

# LA Investigates Foamed Asphalt

Thanks to foamed asphalt, it's now a smoother trip on Mt. Lee Drive to the world famous "Hollywood" sign than the road to stardom.

Los Angeles broadened its options in recycling for street maintenance and reconstruction when it investigated foamed asphalt base recycling late last year. The introduction led to enhanced adoption of base recycling via foamed and emulsion methods in 2004. In a demonstration project the LA Department of Public Works, Bureau of Street Services, reconstructed scenic Mt. Lee Drive high above Hollywood from its locked gate in a residential area to its summit at 1,640 ft. And because Mt. Lee Drive provides access to the world famous Hollywood sign above Los Angeles, foamed asphalt now has a new and glamorous application for the record books.

Existing Mt. Lee Drive was a 1.4-mile crazy quilt of crumbled asphalt, heavily alligatored and patched over the years. Also, water coursing across the steep, twisting pavement was causing extensive erosion of the base material, leading to further failure. As an alternative to an asphalt overlay, the city—partnered with Wirtgen America Inc. ([www.wirtgenamerica.com](http://www.wirtgenamerica.com)) and its distributor Nixon-Egli Equipment Company—decided to try in-situ recycling of the existing pavement, using foamed asphalt as the binding agent.

Los Angeles strives to incorporate recycling as a matter of policy in its road and street program. "We're committed to recycling throughout our entire operation," said Bureau of Street Services assistant director Thomas W. Thomas. "Asphalt recycling has been part of our streets program since the mid-1980s, and in addition to our asphalt recycling our Street Tree Division does green waste recycling." Today, the bureau has retro-

fitted its two municipal asphalt plants to increase their capacities to incorporate 20 percent of reclaimed asphalt pavement (RAP) into the asphalt manufactured at these plants. The city also has a contract with a private sector supplier for a 50 percent RAP, 50 percent virgin plant mix, used in all phases of the city's resurfacing program.

But the full-depth, cold-in-place (CIP) foamed asphalt recycling as executed on Mt. Lee Drive represents a new direction for LA. "Cold-in-place is not new, but it's new to the city," Thomas said. "We're always looking to expand our technology. We've been looking for a project that challenges us, and we have one here on Mt. Lee Drive."

Asphalt recycling as a bureau of street services policy is more than just general environmental stewardship; it saves money and keeps residents happy. "It's a win:win proposition," Thomas said.

"There are cost savings in trucking, in congestion relief because trucks stay off the road, and environmental benefits by keeping equipment out of residential areas. And with CIP, at the end of the day, you have a usable, rideable surface."

And for LA, Mt. Lee Drive represents an extreme test of foamed asphalt's utility. "All of the engineering and customer service issues are found here," Thomas said. "We have a narrow roadway, only one way in and out, and restrictions on truck use. It's a place out of the public way in which we can observe foamed asphalt recycling and can establish our ground rules and how it works."

A major aim was to avoid trucking materials in and out, and bringing an excessive number of construction vehicles through a residential neighborhood. Conventional reconstruction would have required digging out surface and base, hauling it away, bringing in new



*A film crew for The Learning Channel's Monster Machines program videotapes a Hamm HD 120 double-drum vibratory compactor hard at work on Mt. Lee Drive.*



base, and paving with asphalt, requiring 30 to 40 trucks a day. With recycling, once the equipment is on-site, the only truck coming in was the oil tank truck once a day.

### Detailed Pavement Investigation

Last year, a detailed pavement investigation and mix design was carried out in conjunction with the city's department of general services standards division, materials testing. Using a Wirtgen WLB 10 Foamed Asphalt Laboratory, road specimens were analyzed by mixing them with various percentages of foamed asphalt to determine the optimum percentage of foamed asphalt to be added to meet the desired design requirement. The outcome was a plan to recycle the existing pavement to a depth of 6 in., while applying three percent foamed asphalt (by mass). The new, completed base then could cure for four days before application of a light tack coat, followed by surface brooming and application of microsurfacing.

The existing pavement width varied from 15 to 24 ft, including pull-outs to permit passage of two vehicles. In general, the pavement was 2.5 to 3.0 in. deep over native sandstone base material, but could be considerably deeper where washouts had required patches in depths of 6 in. or greater. Due to the width limitations on this project, along with some

very tight bends, a smaller oil distributor tanker than normally used was employed.

The project was a collaborative, public/private sector effort. Bureau of street services employees operated the city-provided water and liquid asphalt tankers, and operated the grader and compactors, which were provided by the equipment distributor.

Water and liquid asphalt was provided by the city. The WR 2500 recycler and WLB 10 foam lab was provided by the manufacturer, which also supplied technical personnel. Lastly, the bureau provided the final microsurfacing driving course.

Initial compaction of the recycled material following the WR 2500 recycler was executed by a Hamm 3412 vibratory single drum compactor, followed by a motor grader, which leveled the material. Additional compaction followed by a Hamm HD 120 double-drum roller and finish rolling by a Hamm GRW 18 pneumatic-tired roller. The finished, compacted, recycled pavement then was lightly watered. After moisture was allowed to evaporate from the recycled pavement, the recycled surface was to be sealed by a microsurfacing

process carried out by the city.

Mt. Lee Drive remained open to traffic the entire time. The steep inclines and drop-offs, hair-pin turns, and tight working conditions made for a challenging work environment, but the recycler more than made the grade, so to speak. One of steepest sections was over 200 yd of 25 percent grade. The recycler was still strong enough to push the oil truck and pull the water, even though its rear wheels were working on loose material. The WR2500 features four-wheel drive, each wheel with its own motor and hydraulic pump. "If one wheel comes off the ground, you don't get any slippage or spinning, because the other three are still driven positively by their individual pumps," Marshall said.

LA incorporates materials recycling for streets in other ways, and has been recognized for it. For example, early in 2003, the LA Bureau of Street Services was honored by the FHWA with a 2003 Award for Excellence in Recycling for its program that improves street preservation through the use of a pre-mixed, rubberized slurry seal from recycled tires.

"Slurry seal projects that would take weeks to complete under the conventional method are now completed within eight hours," FHWA said in presenting the award. About 25,900 tires are used for every 100 miles of streets slurry sealed. Now, foamed asphalt is just one more recycling tool the city can use. **GE**



*Mt. Lee Drive presents steep inclines, drop-offs, hair-pin turns, and extremely tight working conditions, all of which add up to a challenging work environment.*