

# Project Profile

## US 71, Maryville, Missouri Reflex® and Fortress® Technology

Smoother. Safer. Sooner. Missouri Department of Transportation's (MoDOT) "Smooth Road Initiative" commits \$400 million for smooth and safe surfaces on the state's 2,200 busiest miles of highway as phase 1 of November 2004's constitutional Amendment 3. MoDOT's mission is "to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri."

MoDOT is delighting drivers and taxpayers and easing traffic over a smoother road to Northwest Missouri State University, the Kowasaki Motor plant, and all the other good things that are happening in Maryville, north of St. Joseph on U.S. highway 71. And they have minimized costs while speeding construction.

US 71 is a divided 4-lane highway that would have been perfect for the "severely distressed" section of FHWA's Pavement Distress Manual. Normally, MoDOT would have milled and replaced the 7-mile stretch just south of Maryville. Instead, they chose two applications that saved taxpayers between 30 and 40% of the project cost. The Fortress® full depth reclamation process rehabilitated the shoulders, and the ReFlex® process recycled the existing pavement in-place into an engineered base course on the driving lanes.

The first step in both Fortress® and ReFlex® processes is an engineered design procedure by Road Science™ laboratory using samples taken from the pavement. The designs include performance-related tests developed by Road Science™ to improve reliability, early strength and resistance to raveling, rutting and thermal cracking. Brown & Brown Inc. used its CMI RS-650 to reclaim 4 inches of base and the 2-inch deep asphalt shoulders in the Fortress® process which stabilized the material with emulsion supplied by Road Science's plant in Salina, Kansas. After the reclaimer, the cold mix was initially compacted

with a padfoot roller, leveled with a motor grader, and then compacted with Dynapac pneumatic tire and Caterpillar Double steel drum rollers. Greg Brown of Brown & Brown says, "Fortress® is a delight to the contractor. Once the moisture is optimized with the Road Science™ design process, it compacts immediately and gains strength quickly. We don't have to worry about what's behind us."

Following Road Science's ReFlex® emulsion cold in-place recycling (CIR) design, a Caterpillar PR 1000 milled 4 inches of the pavement. The millings fed into a portable plant which crushed and screened to 1.25 inch minus which were then pugmilled with the ReFlex® emulsion and other additives. A Blaw-Knox PF220 immediately paved the recycled cold mix. Dynapac and Caterpillar rollers compacted the mat. Brown says, "The ReFlex® emulsion is not just off-the-shelf, it is tailored to the project. We've had good success for over 4 years." St. Joseph-based Herzog completed the project with a 1.75 inch Superpave overlay.

MoDOT is itself delighted with the project. "We were impressed with how well the reclaimed mix stands up to construction traffic immediately after construction," says MoDOT Central Office Field Materials Engineer Joe Schroer. "Road Science™ people did a lot of investigation and have been on the job making sure everything is going right." According to Troy Slagle, MoDOT District 1 Operations Engineer, Missouri does not have a good source of quality virgin aggregate to meet all the needs of the new initiatives, and the CIR is a great solution. Plus, "We saved \$600,000 on the shoulders alone." Smoother, safer, sooner—and at a great savings. MoDOT is showing "Show Me State" voters that they are taking their mandate seriously.



Fortress  
reclamation of  
shoulders



ReFlex Cold In-Place  
Recycling Process

