

No-Crack CTB Rules on Florida Roads

Like most of Florida, the Tampa Bay area has experienced explosive development. With development comes an increase in traffic, both in terms of volume and loads to the pavement. The problem is good granular base material for building these roads is becoming scarce in the Tampa Bay area and, to make matters worst, much of the development is occurring in low lying areas where the base material for these pavements can be susceptible to wet and saturated conditions for extended periods. High traffic volume combined with heavy loads and saturated bases can be the recipe for high maintenance costs even in the newer pavements.

This is not a problem in Hillsborough, Pasco, Pinellas, and Polk County, where many subdivision streets, parking lots, and county roads that have been constructed using a soil-cement mixture, or cement-treated base (CTB) still offer a smooth ride after nearly a decade of service. Roadways constructed back in 1996 show virtually no rutting or cracking in the thin asphalt surfacing. "The reason for the longevity of these roadways without any signs of distress is ... the *Croc Rock* that lies underneath them," says Alan Payne, president of Florida Soil Cement, LLC, based in Riverview, whose company supplies the CTB manufactured under the name *Croc Rock* to the Tampa Bay market.

One of the bad raps that cement-stabilized roadway bases get is the frequent appearance of small cracks in the asphalt surfacing. Shrinkage cracks can occur in a stabilized base layer during curing. Cracks in the CTB layer can result in stress concentrations and cracking in the asphalt surface layer. The surface cracks tend to follow the same pattern as cracks in the base, and are commonly referred to as "reflection" cracks. Typically only cosmetic in nature, such cracking can exist for years without requiring significant and costly maintenance. However, Payne is supplying Florida roadways with CTB that shows no signs of cracking.

Roadways in the four county area are usually constructed with Florida Department of Transportation (FDOT) approved limerock, crushed concrete, or soil-cement (CTB). Payne's *Croc Rock* is FDOT limerock blended with portland cement. "The big advantage to using *Croc Rock* is that throughout this area there is an extremely high water table and CTB utilizing 100% FDOT limerock and cement gives



This street was constructed with CTB over eight years ago and shows no signs of distress.



CTB is mixed in an ARAN pugmill and transported to the roadway in dump trucks.

us pavements that don't rut, pothole, or crack," says Payne. "By mixing in the cement, we take an approved roadway construction material and make it better. With the extremely limited supply of crushed concrete, *Croc Rock* becomes the natural choice for a durable and economic roadway building material."



CTB is spread on the prepared subgrade where it is then graded, compacted, and cured.

The success of Payne's CTB roadways is the direct result of the quality control put into testing, production, and construction on each project. Limerock samples are obtained from the limerock mine and blended in the lab with Type I portland cement to prepare specimens for unconfined compressive strength testing after 7 days of curing. A desired minimum strength of 300 psi is usually obtained with the addition of only 2-2.5 percent cement by dry weight of the limerock. The combination of dense-graded limerock and extremely small amounts of cement typically results in CTB with densities of 110-115 pcf and optimum moisture contents of 12-15 percent. The material is blended in a central pugmill plant that can produce approximately 600 tons per hour of this cement-treated limerock.

"There is not another base material [that] compares with... its durability, consistency, availability, and ease of installation."

The CTB is delivered from the mixing plant to the roadway in rear-dump trucks and spread on the prepared subgrade by bulldozer or front-end loader. It is shaped to grade and desired thickness (typically 6 inches compacted) by a motor grader. Initial compaction is achieved through multiple passes of a smooth drum roller in the static mode, with finish rolling performed by a pneumatic-tire roller to seal the surface. A minimum field density of 98% of the established laboratory modified Proctor test is required for acceptance. After density is obtained, the base is primed to aid in curing for 7 to 14 days, depending on the county, before final application of a 1.75-inch hot-mix-asphalt surfacing.

Jeff Joaquin, Vice President of Kearney Construction Company, Inc., Tampa, another fan of *Croc Rock* says: "There is not another base material [that] compares with... its durability, consistency, availability, and ease of installation." His company uses *Croc Rock* on every CTB-specified project and regularly convinces clients to switch even when CTB is not part of the original design. "*Croc Rock* allows Kearney the ability to finish the product the same day it is installed,

which greatly reduces the time and energy spent on re-grading and finishing when compared to other base products."

This *Croc Rock* example proves that soil-cement is cost competitive with untreated limerock and crushed concrete, and typically is a better choice when construction and long-term maintenance costs are taken into consideration. As municipalities and developers become aware of the benefits of cement-treated limerock, especially the lack of reflection cracking in old CTB roadways, the demand for cement-treated limerock should continue to increase-allowing drivers to roll, rather than rock, on smooth, safe roadways.



CTB is an excellent base material for commercial applications as well.

More Information

PCA offers a broad range of resources on soil-cement and roller-compacted concrete applications for pavements. Visit our Web site at www.cement.org/pavements for design and construction guidelines, technical support, and research on cement-modified soils, cement-treated base, and full-depth reclamation. For local support, tap into the cement industry's network of regional groups covering the United States. Contact information is available at www.cement.org/local.



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