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Subgrade PREPARATION

Zachry Construction Corp. Builds SH 151 at IH Loop 410 in San Antonio

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The construction of this much anticipated, much needed route from the fastest growing part of San Antonio, Texas, to US Highway 90, just north of the former Kelly Air force Base that is now home to KELLY USA, started September 17, 2002. This project will eventually be a part of the expansion of Bexar County's outer Loop 1604 system, which encircles the city of San Antonio, and is scheduled for completion in August 2004. Zachry Construction Corporation's (ZCC) portion was 4.981 miles, which includes 0.208 miles of bridges. The project spans from slightly south of the city's inner loop, Loop 410 West, abutting another project under construction that exits onto US 90, to one mile south of the Charles W. Anderson Loop, Loop 1604 South. The four 40-foot-wide mainlanes, separated by a 40-foot-wide median, taper up to six lanes at the entrance/exit points.

ZCC's Sam White, project manager; Howard "Butch" Kreusel Jr., project controls manager; and James "Jim" Stockbridge, project superintendent, guided the crews responsible for safety and construction: office, traffic control, wall crew, utility crew, underground crew, two survey crews, two concrete crews, and two dirt crews. These teams worked in conjunction with the TxDOT's Hondo area office, of the San Antonio district, where Carl G. Friesenhahn is the area engineer, and Greg Biedeger is the assistant area engineer. Gerry Burell is the chief inspector for the project, and other inspectors for TxDOT are Pete Groff, Jessica Castiglione and Mike Crow.

This mammoth \$25.5-million project employed several innovative techniques to prepare the subgrade. About 735,000 cubic yards of material was excavated for this project, and some of this hard limestone material was removed by an especially innovative piece of equipment. The TRENCOR Company built the newly designed milling machine specifically for this job. The 160-ton machine, sporting serial no. 1, was provided to ZCC by the G.T. Sirizatti Company in Bandera, Texas.

This machine is capable of milling 8 feet wide and 2 feet deep, and will cut on a 3-to-1 slope, eliminating four other pieces of equipment: the ripper, back-

There are four mainlanes in the project, 40 feet wide, with 40 feet separating them, tapering to six lanes at the entrance/exit points.



A Trenchor milling machine designed specifically for this job proved successful in excavating the hard limestone material.



Before it is mixed in, discharged cement can be seen on the scarified surface.



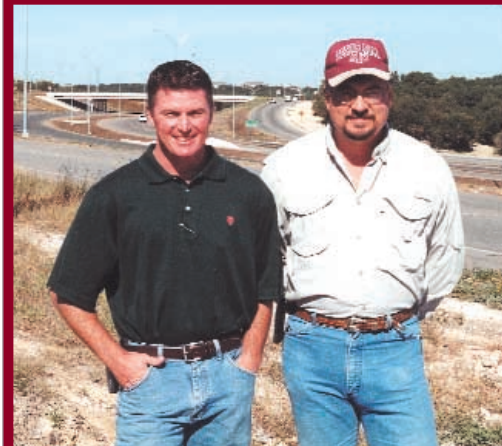


Left: A CMI-Barta, Hydrostatic Drive model RS325 was able to pulverize all of the material including rocks that are ordinarily plucked out of the ground, then mix the cement into the subgrade to the required depth of six inches. The 35,000-pound machine is 8 feet wide, 24 feet long.

Right: Greg Biedeger, Carl Friesenhahn, Jessica Castiglione, and Pete Groff are members of TxDOT's San Antonio district office.



Below: Sam White and Butch Kreusel of Zachry Construction Corp.



ensure the cement would be equally effective, if not superior, and environmentally friendly. Weldon Allison, QS, assured Friesenhahn that QS had specially designed and equipped cement tankers, with trained drivers, which would discharge the cement in a uniform and relatively dust-free manner.

Both TxDOT engineers, Friesenhahn and Biedeger, recognized cement's qualities in granular and plastic subgrades.

Because cement can be laid down, mixed, graded, and compacted in only one day, it makes an effective road for construction traffic or a stable working platform, and allows for faster construction time. Only 3-percent cement was used, as opposed to the 4 percent of the stabilizer originally specified by TxDOT.

ZCC's Stockbridge had used cement before and said, "It was much easier for me. My progress is much faster, and it makes a much better subgrade to lay the other layers on." Stockbridge was able to follow TxDOT's mission for road and bridge contractors, which says: "Get in, stay in, get out, and stay out."

Another innovative piece of equipment was used to pulverize and mix the subgrade

so that it could be stabilized to the required depth of 6 inches. A CMI-Barta, Hydrostatic Drive model RS325 was able to pulverize all of the material including rocks that are ordinarily plucked out of the ground. The representative for this piece of equipment, Edward Black, Cooper Equipment, said, "It will pulverize easily to a depth of 12 inches, is capable of going down to 15 inches, and has an effective cutting width of 6 feet 3 inches."

After subgrade stabilization, the lanes are to be paved with 8 inches of flex-base, 4 inches of Type "A" asphalt, 2 inches of Type "C" asphalt, and finished with 2 inches of Type "C" surfacing asphalt. A total of 128,716 tons of asphalt will ultimately be used on this project.

Four overpasses were constructed, the largest being over Loop 410, where 80 beams were erected. Three smaller overpasses were built at Hunt Lane, 30 beams; Ingram Road, 21 beams; and Potranco Road, 20 beams. For the convenience of the commuting public, these beams were all set on weekends, placed with 150-ton and 300-ton Grove cranes supplied by Alamo Cranes. The beams, all Type IV, were supplied by Bexar Concrete.

An additional feature of the Hunt Lane bridge was 72,810 square feet of Mechanically Stabilized Earth Walls (MSE). Another soil retaining system used was Permanent Soil-Nailed walls, which involved ZCC "shooting" gunite for stability. The Ingram Road and Potranco Road bridges were also widened.

Three other bridges, over Military Highway, Wiseman and Westover Hills, were built in 1997 and 1998 by ZCC with TxDOT's Hazard Elimination Safety Program.

There was 91,154 square feet of precast retaining wall, cast by TEXAS WELDED WIRE PRECAST, with an ashlar pattern for aesthetics. Decorative cactus and desert scenes were cast into the turnaround walls for a pleasing aesthetic effect.

Carl Friesenhahn and Greg Biedeger praised ZCC's efforts on this project. Friesenhahn said, "We worked very well together on this project. Whenever any questions came up or change orders were required, our crew and theirs worked hand-in-hand to expedite the process, and fulfill our mission to finish this massive project." ■

hoe, bulldozer, and motor grader.

One person was able to operate the machine, guided by the ZCC Global Positioning System (GPS). The machine milled the slopes, the drainage and utility trenches, and the electrical trenches in the mainlanes without pulling up rocks, thereby eliminating backfill and blade-work. The ZCC GPS ensured accurate work, and eliminated extra cuts and unnecessary backfills. All earthwork for the project was controlled by this system.

Another time-saver was achieved through the authorized of a change order switching to portland cement to stabilize the subgrade for the mainlanes. Capitol Cement and Quality Service (QS) personnel conferred with Friesenhahn to