

## **The Right Mix**

*Martin K. Eby Construction finds a soil stabilizer to match the demands of Florida road-widening project.*

Polk County, Fla. – Interstate 4, known as “Central Florida’s Crossroad,” connects the Tampa Bay area on the Gulf Coast with Orlando’s theme parks and Daytona Beach on the Atlantic Ocean. One can imagine that such a thoroughfare would be responsible for handling a huge amount of traffic. But for the section of I-4 serving Polk County, with average daily traffic levels reaching 63,000 vehicles – or nearly 23 million vehicles per year – this responsibility was becoming more than the Interstate could handle.

Knowing that the roadway was already operating above capacity and that these traffic levels were expected to increase greatly with time, the Florida Department of Transportation (FDOT) created a master plan to ultimately transform the Polk County section of I-4 from its current four lanes into a 10-lane highway. Additionally, the plan includes the construction of a high-speed ground transportation system in the median.

Of course, Rome wasn’t built in a day, and immediate traffic capacity requirements and budget constraints dictated a much less ambitious short-term solution. First things first, the Polk County stretch of I-4 needed to be modified to more comfortably handle its daily traffic load. Therefore, in June of 2002, FDOT began awarding contracts for the task of widening I-4 from Memorial Boulevard in the city of Lakeland to the Polk/Osceola County line. This \$224.5-million project would span 29.5 miles, widening I-4 from its current four lanes, to six lanes, basically adding a lane to the outside of both the eastbound and westbound lanes.

Due to the overwhelming logistics of the entire project, including the requirement to rebuild five interchanges and replace three bridges along the way, and the fact that it all had to be completed in two years, FDOT broke the job into three main contracts – each to be handled by separate roadbuilding companies. Additionally, the contracts would be design/build, meaning each contractor would be responsible for all aspects of project implementation from inception to completion. A faster and less expensive method of contracting projects, design/build was the logical choice for this time-sensitive project.

No stranger to the intricacies of design/build projects, Martin K. Eby Construction Company, Inc., was awarded Contract 2 of the I-4 widening job on June 27, 2002 – with construction beginning during the first week of January, 2003.

Founded in Wichita, Kan. in 1937, Martin K. Eby Construction Company, Inc., has since built itself into one of the nation's most respected and capable contractors. Known for its project diversity, Eby Construction has completed projects in nearly every construction market including major buildings, manufacturing/industrial, water and wastewater, power and, of course, transportation. Still headquartered in Wichita, the company has additional divisions located in Maitland, Fla., Bedford, Tex., and Austin, Tex. Employing more than 700 people nationwide, the company's 2003 revenues exceeded \$171 million, making it 238<sup>th</sup> out of the Top 400 Contractors in the nation according to sales volume.

Given its experience and capabilities, there's no question that Eby Construction has the know-how and horsepower to tackle large projects in a relatively short period of time. But Contract 2 of the I-4 widening job presents quite a challenge.

Covering 16 miles of the 29.5-mile project, Contract 2 is the largest contract of the three, involving a span of I-4 from the edge of Lakeland to just east of CR 557. Eby Construction is not only responsible for widening the road, but also for widening two bridges, reconstructing the Socrum Loop/CR 582 interchange and replacing both the Mount Olive Road and CR 557A bridges.

According to Dale Willis, a superintendent for Eby Construction and an I-4 project manager, this job requires a very focused approach to be completed on time. "This is a huge, \$80-million job," said Willis. "To complete the 16-miles in two years, we're dealing with a very tight schedule. Therefore, we've split up our Southeast division crews to include the most experienced roadbuilders on this job. We're basically putting our best resources out there based on the importance of the project – and that includes about 138 pieces of equipment and 150 people."

Outside of the bridge and interchange construction, the road-segment widening portion of the project can be broken down into a few major steps. First, excavation must be done to existing portions of the roadway to prepare for the additional lanes. Next, a soil stabilizer is brought in to mix and prepare the base in order to achieve the proper load-bearing ratio to support the eventual

finished road surface. This material is then compacted, covered with a layer of lime rock and paved with asphalt. But it was with the second step of this process – soil stabilization – where Eby Construction encountered some setbacks.

According to FDOT specifications, the stabilized base for the I-4 road widening must achieve a load-bearing ratio (LBR) of 40, which is quite common for most jobs in the state of Florida. Sometimes the materials that are already present in the soil are enough to support this requirement, whereas other times a clay or lime rock must be added depending on the situation. Either way, a soil stabilizer is brought in to mix these materials to a certain depth to achieve the proper LBR. Given Eby Construction's vast experience with previous Florida roadbuilding projects, this requirement was nothing new. They had long been renting a soil stabilizer to handle such a task. But it was the tight schedule involved with this project that brought some equipment deficiencies to light.

