

Michigan Contractor & Builder

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**Special CRAM
Coverage Inside**



The
**Rental
Equipment**
SOURCE GUIDE

Innovative Soil Reinforcement Used

Focus: HOPE renovation is first Michigan project to use Geopier soil reinforcement



Above: A rented Cat to the left is drilling a hole, while a rented Takeuchi TL 126 skid-loader delivers stone to a previously drilled hole. The skid-loader is equipped with a specially designed bucket to deliver a 12-inch lift of stone dropped down the hole, prior to tamping.

1920s vintage brick manufacturing building, now housing the Machinist's Training Center. The renovation adds a central 300-foot-long skylight and a second story on the east side of the building.

In its geotechnical investigation, Taweel Engineering Services P.C. of Livonia found "5-1/2 feet to 6 feet of silty clay fill unsuitable for foundation support and fragments of brick and slag at another boring," according to Jeff Anagnostou, project engineer. Taweel advised precautions be taken to reduce the risk of undermining the existing foundations during construction.

"We knew about the Geopier system from a 'lunch and learn session' presented by Jim Bullard of Geopier Foundation Company - Great Lakes (Indianapolis, Ind.)," said Andy Wasiniak, Walbridge Aldinger project manager. "So we suggested Ghafari check it out."

To the layperson, Geopier soil reinforcement looks like holes stuffed to the brim with gravel. Yet, each Geopier element is an engineered component. The first step is drilling a 30-inch-diameter shaft to the design depth with an

Walbridge Aldinger Construction of Detroit saved \$20,000 in construction costs and approximately three weeks in foundation construction time by introducing an innovative soil reinforcement system to a Focus: HOPE project in Detroit. Ghafari Associates LLC, Dearborn, designed the renovation for this

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Reinforcement Used



A tamper mounted on a rented Cat 304.5 rubber tracked hoe compacts the lift of stone to form the Geopier element.

auger. Then, using the beveled head of a modified hydraulic pavement tamper, highway base course gravel is rammed in 12-inch-thick layers at 1.7 million foot-pounds of energy per minute. The aggregate is pushed downward and outward into the surrounding soil, adding lateral strength as well as vertical support.

Bullard's design-build plan consists of 70 Geopier elements each measuring a

minimum of 6 feet long with one to three piers installed per column location. Each pier supports a maximum load of 40 kips. Foundation Service Corp. of Reinbeck, Iowa, the certified installer, took special care working inside the building with rubber-tired equipment and a mini-excavator tamping apparatus carefully cutting through the epoxy floor at the designated locations.

The Geopier soil reinforcement eliminated the need for bridge beams supported on concrete footings for most of the columns, according to Larry Kowalski of Ghafari Associates LLC. (Seven pier locations close to existing foundations use bridge beams.) The construction

will improve the functionality of the 80,000-square-foot facility with an additional 2,000 square feet of second-floor classrooms and administrative space. The current renovation that started in September is phase two of the three-phase, \$20-million renovation project. When phase two finishes, the students will move into that section, and Phase three will start on the last part of the building and conclude in July 2002.

Since geotechnical engineer Dr. Nathaniel S. Fox developed the Geopier system in 1989, more than 400 major projects have been installed in 35 states, and GFC has licensees in six countries worldwide. Geopier soil reinforcement

elements support diverse structures such as office and apartment buildings, parking garages, factories, grain silos, oil storage tanks, retaining walls, and bridge abutments. Foundation Services Corporation rented mini-equipment for the work it did on the project.

"Our typical operations consist of larger equipment. Going into a facility like this was a special project for us, so we rented the smaller equipment. We have some small backhoes, but if they are busy, I would rent them. That was the case here. Our other equipment was busy, so that's why I rented it," said Bill Pecenka, general superintendent of Foundation Services Corp. □

Reinforcement Used