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Portland Cement Association
Southeast Region
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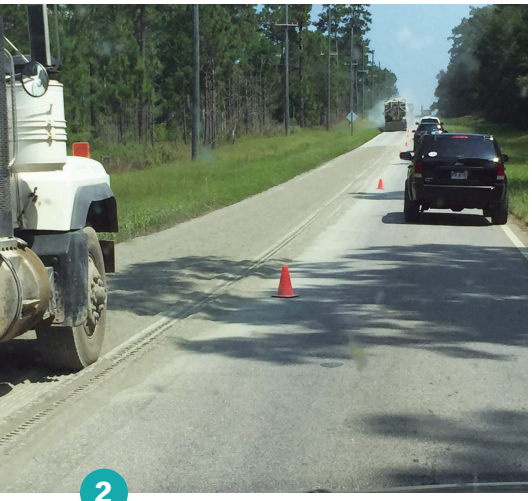
Full-Depth Reclamation (FDR) Depth Increased and Saves over $1 Million on Metcalf Road in Thomasville, Georgia

1 Local officials attend open house



2 Cement spread on top of pavement

3 FDR reclaimer commences

Thomas County, Georgia, planned a roadway improvement for 10 miles of Metcalf Road in Thomasville, involving eight inches of full-depth reclamation (FDR) with cement and a two-inch asphalt surface course. However, the engineering consultant recommended increasing the pavement surface to three inches. The estimated cost of that extra inch of asphalt increased the cost by nearly $1 million more than the funding dedicated for it. PCA-SE worked with Thomas County to redesign the project and recommended increasing the FDR depth to 10 inches. This relieved the need for that extra inch of asphalt, saved the County more than $1 million and allowed the project to proceed.

On July 21, 2015, 40 local public works officials, consulting engineers, and Georgia Department of Transportation (GDOT) officials gathered in Thomasville for a FDR Open House of Metcalf Road. PCA-SE staff conducted a project tour and gave detailed information on how the FDR process works and its benefits.

Metcalf Road is located in a portion of remote southern Georgia where large capital projects, such as these are rare. There are 125,000 centerline miles of roadway in Georgia. The GDOT directly maintains 25,000 miles of interstates and state routes while the cities and counties maintain the additional 100,000 miles of roads. Local road projects are funded through a grant system run by GDOT and by the use of Special Local Option Sales Tax (SPLOST) managed by local officials.

Metcalf Road was historically lightly traveled and was, in fact, originally a farm-to-market road. In recent years, several large tracks of land were formed into quail hunting plantations along Metcalf. Additionally, a logging operation on the south end of the road began to routinely operate 30-plus heavily loaded tractor trailers per day. All of this traffic began to take its toll on Metcalf Road, pushing it well beyond its design and construction limits.

Thomas County Public Works Manager Tony Wooten attended a similar open house in neighboring Grady County and became familiar with the FDR process. This convinced him that FDR should be used to reconstruct Metcalf Road and he pursued a plan to rebuild the road.

The $3.4 million dollar project was bid earlier this year. Thomas County broke up the project into two different contracts. One for the FDR of the roadway and the other the hot-mix asphalt (HMA) paving that would follow the reclamation process.

Due to heavy truck traffic on Metcalf Road, the new cement-stabilized base was designed a bit thicker than normal. The FDR contract called for a 10-inch FDR base using 55 pounds of portland cement per square yard. The contract also called for the roadway to receive a prime coat of emulsion at the end of each day's work, followed by a dusting of sand to prevent damage to local traffic. All of the FDR work was performed under traffic utilizing a pilot vehicle to route traffic around the ongoing work, thereby never closing the road.

