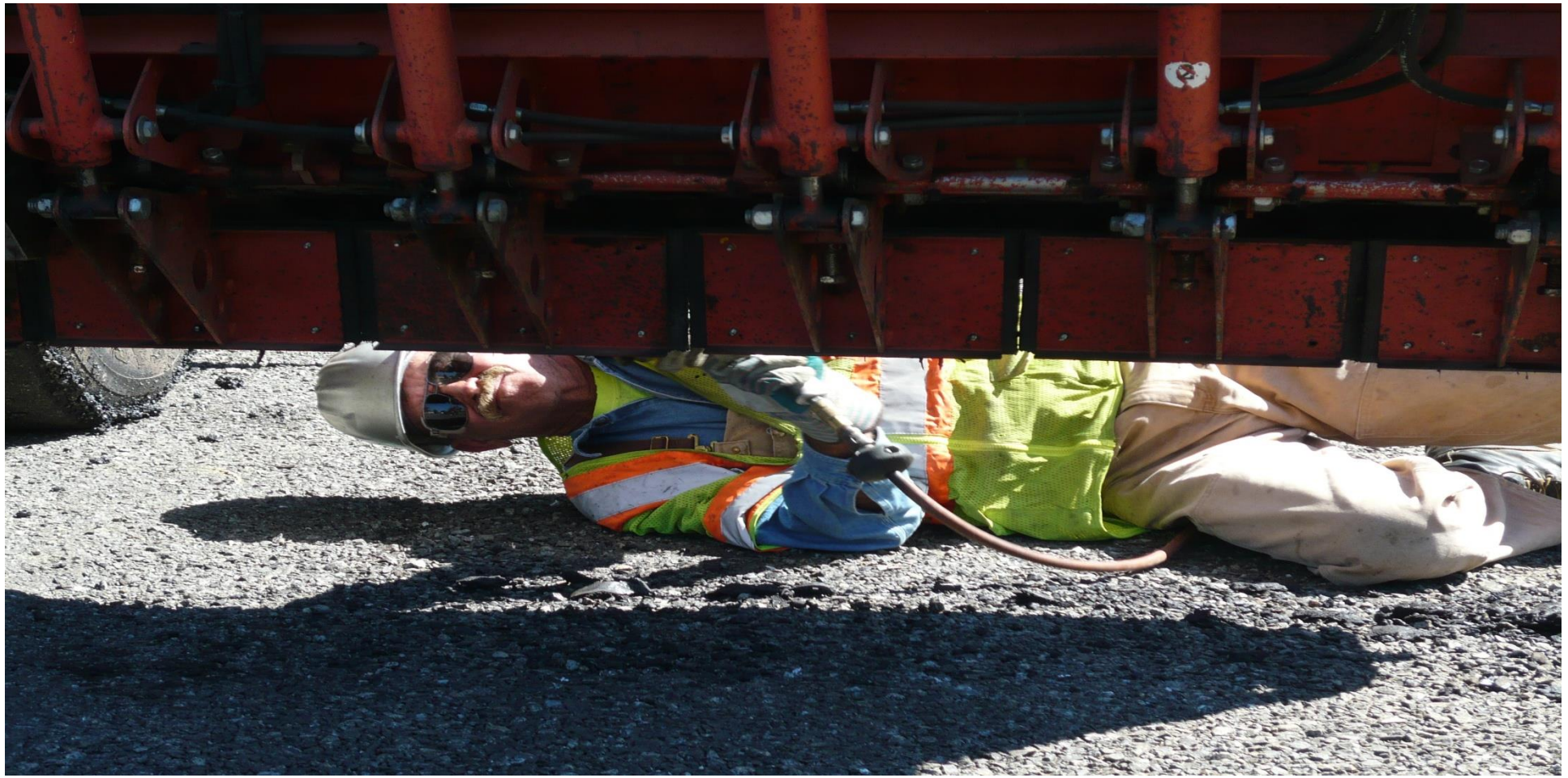
# DIRTY AGGREGATE

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!



# Hot Applied Longitudinal Joint

- "Meet Line"
- 12" Min

# Compaction

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


# Compaction

- Optional
  - Steel Drum

Sweeping

Hot applied

Swept within 15 minutes of placement!