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WATSONVILLE PRESERVES ROADS IN THREE STEPS

California coastal community extends asphalt pavement life using thin, multilayered pavement preservation methods

By Paul Fournier

The city of Watsonville, Calif., has adopted a three-step preventive maintenance program for its asphalt road pavement system, replacing the costlier mill-and-fill method as the treatment of choice.

Several years ago, officials faced the need to make extensive repairs to the city's road system. While state and local tax revenues were declining, they realized a dramatic change had to be made in the city's approach to asphalt road maintenance and repair. The traditional way of deferring maintenance until pavements were badly cracked, then peeling off a few inches and installing new hot-mix asphalt, was straining the budget.

"Up to then we usually milled off a portion of the pavement and filled in with new hot-mix asphalt or simply overlaid what was there, and we were able to finance the construction with gas-tax money," said Patrice Theriot, P.E., principal engineer for the city's Public Works & Utilities Department (PW&U).

But as tax revenues began to shrink, she noted, so did the PW&U road-maintenance budget. They could no longer afford using asphalt mill-and-fill as the favored treatment.

The 52,000 residents of Watsonville, which is located in the Pajaro Valley farming area near Monterey Bay, are served by a 90-mile network of roads. As principal engineer responsible for maintaining these roads, Theriot wanted an economical way to prevent them from deteriorating to the point where costly repairs and even total reconstruction were required. Pavement preservation thin applications offered a solution.



Valley Slurry Seal crew applies micro surfacing on East Lake Street in Watsonville, Calif., as part of City's three-step pavement preservation program.

Pavement Preservation Solution

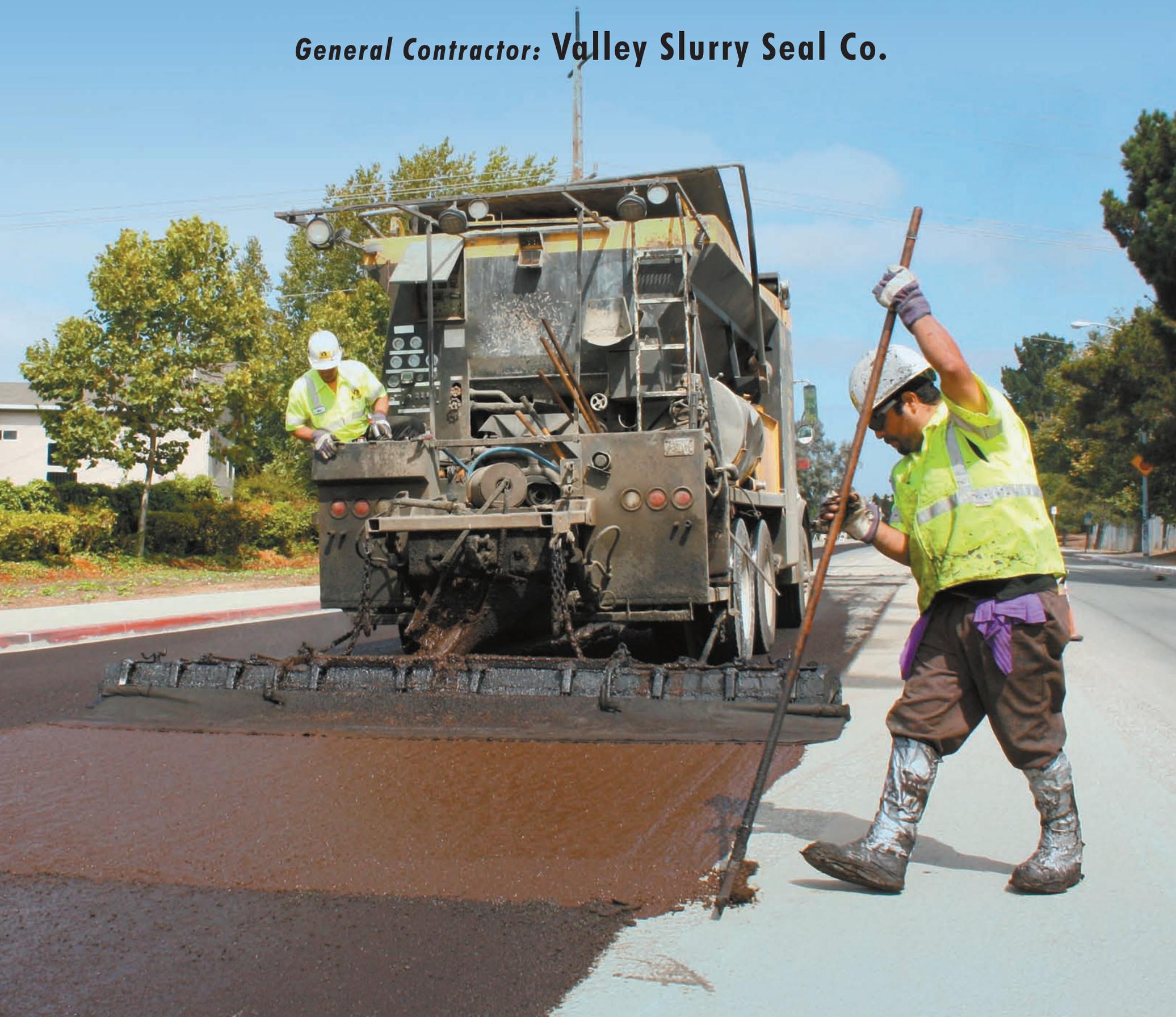
According to the Federal Highway Administration, pavement preservation includes a number of economical preventive maintenance treatments that are applied to pavements whose structural sections are still in good condition and whose surfaces can be restored almost to the original condition. These methods prolong the service life of pavements by coating them with a thin protective surface treatment. But they must be applied to road surfaces that are still in good condition – once structural integrity is lost it's too late for pavement preservation, and other, more expensive methods ranging from mill-and-fill to entire reconstruction become necessary. Such methods as crack sealing, chip sealing, slurry seal, micro surfacing and a combination of these treatments fall under the pavement preservation umbrella.

