

Full-Depth Reclamation with Cement Stabilization

Rehabbing ball field roadway and parking areas.

By Ariel Soriano

Chattanooga, TN, has over 1,200 centerline miles of roadway and numerous paved areas to manage. Like many municipalities in the United States, Chattanooga maintains and rehabilitates this massive infrastructure with limited resources and funding. To extend available resources, the city is evaluating and implementing the use of innovative materials and methods to extend the service lives of existing pavements and push the design lives for new projects from 20 years to 30 to 50 years. Two methodologies evaluated and implemented by Chattanooga are full-depth reclamation (FDR) and FDR with cement stabilization (FDRC).

FDR and FDRC both use a pavement reclaimer to pulverize the existing

Cost Comparison—Conventional Construction & FDRC

Conventional Construction

Remove existing pavement materials
Prepare subgrade
Build new conventional pavement structure (6 in. aggregate base, 3 in. asphalt surfacing)
~2 to 3 weeks
~\$130,000

FDRC

Materials cost: \$15,388
Staff & equipment cost: \$26,875
5-day construction: 3 days reclaiming/grading/mixing cement/compacting; 2 days paving

\$42,263

FDRC was about 33 percent the cost of conventional construction.

pavement structure to some predetermined depth. The reclaimed material, which normally requires some water

in addition to bring the material up to its optimum moisture content, is then graded and compacted in-place to form a new aggregate base or subbase as part of a new pavement structure. FDRC involves incorporating three to five percent (by weight) Type I portland cement and water with the pulverized material into a relatively consistent mixture. The resulting material may then be graded and compacted in place to form a new stabilized base or subbase for the new pavement structure. In both cases, hauling away existing material and exposing the subgrade to potential precipitation is minimized or eliminated.

Chattanooga was given the task of rehabilitating the roadway and parking areas of the Hixson Ball Fields. Fortunately, the city had just purchased a Model AZ-480HD Asphalt Zipper (www.govengr.com/zipper), which made it possible to perform either FDR or FDRC in-house with its own grading and paving work force. Since the area is founded on silty clay soil and is often subjected to flooding, choosing a pavement structure resistant to water infiltra-



The roadway and parking areas surrounding Hixson Ball Fields evidenced severe distress and poor drainage.

tion and subsequent weakening was imperative. Therefore, the city chose FDRC to rehabilitate the 44,000-sq ft paved areas, which consisted of about two in. of asphalt surfacing over about four in. of aggregate base stone.

To establish water flow off the parking and roadway areas, the pavement was reclaimed to a depth of eight in. and the resulting material was graded and compacted to achieve sheet flow off the pavement. When the initial grading was completed, cement was distributed over the area at a rate of about three percent by weight of reclaimed material (~24 lb/sq yd) City crews connected a water truck to the Asphalt Zipper's distributor bar and made another pass to mix the cement, water, and reclaimed material. Finish grading and final compaction were completed within a few hours following the mixing operation. The entire process took about three days. Within a few days, a two in. Tennessee Department of Transportation 411 Grade E asphalt surface was placed on the stabilized base course and subsequently striped to finish off the project.



The pavement reclaimer pulverizes the existing pavement structure to a predetermined depth. The resulting material is graded and compacted in-place to form a new base or subbase.

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Asphalt Recycling in Michigan

In Michigan, the Asphalt Zipper size and cost have given local agencies a tool for rebuilding deteriorated roadways that was previously only available through contractors using specialized machinery. The manufacturer (www.asphaltzipper.com) offers five models from 99 to 185 hp and 18 to 48-in. widths at a price range from \$70,000 to \$98,000. The smallest model weighs 4,500 lb and can be run on a backhoe, while the largest, at 7,900 lb, is run from a loader.

Craig Kelso, Mackinac County Engineer uses the Asphalt Zipper and says, "I was just so impressed that the Asphalt Zipper saves so many steps, wasted material, and time. The Commission has wanted to salvage, reclaim, and recycle asphalt for quite some time, but they had few options. Without this type of machinery, all we could do is use an excavator to remove the asphalt surface, and maybe take it back to the plant for crushing. It is a cumbersome process, and we have lost our resources out of the road. The Asphalt Zipper gives us the expedience of using materials on-site. It helps us get the road ready for surfacing faster and achieve a better product when we are done. I have looked for something that would help me get the results I need, and the Asphalt Zipper has been just that."

Pulverizers/recyclers can be used for:

- FDR
- Base stabilization with cement, lime, or other binders
- Mechanical stabilization with or without adding base materials
- Utility cuts without material removal
- Patching
- Shoulder reconstruction
- Bridge deck rehabilitation
- Parking lot reconstruction or removal

According to the manufacturer, the Asphalt Zipper can cut and pulverize up to 1,000 linear ft per hour; cuts up to 12-in. thick asphalt, and leaves sub-in. material behind. Several Michigan agencies and their contractors have experience with this machine and report outstanding results. For further information, contact Derek Haynie at 801-847-3202 or dhaynie@asphaltzipper.com.

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