



FULL DEPTH RECLAMATION GETS TO THE ROOT OF THE PROBLEM ON KENTUCKY STATE ROUTE - 175

Case Study

Full Depth Reclamation

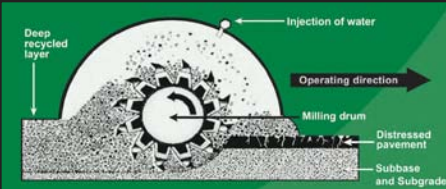


Illustration Courtesy of the Portland Cement Association

Mt. Carmel Stabilization Group is the leading soil stabilization company in North America with over 60 years of experience in providing expert soil stabilization services to our customers across the country. Our technical reports and case studies are an effort to educate our contractor partners, consultants and agencies on the merits of design, construction, and the environmental benefits of soil stabilization.

Mt. Carmel Stabilization Group, Inc.
 PO Box 458
 Mt. Carmel, IL 62863
 (618) 262-5118
www.mtcsg.com

© Mt. Carmel Stabilization Group 2009

ANNUAL OVERLAYS WERE NO MATCH FOR SUB-SURFACE ISSUES

(Bancroft, KY; August, 2009)

In any given year, Mt. Carmel Stabilization Group will perform soil stabilization applications on hundreds of projects ranging from highway reconstruction, airport runways, subdivision roads, commercial building pads, drying operations on mass grading projects and many other miscellaneous project types. These projects can range in size from 1,500 to several million square yards. Each project presents a unique situation and subsequent challenges to success. This particular project is the rehabilitation of a 1 mile stretch of Kentucky State Route 175 in Muhlenberg County near Bancroft, KY.

The Problem - A Failed Roadway Caused by Heavy Loads From a New Coal Mine

A new coal mine, run by Pheonix Coal, brings new jobs and economic development to a rural community.

The downside is that it also brings dozens of haul trucks loaded with 80,000 lbs of coal. This road was not built to accommodate frequent heavy loads and shortly after quarry operations started, the roadway began to yield to the strain. Looking back, this road has long been in bad shape. Years of overlays had attempted to cover up the problem. Once the haul trucks started running on it, the real problem came to the surface quickly.



Photos from the roadway show the full extent of the damage. Maintenance crews attempted fill in the deep ruts with gravel but the source of the problem was deep beneath the roadway.

The Solution - Full Depth Reclamation

Full Depth Reclamation (FDR) is a process in which the full flexible pavement section and a portion of the subgrade are uniformly pulverized, then treated with a chemical additive such as Portland Cement or Lime Kiln Dust. The result is a chemically stabilized base course that provides a much stronger, stiffer and long lasting section for the new pavement or surface layer. FDR is widely used across the country and Mt. Carmel Stabilization Group has been performing FDR since they did their first project in 1949 in Southern Illinois.

The Kentucky Transportation Cabinet required the coal mine to bond this stretch of road. Subsequently, the coal mine was looking for cost effective repair or maintenance solutions that would provide a long lasting, high quality end product to satisfy the state and the local community. Representatives from the Portland Cement Association got wind of the situation and immediately began discussing FDR with the state and Phoenix Coal. During a site visit, Mt. Carmel Stabilization Group and the PCA educated the parties on the process and benefits of FDR. The KYTC had no prior experience with FDR but decided to give their approval. 12" of FDR with cement, followed by a double chip-seal layer was settled on as the appropriate design. Construction operations began a few weeks later.



Portland Cement is then applied at the specified application rate using Mt. Carmel's custom built spreader trucks which are specially designed for accuracy and dust control. For this project, Mt. Carmel used 6% cement.



After cement application the section is remixed with water added in the machine's mixing drum to hydrate the cement and obtain the optimum moisture content for compaction.



Following remixing, the area is compacted with a sheepsfoot roller and shaped to grade before a pneumatic roller finishes the job. The new cement stabilized base is ready for the surface.



The first step in FDR is to pulverize the existing roadway. The resulting gradation is 90% < 1".

Pulverization and treatment depth on this project was 12". This ensures the full pavement and ample subgrade soil are incorporated. The area is then shaped and compacted prior to the cement application.



FDR Provides Comparable Results at a Fraction of The Cost of Typical Reconstruction

\$75,000. That's the approximate cost of the entire FDR process for this one mile project. The only additional costs on this project was the surface treatment; in this case a double chip-seal layer. Based on over 60 years of experience with FDR, this road will hold up to light and heavy traffic for over 20 years. How much is your agency spending on less permanent solutions?