In 2002, guided by a pavement management program developed by the Metropolitan Transportation Commission – a regional planning organization for roads and transit – and data from a consultant's inventory of road conditions, the PW&U department began to 'cape seal' its most heavily traveled streets.

WATSONVILLE PRESERVES ROADS IN THREE STEPS

Owner: Watsonville (Calif.) Public Works & Utilities

General Contractor: Valley Slurry Seal Co.





A BearCat distributor takes on a load of polymer-modified asphalt emulsion at the VSS Emultech plant.

The treatment consisted of an asphalt emulsion chip seal covered by a slurry seal that was made with asphalt emulsion and Type II stone (100 percent passing No. 4 sieve). This was the first of several increasingly sophisticated treatments as the department's road maintenance approach evolved from one that employed primarily milling and filling to one that uses thin (less than 1-inch total thickness), multilayered pavement preservation applications.

In 2004, encouraged by the performance of thin surface treatments, Theriot called for the department to use a variation of the cape seal. This version consisted of asphalt rubber chip seal utilizing a crumb rubber modified liquid asphalt binder, topped by micro surfacing, a more complex type of slurry seal.

Thin, Workable Micro Surfacing

A cold-mix slurry, micro surfacing is made on the job site by blending mineral aggregate, mineral filler such as portland cement, water, and a polymer-modified asphalt emulsion. It can be used on high-traffic volume roadways, doesn't require rolling and is usually ready to accept traffic within an hour. Since it can be spread to variable thicknesses, micro surfacing is ideal for not only applying wearing courses but for leveling surfaces and filling wheel ruts as well.

Furthermore, since slurry seal, micro surfacing and chip seal are thin treatments, street curb reveal is preserved, and in most cases crews don't have to raise manholes and catch basin structures.

Impressed by these features, Theriot incorporated a combination of surface treatments in the department's 2005 version of pavement preservation – a three-step process that since has become the city's standard treatment for qualified pavement candidates.

