

# When They Said We Could Repair Our Asphalt Roads with Portland Cement, We Laughed!

Like most counties, Houston and Choctaw Counties in Alabama have their share of older asphalt roads that are failing due to age and lack of proper engineering. Additionally, skyrocketing fuel, asphalt and labor costs represent a larger share of their budgets.

Traditional road repair methods were quickly becoming a financial burden to the counties. Peeling up stretches of deteriorated asphalt, loading it onto trucks, hauling it off to dump it and hauling in new base was costing them not only money but precious time and labor.

They needed to find a better, faster, cheaper solution to their county road repairs. And, that solution needed to include longer-lasting roads.

That's when county engineer, Mark Pool and assistant engineer, Barkley Kirkland, discovered Full-Depth Reclamation (FDR) with Portland cement.

These engineers were already familiar with the benefits of FDR where the road surface is blended with a portion of the base. They learned that by adding Portland cement to the surface of the road before reclaiming, they could make a better, longer lasting repair.

Key to making this process economical was the purchase of an Asphalt Zipper, a portable asphalt reclaimer that mounts on the bucket of a front-end loader. The model they chose features a 4-foot cutting head and a 185 hp diesel engine.

At first, the county applied cement from bags from the back of a truck. They soon realized that they needed a faster and more accurate and efficient way for the cement application. This was resolved by using a spreader box that fits on the rear of their dump truck. It allowed them to accurately meter the amount of cement they need—usually about 1/2 inch for 6"-8" of depth.

After spreading the Portland cement on the road surface, they pulverize the old asphalt with the Asphalt Zipper and mix the Portland cement and asphalt with an inch or two of the base. Water is injected from a water truck through the Asphalt Zipper's onboard spray bar during the reclamation process. The road is then graded and compacted and left to cure for a day or two.

The finished road base is very solid and will continue to strengthen for years to come. A wear course of asphalt or chipseal can then be applied for a beautiful, smooth road that will last for many years.

But does this process save Houston County the time and money they were hoping for? Assistant engineer, Barkley Kirkland smiled and said, "Oh, yeah, we can get a lot more done now. What used to take us two days to do, we can now get done in half a day! And we get a better road."

Garry Grantham of Choctaw County, has discovered that FDR with cement is the best way to



repair their older, damaged roads, too. Once the cement has cured they have found great success simply paving the reclaimed road with chipseal instead of asphalt.

When asked why chip seal instead of an asphalt surface, Grantham answered, "After we do Full-Depth Reclamation on the road and compact it well, the road base is often so solid that chip seal is all it needs. But the biggest reason is savings. With the high cost of asphalt, we can do more roads using chip seal. We find we save over \$10,000 per mile using chip seal instead of asphalt!"

"We're saving at least 50% in material costs and doing it all in one third of the time. When you can get the same or even better results in only a couple of days compared to what would have taken us a couple of weeks, everyone is better off."

Grantham sums it up, "We can only put off projects so long. The work has to be done. We've got to be looking for ways to be more productive and efficient, and right now Full-Depth Reclamation is an affordable long-term solution that really works."

# The Franklin County Story

## Stretching the Dollar in Tough Times

With shrinking budgets compounded by increased costs of maintaining county roads, many counties are looking toward alternative solutions. No longer can counties afford extensive asphalt overlay programs; instead, many counties are delaying maintenance as they search for funding. With delayed maintenance comes magnified deterioration. The answer to this deterioration is Full-Depth Reclamation (FDR) with cement.



David Palmer, Franklin County Engineer

FDR with cement is a mixture of the in-place asphalt pavement, existing base, cement and water. The mixture is then compacted and surfaced. With a strong base, the option of a cost-saving chip seal becomes a reality.

The pioneer for FDR with cement in Alabama is David Palmer, Franklin County Engineer. "I began reclaiming my roadways with cement in 2002. After only limited success with incorporating aggregate with my reclaimer, I began using cement. To date I have reclaimed over 50 miles of roadway in my county; my reclaimer is my most valuable piece of equipment," said Palmer.

Today over 20 counties in Alabama are using cement to stabilize deteriorated roadways. Not only is it the most cost effective solution but it is the quickest and most durable.

