

# FULL-DEPTH RECLAMATION WITH CEMENT

INTEGRATED PAVING SOLUTIONS

## WHAT IS IT?

Full-depth reclamation (FDR) with cement is a stabilizing pavement solution in which a deteriorated asphalt pavement and the underlying base materials are pulverized then mixed with cement and water to form a cement-treated stabilized base course. An FDR road can be completed with either an asphalt or concrete surface layer.

### Why do it?

The recycled base will be stronger, more uniform, and more moisture resistant than the original base. The result is a long-term base that can help carry future traffic. FDR conserves virgin construction materials and makes smart, strategic sense by the reuse of past pavement investments.

### The Process

FDR is a simple procedure and the process can often be completed in one day.

- **Sampling** - The road should be investigated to understand the existing materials. A laboratory evaluation of the existing pavement, base, and subgrade will help determine the desired amount of cement for the mix.
- **Pulverization** - The existing pavement is pulverized with a machine that resembles a large rototiller, usually to a depth of 6 to 10 inches. After pulverization the material is shaped to the desired cross-section and grade, and is ready for cement application.
- **Spreading** - The cement can be spread in either a dry or slurry form.
- **Mixing** - Water is often applied during the mixing process to facilitate compaction operations. The old road pavement will resemble a 'black gravel' and will bond easily to the hydrated cement.
- **Compaction** - The road is then compacted to the required density, usually with vibratory rollers. A pneumatic-tire roller may follow to finish the surface. Final compaction should take place no more than 2 hours after initial mixing of the cement.
- **Curing** - A sealant or water spray is used to keep the new base moist to gain the desired strength.
- **Surface** - A surface consisting of a thin bituminous chip seal, hot-mix asphalt, or concrete completes the rebuilt road.

### When to use it

FDR is often the least-expensive strategy, on a first-cost basis, to rehabilitate low to medium volume asphalt roads with moderate to severe deterioration.

Pavements that are candidates for FDR cannot be rehabilitated with simple resurfacing because:

- The problem exists in the base or subgrade, moisture degradation, traffic overloads, or subgrade failure can cause the pavement base to fail.
- The existing pavement requires excess patching.
- The pavement structure is inadequate for current or future traffic.



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FDR can be used as a base for:

- High-volume streets and local roads
- Residential streets
- Airport runways, taxiways, and aprons
- Parking lots

### Helps meet environmental goals

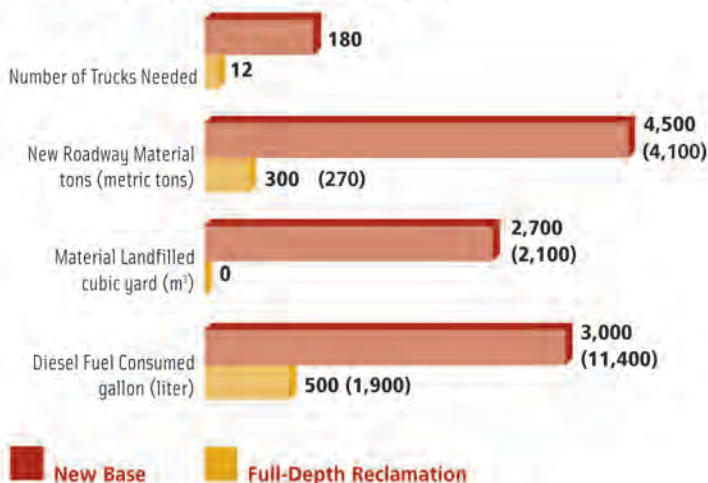
- Recycles used asphalt and conserves virgin raw materials.
- Reduces truck traffic because there is no need to haul in aggregate or haul out old material for disposal.
- Eliminates stockpiling or disposal of recycled asphalt pavement.

### Features

- **Creates a safer road** - Eliminates rutting in the base layer.
- **Increases the stiffness and load-bearing strength of the base material.**
  - Higher load carrying capacity than granular bases
  - Continues to gain strength with age
- **Stretches budgets by utilizing previously purchased materials** - Recycling costs are normally 25 to 50 percent less than removal and replacement of the old pavement.
- **Corrects drainage problems** - Forms a moisture-resistant base that keeps water out and maintains higher levels of strength, even when saturated.

### Energy Use and Materials

#### Full-Depth Reclamation vs. New Base



Based on 1 mile (1.6 km) of 24-foot (7.3-m)-wide 2-lane road, 6-inch (150-mm) base



Portland Cement Association  
5420 Old Orchard Road  
Skokie, Illinois 60077-1083  
847.966.6200 Fax 847.966.9781

500 New Jersey Avenue NW, 7th Floor  
Washington, DC 20001-2066  
202.408.9494 Fax 202.408.0877  
[www.cement.org](http://www.cement.org)