Three Steps To Preservation

Designed to replace the more expensive mill-and-fill method, Watsonville's three-step process consists of the following sequence: Using micro-surfacing to fill in wheel path ruts and as a shoulder-to-shoulder leveling course; applying a single layer of chip seal; and placing a wearing course of polymer-modified slurry seal over the chip seal. Asphalt emulsion employed in micro surfacing and slurry seal is a cationic-type modified with styrene-butadiene-rubber (SBR) latex polymer, a synthetic rubber. For chip seal, PW&U specifications allow several alternates including SBR polymer-modified asphalt emulsion or an asphalt-rubber.

PW&U requires that wheel path ruts with depths of 0.5-inch or more be filled using a wheel path depression box (rut-fill box) with a width of between 5 and 6 feet. Micro surfacing used for rut filling and leveling is made with Type III stone (100 percent passing 3/8-inch sieve). A smaller, Type II stone (100 percent passing a No. 4 sieve) is used for wearing courses of SBR polymer-modified slurry seal, while the chip seal contains 0.5-inch stone.

Protecting 85 Streets

In 2009, despite a \$4.5 million shortfall in Watsonville's general fund, the city's three-step work was able to go forward with the help of more than \$1 million in

Stimulus funds via The American Recovery and Reinvestment Act of 2009 from the federal government.

Valley Slurry Seal Co. (VSS), headquartered in West Sacramento, Calif., was awarded the \$1.1 million contract for the work. Key VSS personnel for the project were Mike Wallen, construction division manager; Rick Cross, operations manager; and Victoria Wightman, job superintendent.

The job involved applying about 130,000 square yards of three-step process to 45 streets, and treating an additional 40 streets with 135,000 square yards of micro surfacing only. A Macropaver mixer-spreader applied the micro surfacing and slurry seal. Equipped with a continuous-flow pug mill, this self-propelled machine proportions and mixes ingredients, and applies the finished product to the pavement through a spreader box. It is capable of spreading micro surfacing and slurry seal over an entire lane width.

On roads slated for the three-step treatment, once VSS completed any necessary micro surfacing rut-filling and leveling, a single layer of chip seal was placed by a subcontractor, International Surfacing Systems (ISS) of Modesto, Calif. This crew



The PW&U department seals catch basins before pavement preservation treatments to prevent contamination of watercourses.

employed a BearCat distributor to spray asphalt emulsion on the pavement, and a BearCat spreader to broadcast stone over the emulsion. Crushed stone for the project was supplied by Granite Rock Quarry of Aromas, Calif. ISS followed the spreader with 9- to 10-ton pneumatic rollers to consolidate the chip seal. The crew swept away loose stone the same day.

Finally, VSS workers placed the SBR polymer-modified slurry seal wearing course, using the Macropaver. No rolling was required, and the surface was ready for traffic within an hour.

The Micro-Surfacing Team

The SBR polymer-modified asphalt emulsion used in micro surfacing and slurry sealing was provided by VSS Emultech, which produced the material using SBR latex polymer manufactured by BASF Corporation. VSS Emultech is a sister company of Valley Slurry Seal Co., as is VSS Macropaver, a division of Reed International that produces the Macropaver micro surfacing machine.

Established more than 50 years ago, Valley Slurry Seal Co. is a member of the Associated General Contractors of California. The company's contract with PW&U includes a warranty of 550 calendar days for its materials and workmanship.

Watsonville's Public Works & Utilities department, headed by director David A. Koch, has more than 100 employees. In addition to maintaining the city's roads and streets, PW&U operates the city's wastewater treatment plant and maintains 115 miles of sewers, 18 sewage pump stations, 100 miles of storm drains and 15 stormwater pump stations. The department also collects refuse and recyclables, and operates a 100-ton-per-day landfill that includes a recyclable baling operation. ■

The project involved applying three-step process or micro surfacing only to 85 city streets.

Page 3: Contractor's Macropaver mixer-spreader applies leveling course of micro surfacing containing SBR polymer modified asphalt emulsion on a residential street.