# The Road Recycled

## Full-Depth Reclamation with Cement

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Full-Depth Reclamation with Cement

# The Miller Group Exceeds Expectations in Macon County



1.938 mile project was completed in 3 days. The depth of mixing was 6.5" at a rate of 21-lbs/yd<sup>2</sup> of cement. The reclaiming portion of the project cost \$3.96 yd<sup>2</sup>.

The project was a constant open house being visited by 7 county engineers and numerous (33) ALDOT engineers and technicians.

"I was not aware that there was equipment available to reclaim an entire lane in one pass. I was expecting to see two reclaimers working in tandem to reclaim a single lane, similar to what I had seen on other projects," said David Bollie, ALDOT Assistant 6th Division Engineer. "We learned that the reclaimer was an asphalt milling machine that had been retrofitted to perform Full-Depth Reclamation. I was also expecting to see the reclaimer stop and wait for the water truck to unhook, refill and rehook. We also learned that the reclaimer had been retrofitted with a water reservoir," said Bollie.

"We were well satisfied with the work of APAC and were favorably impressed with the work of the Miller Group. We see a lot of potential for Full-Depth Reclamation using Portland cement in Macon County," said Dennis Bradford, Macon County Engineer.

The Miller Group, out of Morrow Georgia, was the contractor on the project.



Left to right: Dennis Bradford, Macon County Engineer; Andrew D. Thompson, County Commissioner.

# Chambers County Uses ALDOT Funding



It was becoming hard to distinguish between the patches and the original surface treatment on Chambers County Road #1389. After much

discussion as to how to fix the roadway, it was decided to reclaim the asphalt and base by incorporating cement. In May of 2008, Chambers County became the first county in Alabama to let a FDR with cement project using ALDOT funding.

Lyndi Davis Blackburn, Assistant Materials and Tests Engineer, was responsible for developing a specification that could be used for the project. "I had only read about FDR in magazines; however, it was obvious that it made sense," said Blackburn. FDR with cement has performed to a level that it is now being specified on state routes.

Portland Cement Association (PCA) recently asked Henry Hawkins, Chambers County Engineer, why FDR with cement was chosen for his project. "When you consider that paving with hot mix asphalt costs \$210,000 per mile for widening from 18 to 20 feet, leveling, patching, binder, and a wearing surface as opposed to \$145,000 per mile with FDR with cement (8 inches thick), a prime and a

double surface treatment; it doesn't take a genius to realize the best bang for your buck is FDR with cement! The biggest challenge we are facing is how to stretch the dollar. We are always looking for a better and more economical way to do things," said Hawkins.

The 4.455 mile project included 58,647 yd<sup>2</sup> of reclamation to a depth of 6", incorporating 22-lbs/yd<sup>2</sup> of cement, surface treatment and traffic striping. The low bidder was R.E. Grills Construction with a low bid of \$600,050.35. The project attracted six bidders.



Left to right: Jack Bunn, Chambers County Commissioner; Dee McDaniel, ALDOT; Henry Hawkins, Chambers County and Robert Taylor, PCA.

# Pike County Invests CDBG Money In Base



Russell Oliver, Pike County Engineer

"When I took the Pike County Engineer job my goal was to earn the respect of my commissioners by getting them trusting in my abilities. Trying new processes was not in my plans," said Russell Oliver, Pike County Engineer. Soon after accepting the position he learned that his predecessor, Herb Huner, had plans developed for a project that incorporated FDR with cement. "I was only vaguely familiar with the process, but fortunately Cornelia [Cornelia Sanders, Assistant County Engineer] made certain that we soon understood reclamation and had the opportunity to visit a project during construction. That is when we had another surprise learning that the process had not been tried on a dirt road such as our project," said Oliver.

The project consisted of two unsurfaced roadway sections with lengths of 1.712 and 0.755 miles. "Based on our cost estimates using traditional methods (soil-aggregate base) we could afford to pave only 0.23 miles. This would have paved through the most densely populated area of the road only," said Oliver. Pike County found that the cost savings realized by using CTB [Cement-Treated Base] would enable them to pave both roads with the available CDBG funds, while realizing equal or better structural characteristics than the soil aggregate base. "We see this as a win-win situation for everyone involved," said Oliver.

