Objectives

- Discuss why we pave
- Types of Asphalt
- Paving systems and equipment
- Paving tasks
Why Do We Pave?

- Replace/Repair pavement and return the street to its normal state
- Replace temporary pavement with permanent pavement
- Because the Agency that owns the street requires us to do so. (City or Cal-Trans)
Types of Asphalt Mix

- Hot mix asphalt

- Cold patch asphalt

Sizes
- Fine $\frac{1}{4}$", $\frac{1}{2}$", $\frac{3}{4}$"
- Medium $\frac{1}{4}$", $\frac{1}{2}$", $\frac{3}{4}$"
- Usually $\frac{1}{2}$", Medium
- When available, use $\frac{1}{4}$" to pave around a manhole
Mix Selection

- $\frac{1}{2}$” medium AC is the standard mix selection for Fremont, Union City, and Newark
Hazards of Hot Asphalt Mix

- Hot mix asphalt temperatures range from 325 to 275 degrees when at the quarry

- This is capable of severely burning a person, even through normal clothing

- The hot mix contains oils that are sticky and can adhere to skin, clothes and equipment
Paving Systems and Equipment
Construction Truck

- Two Types:
  - Equipment ID – 022 Type – 1995 Ford CF7000 (Construction Truck)
    - Vehicle 22 is a truck used for general construction projects, which include easement maintenance
  - Equipment ID – 054 & 055 Type – 2001 Ford F-550 (Construction Truck)
    - Vehicles 54 & 55 are trucks used for general construction projects, which include paving
Tools Used in Paving

- Torch Kit with Gas
- Sand
- Asphalt
- SS1H Emulsion Oil
- Paint Roller and Handle
- Asphalt Roller and Trailer
- Tamping Rammer
- One-Way Plate Compactor
- Emulsion Sprayer
Asphalt Rake (Lute)

- Unique "shark" teeth for precision grading of materials
- Used to level asphalt
- Use grading edge of rake to sift material
- Smooth and level with one pass using opposite side of rake
Paving Tasks
Post No Parking Signs

- Two days prior to paving
- Can be done by a team member or USA person
- Place the signs in a manner that will maximize the work area for the repair crew
- Post signs with stakes or barricades
Order Asphalt

- CS Lead Worker will tell CS Planner/Scheduler in advance the type and amount of AC needed for the job

- CS Lead Worker tells driver what type and how much to get on the day of the job
Obtain Asphalt

- CS Lead Worker or crew member takes dump truck to A.C. plant
  - Soap bed of dump truck
  - Driver notifies the plant via speaker/microphone the company name, vehicle number, type of asphalt and tonnage
  - Drive under hopper till hopper operator signals driver to stop (Red light)
  - Wait until asphalt is placed in dump truck and receive the green light to drive out from underneath the hopper
  - Pick up receipt and check vehicle gross vehicle weight (If overweight, dump some asphalt in the designated area)
  - Place tarp on the load for transport
  - Transport load to jobsite
Call Inspector

- Planner/Scheduler or Crew Leader calls inspector the day before the work is to begin and informs the inspector when and where we are paving.

- The contact information for this is found on the city permit.

- Relays any important information from the inspector to the crew.
Sample Permit (Union City)
Conduct Equipment/Vehicle Pre-Checks

- Complete a Driver's Vehicle Inspection Report
- Check that Truck #54 and/or #55 have paving materials
  - SS1H Oil
  - Oil sprayer (if needed)
  - Rakes
  - Play sand
  - Paint rollers and handles
  - Thermometer
  - Tamping rammer
- Truck #71, #72 or larger with asphalt roller and trailer
Conduct Equipment/Vehicle Pre-Checks

- Verify roller has sufficient fuel and water
- Verify roller is tied down to the trailer
Setup Traffic Control

- Setup traffic control in accordance with the WATCH handbook

- After setting up traffic control, remove the plate if necessary and place in a safe area.
Compaction and Mix Temperature

At paving temperatures, asphalt cement is a lubricating fluid! As it cools, asphalt cement becomes a glue-like binder!
Compaction and Mix Temperature

320 to 260 degrees Fahrenheit – breakdown (largest increase in density)

260 to 240 degrees Fahrenheit – possible tender zone (if tender stay off patch).

240 to 180 degrees Fahrenheit – intermediate rolling.

180 to 150 degrees Fahrenheit – finish rolling.
Oil the Trench
Conduct 1\textsuperscript{st} and 2\textsuperscript{nd} Lift of AC

- Dump a 3" – 4” lift of asphalt into the trench*

\textit{Note: This is a city requirement}
Conduct Final Lift of AC

- Dump your final lift
- AC typically compacts at a rate of $\frac{1}{4}$” per inch
- For example:
  - To obtain a compacted thickness of 2”, the lift would be 2-1/2”
Rake the Final Lift

- Try to rake all the big rock out of your final lift leaving the fines
- Level the surface until you achieve the proper uncompacted height
- Pinch the edges on all sides from the existing AC, inward 2" at a 45 degree angle
- Give it a nice taper
- Fill in any holes or low spots with more AC. Rake off all excess AC from high spots
Environmental Factors Effecting Compaction

- Base conditions
- Mix temperature
- Surface temperature
- Air temperature
- Wind
- Lift thickness
- Shade
- Moisture
Compact AC with Roller
Compact AC with Roller

- Ensure at least 1/2 to 1/8 the roller width is on the existing AC and the other portion of the roller is on the new AC
- This is done for pinching edges
Conduct 2\textsuperscript{nd} Compaction with Roller

- Overlap the existing AC by 6" and work across the trench. On each succeeding pass, overlap your previous pass by 6"
Conduct Final Roll Over Patch

- Continue to roll the patch in the direction of traffic until it is even with existing AC and the patch is smooth.
- Do not roll the patch if the temperature of the AC is below 175 degrees.
- Do not leave any part of the new patch low.
Oil the Edges

- Roll all seams with a paint roller coated with SS1H
- Apply a medium to heavy layer of sand over the wet SS1H
- Apply it lightly over the rest of the patch
- Use a broom to work the sand into the oil and AC
City Inspectors

Looks for:

- Type of AC used
- Temperature of the lifts
- Thickness of lifts
- Even flat trench that follows the curvature of the road
- Big voids within the patch
- Edges are sealed
Pave Around a Manhole

- You would want to jack hammer a 12” wide and 2” depth trench around the manhole casting

- Pinch the outer edge
  - Using a utility compactor (vibrator plate)
  - Working your way in with overlapping passes
  - Rake in front of the utility compactor on the first several passes to ensure edges are correct
Stow Equipment and Remove Traffic Control

- Allow the temperature to reach 160 degrees or less
- If the AC is not ready for traffic, cone the area off and return when it is
- Clean all tools and equipment with torch and/or scraper
  - Clean the dump bed and ditch gates
  - Utility compactor
  - Rakes
  - Shovels
Common Mistakes/Symptoms

- Cracking
  - Caused by rolling with too much water or the patch is still too hot to roll
  - Rake up the AC and start over again
- AC sticking to roller drum
  - Not enough water on the drum
  - Increase water flow
Install a Cold Patch

- Dump the cold patch in the desired hole and fill it about 2” above grade
- Do not pour to grade, always pour the cold patch above grade
- Compact the cold patch with a plate compactor or wheel roll it with a truck tire
PAVING SOPs

- SOP-CS114-1 PAVING
- SOP-CS114-2 OILER/EMULSION SPRAYER
- SOP-CS114-3 PAVEMENT SAW