

Twelve Years and Counting: Recycled Streets Still Going Strong in Stephenville

By: Cement Council of Texas

Officials at the City of Stephenville, Texas, are delighted that their cement-recycled streets have provided outstanding service for the past twelve years. "They've not had to re-work any of the bases that we've [cement] stabilized," says Sanford LaHue Jr, consulting engineer, Schrickel, Rollins and Associates, Arlington.

Stephenville uses a process called Full-Depth Reclamation (FDR) to recycle failed streets by pulverizing and mixing the old asphalt and base, and blending it with cement to create a new stabilized base. The new base is then surfaced to provide a long-lasting pavement at a fraction of the cost of usual pavement reconstruction.

LaHue designed the city's first recycled streets in 1992 after the city experienced base failures and potholes. The street reconstruction program initially included visual evaluations of the condition of the streets to determine which streets would require rehabilitation. When a pavement had experienced only minor cracking, workers placed a standard asphalt overlay on the street. LaHue recommended FDR wherever the base had failed.

His evaluation and the decisions made allowed the city to rehabilitate as many streets as possible. But over the years, LaHue observed serious deterioration in the streets that had received a simple overlay, while the cement recycled streets held firm. He began to specify FDR with cement for all of the streets. "From 2000 on, we stopped straight overlays and just did cement recycling," says LaHue.

"Recycling with cement is our preferred option for street rehabilitation," says Drew Wells, Stephenville's Director of Community Services. Stopgap surface treatments with overlays have proven "very unpredictable and unreliable. We've had some differing results," he adds. But all the cement recycled streets have produced a "very favorable outcome," says Wells. "It has been the best process for us."

The city begins the pavement recycling process by sampling the material from streets targeted for rehabilitation to determine the right amount of cement to use. City specifications require contractors to pulverize the existing asphalt surface and base six inches deep, and then blend in 25 lbs. per square yard (or 5% by dry weight) of cement. Streets with good base and surface materials require less cement than those with marginal materials.



Reclaimer pulverizes the existing street. One or two passes usually achieves gradation requirements.

After adding water to obtain the right moisture for compaction, the streets are re-shaped, compacted and bladed to final elevation. The cement-stabilized base layer is moist cured until a prime coat is applied. A 1 1/2-inch asphalt surface finishes the street.

Because the city is recycling existing roadway materials, there is no need to import new aggregate. Recycling eliminates the need to haul existing roadbed material to landfills or to bring in new base.



Motorgrader operator re-shapes the street after adding cement to the existing pulverized material.

The added cement increases the volume of the original pavement materials slightly. "On most of the streets this extra volume is used to restore the crown on the streets. However, if excessive crown is a problem, the excess material will have to be hauled off", says LaHue. The profile of the street basically remains the same as before. "You're not overlaying the gutters and you're not changing the drainage," he adds.

FDR with cement is a process that most contractors are equipped to do. "It's easy to get contractors to install, it's easy to inspect, and once you get your gradation, it's easy to control," LaHue adds. "Quality control is not a big issue because the mixing process and the cement just work so well."

Stephenville street superintendent Tony Gonzales agrees. "It's a simple process," says the 17-year veteran of the city's street department. The process has "saved us a lot of money that we can use to do curb and gutter work," he adds.

"We are beginning to see relief in our maintenance budget because our maintenance calls are a lot fewer. The maintenance on streets has been reduced and this frees us up to do other maintenance functions."

Unlike other road reconstruction processes, the cost of FDR with cement has not risen dramatically over the years. City of Stephenville bid tabulations from 1992 show that costs then were \$2.60 per square yard. In 2003, the cost rose to only \$3.40 per square yard, according to records provided by LaHue.

The confidence LaHue and city officials have in cement recycling became evident when the city was faced with rehabilitating a major thoroughfare. In 1994, TxDOT discontinued its role in maintaining Harbin Street, a major high volume collector road through Stephenville. LaHue decided to lower the pulverization depth to 8 inches and use 32 lbs per square yard of cement. A two-inch asphalt surface completed the work. Since its completion in 1995, the highly trafficked street has experienced "no base failures," says LaHue. "It handles the traffic loads very well."

The speed of construction is also a big plus, says Gonzales. Crews begin the process early in the morning and finish recycling before residents come home from work. "We never close the streets," says Gonzales. "I've become a big believer in cement."

Compared to traditional remove and replace construction, "the inconvenience to residents is a lot less" says Rick Brockington, president, Brock Paving Industries of Roanoke, Texas. Brock Paving began recycling with cement in 1990. Brockington says cement recycling gives cities on tight budgets "more bang for the buck." The company won the 2004 contract to rehabilitate Stephenville's streets.

The decision to recycle has not gone unnoted by Stephenville residents. Says Wells: "Folks have been pretty appreciative that we're being proactive rather than reactive."



Steel-wheeled vibratory roller compacts the reclaimed base to 95% standard Proctor density.

More Information

PCA offers a broad range of resources on soil-cement and roller-compacted concrete applications for pavements. Visit our Web site at www.cement.org/pavements for design and construction guidelines, technical support, and research on cement-modified soils, cement-treated base, and full-depth reclamation.

For local support, tap into the cement industry's network of regional groups covering the United States. Contact information is available at www.cement.org/local.



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