

# TECH TRANSFER

## When the Rubber Hits the Road

By Robert K. Sandwick

For the past five years, Rubberized Emulsion Aggregate Slurry (REAS) has been successfully applied to pavements in Southern California to protect the asphalt of streets and highways as well as parking lots and airports. This relatively new product, which incorporates finely ground rubber from discarded tires, has been well received by cities and counties throughout the state. The City of San Diego has applied 90 million square feet of REAS over the past two years. The Los Angeles County Public Works Department has applied this product to more than 75 million square feet of streets and highways, as well as on all the paved surfaces at El Monte Airport, including runways, taxiways, airplane tie-down areas and parking lots.

### Local agencies report good results from pavement maintenance using Rubberized Asphalt Slurry Seal.

According to Harry W. Stone, Los Angeles County Department of Public Works, test results indicate that REAS "has the potential to decrease the maintenance frequency for recoating asphalt surfaces while providing a highly skid resistant surface." At El Monte Airport, for instance, the surfaces show no wear even though it has been 4 1/2 years since they were applied. The seal coat is continuing to provide uniform coverage and maintain its dark color. Other products used

*This article originally appeared in the Fall 1998 issue of Tech Transfer, the quarterly newsletter of the Technology Transfer Program.*



Access the newsletter at  
[www.techtransfer.berkeley.edu/newsletter](http://www.techtransfer.berkeley.edu/newsletter)

to seal coat the airport pavements have not performed this well over a comparable time period.

To produce REAS, finely ground rubber from discarded tires is introduced into an anionic asphalt emulsion along with a polymer modifier to stabilize viscosity, setting and curing characteristics of the slurry mixture. Obviously this recycling of used tires into a useful product provides an environmental side benefit. One tire finds its way into approximately 750 square feet of REAS. This translates to about 85 old tires being used for one 12 foot lane mile of seal coat.

### Advantages of REAS

Three gradations of aggregate are used for REAS: Fine Aggregate, Type I and Type II. The Type I and Type II aggregate gradation is the same specification used in non-rubber slurry seal and has been used successfully on major highways as well as local streets.

A REAS slurry mix uses twice as much emulsion as is used in conventional slurry seals. A standard wet track abrasion test is necessary to certify the formulation of the REAS slurry mix. The results have exceeded the same tests for the non-rubber emulsion slurry. This translates into a longer life in the field.

Other benefits to REAS include an extremely black color due to the carbon black that is added to the rubber of tires when they are manufactured. The black color of the seal coat is retained for over five years after application and provides a high contrast for painted traffic markings. This in turn provides for safer roads. The added polymers fortify the REAS to provide a superior water barrier to protect the asphalt pavement. Another benefit is protection from the sun's ultra-violet rays, which can deteriorate the underlying asphalt pavement.

REAS is easy to apply. Because it is used with 1/8-inch aggregate rather than 1/4-inch, it forms a thinner layer than non-rubber asphalt emulsion slurry, allowing it to set in the same amount of time as the non-rubber product. This occurs without the addition of an accelerator or retarder which often becomes necessary for non-rubber slurry seal.

Regular slurry seal develops scuff marks caused by tires reacting to power steering. This recurring problem requires frequent returns to the project site to reapply the slurry seal in the scuffed-up areas. Where REAS is used, very few scuffed areas require repairs.

-continued on reverse-

## When the Rubber Hits the Road *(continued)*

REAS may be applied with standard continuous flow slurry seal equipment or by hiring the services of a central mixing plant and its distributor trucks. Application with continuous flow equipment would be the same as applying traditional slurry seal, with an on-board mixer discharging the slurry mix into a screed for uniform application onto the pavement.

### **A Central Mix Plant**

Petrochem Marketing, Inc. has set up a central REAS slurry mix plant located at the Industrial Asphalt site in Irwindale, California. From there the company can dispatch the REAS mix in special trucks with a built-in agitator to keep the material mixed while it is being transported to the job site. A spreader box is attached to the rear of the truck so that the slurry mix can be deposited from the tank for spreading onto the pavement. A water tank and spray bar is also built onto the truck at the front end to dampen the pavement before applying the material.

The advantage of this portable system is that it allows any size project to be slurry sealed, so the local agency can rent the necessary equipment and perform the application when desired. The local agency does not need to maintain a stockpile of aggregate near the project. The installation of more REAS slurry mix plants in California is planned.

What is the life of REAS compared to traditional slurry seal? Joel Halbert,

recently retired as Materials Engineer for the City of San Diego, has been involved with the use of this product on San Diego's streets. He states that the nearest source of crushed granite aggregate suitable for slurry seal was in the Riverside area, some 90 miles away. Before REAS, Mr. Halbert said, San Diego had to reseal pavement after 3 or 4 years. But test strips of REAS placed about 4 1/2 years ago in San Diego still retain the black seal coat, and it appears that the seal will last at least 6 years. Mr. Halbert stated that the extended life of REAS over the long haul outweighs the fact that it costs approximately 15% more than traditional slurry seal. For that reason, the City of San Diego is spending \$5 million dollars per year for its Rubberized Emulsion Asphalt Slurry Program.

### **Specs Available**

The 1998 Supplement of the "Standard Specifications for Public Works Construction" (Green Book) has added Section 600-3.2 Rubberized Emulsion - Aggregate Slurry to the Specifications. The Supplement may be purchased from Building News, 1612 South Clementine Street, Anaheim, CA 92802. The phone number is (714) 517-0970.

To summarize, it appears that the REAS slurry seal is truly a miracle product which provides many benefits, including the diversion of used tires from waste sites back to the streets. Another advantage is that the long-lasting, thinner, tighter, emulsion-rich, continuously black product creates a blacker

surface. This provides a superior contrast with pavement markings, making them easier to see, which in turn leads to safer streets and highways for the motoring public. REAS is also more cost-effective as an asphalt pavement protection material than normal slurry seal.

For all these reasons, we shall probably see more rubber hitting the roads in the near future.