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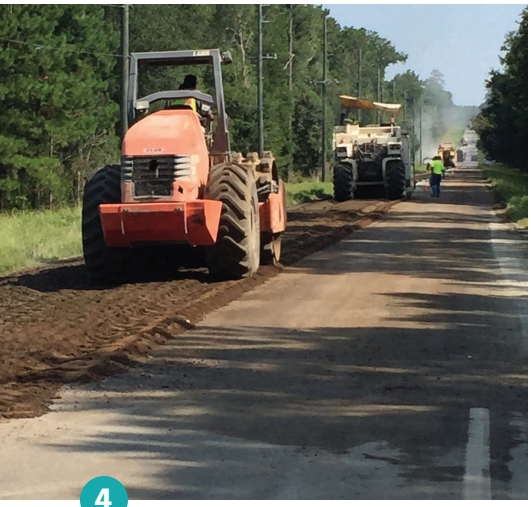
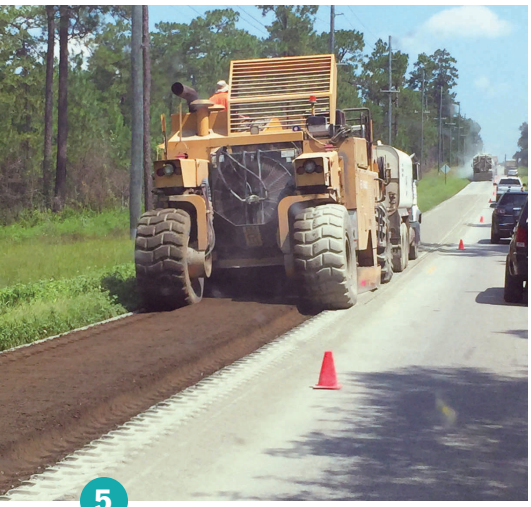


4 Sheepsfoot roller compacting FDR



5 FDR performed under traffic

6 Attendees observe FDR process

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Pavement Applications Director–Georgia
Portland Cement Association SE Region

ACPA-SE member Blount Construction (Marietta) was the successful low bidder on the FDR portion.

The pavement, bid under a separate contract, called for a two-inch lift of 12.5 mm HMA; with the understanding that an additional one-inch overlay could be added later should the county DOT deem it necessary.

The FDR portion commenced in early July and took four weeks to complete. The open house was the perfect opportunity to display to the local officials the efficiency of the FDR process and all of its benefits. The Metcalf Road Open House has stimulated a buzz regarding future FDR use for road construction. At least two additional public works officials are now planning projects that include using FDR.

Typical Construction Sequence of Full-Depth Reclamation with Portland Cement

1. **Investigate existing pavement:** To ensure that the final results are optimized, always investigate the existing pavement structure and subgrade prior to reclamation. Typically, samples of the pavement and subgrade are collected to the desired depth of reclamation and tested by a qualified testing laboratory to determine the appropriate rate of Portland cement addition. Either too much or too little cement may reduce the quality of the final product.
2. **Plan operation to ensure a well coordinated job:** Mixing, curing, and paving operations should be sequenced to minimize traffic disruptions and cover the FDR in a timely manner. Although FDR base can carry traffic for a week or more with only a chip-seal treatment, extended exposure without further paving is not recommended.
3. **Begin FDR by pulverizing existing pavement:** As a first step, it is recommended that the existing pavement be pulverized to the desired depth using the pavement reclaimer. The maximum particle size after pulverization varies with different specifications, but is generally required to be 2 inches or less. The contractor may elect to add some water at this stage to reduce dust and ease initial shaping, as was done on this project.
4. **Roughly reshape the pulverized pavement:** A motor grader and sheepsfoot roller are used to roughly regrade the base and prepare it to receive Portland cement.
5. **Spread Portland cement:** Cement is spread with a spreader that is calibrated to deliver the specified amount of cement within tight tolerances. (Typically +/- 5 percent.) Actual spread rate should be measured in the field by testing technicians periodically during construction.
6. **Mix cement, water, and pulverized pavement:** The reclaimer will make a second pass to mix the cement and pulverized pavement. The reclaimer will also use an attached water tanker to simultaneously bring the final mixture to the appropriate moisture content as determined in Step 1.
7. **Compaction and fine grading:** The sheepsfoot roller is used to compact the reclaimed mixture. The motor grader works in tandem to achieve deep compaction while maintaining the desired elevation. Once initial compaction is achieved, the motor grader and vibratory steel wheel roller will complete the fine grading operation and provide a smooth surface ready for overlay. This step is critical in achieving a smooth base that is ready to receive further overlay.