Project Facts	Section #1	Section #2
Length	0.755 mi.	1.712 mi.
Width	20'pave/22'CTB	same
Depth of Reclamation	6"	same
Lbs/Yd <sup>2</sup>	23.4 lbs/yd <sup>2</sup>	19.0 lbs/yd <sup>2</sup>
Price of FDR	\$3.41/yd <sup>2</sup>	\$3.08/yd <sup>2</sup>
Mobilization	\$15,550 Combined	

The roadway sections were surfaced with an AKG treatment. Traffic control and striping were separate items from contract. The soil aggregate base was estimated to be \$7.00+/yd<sup>2</sup> plus the roadbed processing cost.

# Ask The Experts

**When describing Full-Depth Reclamation with cement to a county engineer for the first time, I often get asked the same questions. Below are the most frequently asked questions with my best answers.**

- 1. How much can they do in a day?** This is dependant on equipment. However, most contractors are capable of reclaiming one lane mile per day.
- 2. How long can I leave my reclaimed roadway un-surfaced?** I have no idea. We have left roadways exposed in Alabama for as long as two months with no ill effects.
- 3. When can I place my surface treatment or asphalt overlay?** This can be started as soon as the equipment can be supported by the base without marring. This has been accomplished in 1-2 days.
- 4. When can I return traffic?** It is recommended to keep heavy loads off the roadway for 5-7 days after completion. Should you need to maintain heavy traffic we can accomplish this by constructing one lane at a time using a pilot car or by including a detour. Car traffic can be returned immediately.
- 5. How long will the product last?** PCA literature indicates the product will last 20 years. This will depend on your vehicle weights and repetitions. Recently on a project in Cullman County, I was informed of a county road that was placed with cement in the 1960s and is performing well to this day.
- 6. How much cement can I expect to use?** This will vary with soil type and reclamation depth. Most of the projects completed in Alabama have ranged between 20 to 30 pounds per square yard for 6" and 7" depths.
- 7. What soil conditions work best?** In general most all soil types will work for FDR with cement. By pulverizing the old existing asphalt pavement into the underlying soils, an optimized blend is created for the successful addition of cement. As the Army Corp of Engineers are quoted as saying "Portland Cement is probably the closest thing we have to a universal stabilizer".
- 8. Can I do it in-house?** Yes. There are roadway reclaimers that can be rented should your county not have one. In addition to the reclaimer, you will need a motor grader, a rubber tire roller, steel drum roller, a water truck and a good understanding of the scope of the project. It is suggested that on your first project you begin with small segments to get a feel for the process and the capability of your crews and equipment.
- 9. What are the rough costs per mile?** Based on the quantities mentioned in question 6, you can budget \$5 per square yard. This will include a prime and sand blotter. The chip seal or asphalt will be additional costs.
- 10. Are there specifications available?** ALDOT has a specification that is required where state funds are used. There is also a less stringent specification that has been used in Alabama that is available.
- 11. Can I do this on a dirt road?** Yes. We would suggest that once constructed you place either a surface treatment or an asphalt overlay on top.
- 12. Is cement really the greatest product in the world?** Absolutely!

## The Highest Quality Most Economical Solution



For additional FDR with cement information,  
[www.strongroads.info](http://www.strongroads.info)  
[www.cement.org/pavements/](http://www.cement.org/pavements/)

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# Mobile County Sees Future in Full-Depth Reclamation with Cement



Mobile County became interested in using Full-Depth Reclamation with cement during the Spring of 2006 after several of the county's engineers attended a Technology Transfer program hosted by Auburn University. James Vorpahl, Mobile County Construction Engineering Manager, was impressed enough to bring the presentation to his office where all his fellow engineers could hear first hand of the process. The meeting was well attended with much discussion; however, the county did not commit to reclaiming a roadway with cement.

It was not until the Fall that the subject arose again. "We had our latest Pay-As-You-Go program going to the ballot and we wanted to use one of the projects listed in this program as a trial FDR project, should the program be approved by the public. Based on some preliminary cost estimates it looked like FDR would not only provide a cost savings over our traditional widening and resurfacing methods but also have better results. At the time we were experiencing a nonstop increase in construction costs and saw an opportunity to try a new construction process that would save the county some well needed funds," said Vorpahl.



Joe Ruffer, County Engineer, and John Murphy, Assistant County Engineer, were convinced enough and let a project in September of 2008. The roadway selected was Churchula-Georgetown Road in the northern part of the county. The roadway was chosen due to the poor condition of the base.

The project length was 5 miles incorporating 968 tons of cement in 64,500 yd<sup>2</sup>. Blount Construction was the reclamation contractor.