State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS

Date: November 26, 2002

File: 345.1

Original Signed by
BRENT FELKER

From: BRENT FELKER
Chief Engineer

Subject: Tire Shreds in Civil Engineering Applications

The California Department of Transportation (Department), in an effort to be good stewards of our resources and environment, has established a variety of uses for recycled content tire products in engineering applications on our transportation projects. As these products and applications have shown promising results, the Department encourages you to look for additional opportunities to incorporate recycled content tire products in your transportation projects.

The Department has successfully used rubberized asphalt concrete (RAC) as a pavement rehabilitation strategy for numerous years. A recent pilot to emphasize the end result of RAC projects offers substantial latitude to the contractor in terms of the means and methods for installation of RAC. Additionally, this pilot requires the contractors to warranty their work for a specified period of time. It is hopeful that the latitude provided to the contractor will ultimately result in streamlined construction practices that will lower costs for these pavement strategies. Please encourage your staff to continue to consider utilizing RAC for their pavement strategies. Lifecycle cost analyses should always be performed for the various pavement rehabilitation alternatives to determine which is most beneficial to the Department, as RAC often is.

The use of tire shreds as lightweight fill has also been identified as an excellent engineering application that uses substantial numbers of waste tires, removing them from landfills and stockpiles. This was evident on the Dixon Landing Project in District 4 where 660,000 waste tires were used to construct a 220 m embankment (a very large number of tires for a relatively small embankment). Because of settlement issues with the existing soil, lightweight fill was a necessary consideration in the design of the embankment. Additional advantages to using tire shreds were that they were easily compressed, free draining, increased slope stability and a more economical alternative to conventional lightweight materials. The unit cost for tire shreds at this installation was 45 percent less than the unit cost for the equivalent conventional lightweight aggregate.

Another innovative application for tire shreds is being evaluated behind retaining walls. District 8 will be placing tire shreds behind a test section of retaining wall in one of their projects later this year. This test section will be instrumented with monitoring devices to measure the pressure of the tire shreds on the retaining wall. Studies have indicated that the pressures against the retaining wall should be substantially less than that with conventional backfill materials. If this test section proves as expected, future retaining walls can be designed to be smaller as the loads on them will be reduced. Smaller walls will require less material, again resulting in cost savings.

The Department, working in partnership with the California Integrated Waste Management Board and University of California, Davis, is actively studying the potential for use of tire shreds as fill material behind abutments. The seismic characteristics of tire shreds are being evaluated along with how the material behaves in conjunction with the structure. The Department is anxious for the team to conclude their studies and evaluation of this application.

These initial steps taken to evaluate non-traditional materials in innovative applications has the potential of satisfying engineering needs for the Department, reducing the cost of our transportation systems, and having a positive impact on the environment by diverting materials from the waste stream. If your district has the opportunity to incorporate these innovations into your projects or to develop innovations of your own, you will meet the challenge extended to you under the Department's resource conservation and stewardship goals.

c: Pavement Steering Committee
Design Quality Management Board

bc: Brent Felker
Tony Harris
Karla Sutliff
Tim Craggs
Linda Fong

LFONG:lfong/dtafoya

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