Tire Bale
Slope Failure Repair
Synopsis

March, 2004

TxDOT's Fort Worth District embarked upon a recycling mission in 2001 to find a way to use baled scrap tires. Taking up the Texas Legislature's mandate to increase the use of scrap vehicle tires in highway applications, the District's Construction and Maintenance Recycling Coordinator, Richard Williammee, P.E., investigated using tire bales as a possible repair method for slope failures resulting from higher than normal rainfall in the area. Tire bales had previously been used in the nation as a roadbed foundation and to prevent channel erosion.

A slope failure site was identified on Interstate 30 east of Fort Worth. Although no funds had been budgeted for such a project, possible donations of tire bales and baling services were identified, along with a free demonstration of vertical tire baling equipment by a vendor from Minnesota. The Texas Transportation Commission approved the acceptance of the donations as well as the use of the TxDOT Arlington Maintenance yard as the baling and storage site for the repair project.

The project was carried out in several phases between February 2002 and August 2002. A total of 360 tire bales were used containing on average 100 scrap tires per bale for a total of approximately 36,000 scrap tires. Once all of the tire bales were in place, the slope was completely covered up and shaped to its' original condition. A company was hired to supply and spread compost and seed in order to stimulate vegetation growth to minimize future surface slope erosion.

As of mid-October 2002, the Ft. Worth area had received almost 50 inches of rain since placement of the first tire bales in mid-February. A site visit at that time revealed some small cracks developing along the top ridge of the slope. A geotechnical engineer under contract to the Fort Worth office was hired to perform a preliminary slope stability analysis of the final product. Initial analysis revealed that the use of tire bales instead of the original soil slope had improved the Factor of Safety by 2-3 times.

Post-evaluation of the project identified a few items that can maximize success in using tire bales for future slope failure repairs. Periodic monitoring has shown no evidence of a repeat failure. The District is stockpiling additional bales for use in a future failure and has been awarded an Implementation Project by the ROC (Research Oversight Committee) to repair and instrument the next site for a more detailed evaluation of the tire bales and their benefit to slope retention.