“The specifications state that we need to achieve a finished 12-inch mix – meaning we'd have to use the stabilizer to mix down at least 18 inches to get the proper combination of materials,” said Willis. “Depending on what's already present in the soil, we might have to add some materials before the mixer is used to be able to attain the specified LBR. For instance, if it's a granular soil – like the sugar sand that's common here – we'll have to bring in some clay or lime rock to mix in with the existing soil. But if we're dealing with pure clay, we usually don't have to add anything. We just balance it out with a grader and mix it. No matter what materials are present, the mixer must be used to make the soil uniform across the 12-foot lane.”

Though Eby Construction's rented soil stabilizer was able to do the job, it was the amount of time it took to do so that was of concern. “We were renting about a six- to eight-year-old mixer that we had used for several previous jobs,” said Willis. “The company we were renting it from decided to stop renting the unit and instead wanted to sell it to us. On the I-4 job, we were getting about a half-mile of production per day out of this machine – and given the time constraints of this job – we were looking for something that offered better production.”

Out of necessity, Eby Construction started looking for a better soil stabilizer solution. They began contacting local construction equipment dealers to set up on-site demonstrations of other equipment options. Nortrax Equipment Company – Southeast L.L.C., a John Deere dealer based

in Tampa, was one of the entities they contacted. According to Chris Wood, a territory manager for Nortrax, the timing couldn't have been better.

“Though we are a John Deere dealer, we handle other product lines to fill in the equipment gaps not covered by the core line – and BOMAG is one of these brands,” said Wood. “It just so happened that when Eby Construction was looking for a new stabilizer, we were receiving a new asphalt recycler/soil stabilizer from BOMAG.”

Designed for deep-mix applications, the new BOMAG MPH122 recycler/stabilizer incorporates a mid-mount rotor design that can mix down to a depth of 20 inches at a productive width of 92 inches. The unit's rotor offers variable mixing speeds from 100 to 170 rpm and includes 194 paddle-shaped teeth to efficiently mix material, while its all-wheel drive configuration provides high tractive effort and gradeability for easy maneuvering about the jobsite.

In December of 2003, Nortrax brought its new MPH122 out to Eby Construction's I-4 jobsite for a demonstration. Based on the success of this trial, Eby Construction quickly bought the unit. It was the first MPH122 sold by Nortrax – and the first sold into the U.S.

Eby Construction's primary reason for purchasing the unit involved production. “When we tried out the BOMAG mixer, we couldn't believe how much we were getting mixed in a short period of time,” said Willis. “With previous units, we were getting about a half-mile of production a day, whereas this new unit was giving us two to three miles of production. When it comes to mixers, it's pretty basic. You're looking for speed and production. But when you get something that's more than twice as fast as what you're used to, it's very exciting. That's why we bought it.”

According to Wood, much of the unit's productivity can be credited to the rotor design. “It's an upcut-style rotor, meaning when the rotor is rotating, the teeth hit the work surface from back to front and drive that material up into the hood,” said Wood. “This keeps the material in contact with the rotor's teeth for a longer period of time – pulverizing it – which results in a better mix.”

While Willis doesn't know exactly what makes the new unit more productive, he's just happy with the results. “It doesn't matter to me what direction the rotor spins,” said Willis. “As long as it gets down the road and gives me good production, that's all I care about.”

Eby Construction has now been using the new MPH122 on the I-4 road-widening project since January of 2004 with good results. Approaching the project in several smaller, more manageable segments, the stabilizer is being used to mix a stretch of two to three miles a day and is immediately followed by a BOMAG BW213D-3 84-inch smooth-drum roller to achieve compaction and seal the material from moisture penetration. A grader is then used to spread a 12-inch layer of lime rock to provide a good, solid base for the finished road surface. Within a couple of days, the asphalt crew arrives on the scene to finish the road segment.

“The new mixer is allowing us to get the job done quicker, and I don’t know of one construction operation that’s not interested in that,” said Willis.

Other than increasing productivity on the I-4 job, the purchase of the MPH122 holds further potential for Eby Construction. In addition to being used for soil stabilization requirements on upcoming jobs, with a couple modifications the unit has the ability to be used for full-depth reclamation of asphalt pavements. Though this is not currently a common practice in Florida, interest is growing.

“I can certainly see us using this machine for asphalt recycling in the future,” said Willis.

“We’ve never done it before, but if the opportunity arose, we’d have the machine to do it.”

Also, now that Eby Construction owns a stabilizer, it has the ability to lease the machine out to further maximize return on investment. “On most jobs, a mixer will just sit there 75-percent of the time,” said Willis. “Therefore, we’ll also rent the unit out to other companies to make the most of our investment.”

The overall completion date for the entire I-4 project is scheduled for the fourth quarter of 2005 or the first quarter of 2006, but Eby Construction’s specific project deadline is set for May 5, 2005. With a little less than a year remaining to complete the project, Willis says that Eby Construction is on schedule. Though it’s hard to say at this point how much the new stabilizer will mean to achieving the absolute minimum goal of finishing the project on time, it is at least clear to those on the crew that the equipment has saved days in mixing time. And with FDOT incentives of \$10,000 per day for finishing early – or the same in penalties for finishing late – few would argue with the significance of having a higher production machine.