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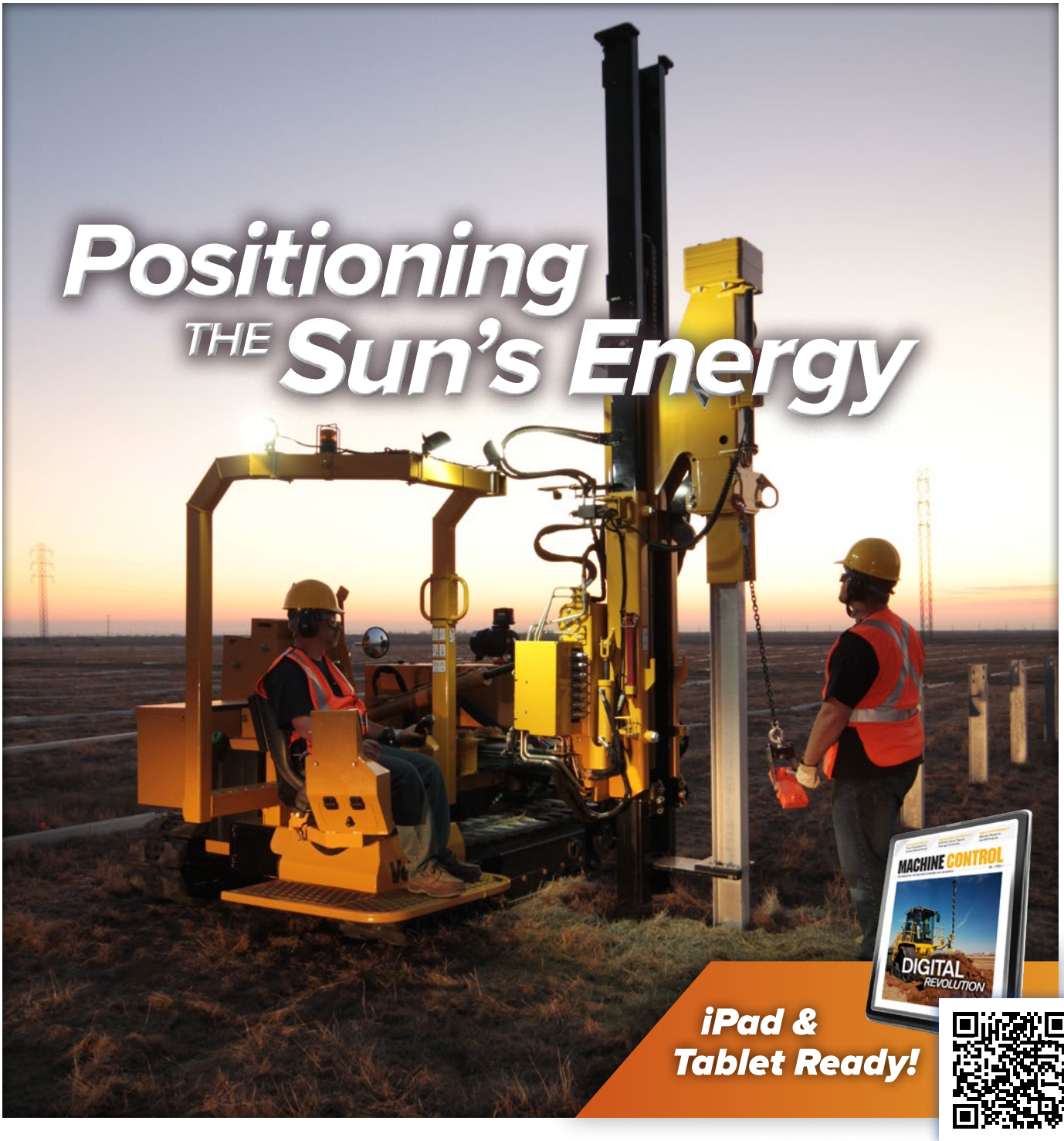

Curbing Impediments to Efficiency

A recent retrofit of a parking lot on the West Virginia University campus in Morgantown, WV was anything but ordinary. To do the curb work cost-effectively, the contractor would have to maintain a precise curb height amid tight radiuses and reach down below the existing asphalt pavement 14–16 inches into a deep ditch to construct the curb. The project would require special equipment.

The parking lot was scheduled to be retrofitted in fall 2012. The process involved cutting out the old asphalt, preparing the sub-base and constructing a new curb. In northern climates, it is particularly important to construct the curb far below grade, below the frost line.

According to slip form curb machine manufacturer Phoenix Curb Machines, retrofitting is already a large sector of the curbing business and growing, due to land availability and cost. There was little room for temporary parking and plenty of traffic comes and goes from campus, as Morgantown-based contractor Green River Group Construction Company would discover during the project.

This project was a $1.2 million retrofit of 6-acre parking lot, which included three bio-retention areas, drainage work, base course and wearing course asphalt for the existing parking lot and an addition of 1,200 lineal feet of curb. Green River installed a 20-inch curb, 14 inches below the existing surface, and left 6 inches exposed. To do the curb work, the contractor used a newly purchased Phoenix 7500 slip form curb machine equipped with a Topcon System Five grade control system. Steve Calvert, Green River's owner, had seen the machine at World of Concrete 2012 and at a Phoenix Curb Machines demonstration and decided to purchase one.

Maneuverability and precise grade control were paramount on this project and Green River would need this advanced equipment to tackle it. For one, the contractor was to install curbing in and around an existing parking lot where the asphalt had to be cut down and back 4-6 inches from the face of the new curb to make room for installation. The sheer height of the 20-inch curb promised to pose a challenging placement. The machine would have to maneuver over multiple surfaces and ditches without

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BY DON **TALEND**

A recent curb installation in a large parking lot at the University of West Virginia in Morgantown, WV utilized a midsize curb machine and automated grade control that made the job more efficient and precise.

Phoenix Curb Machines

Phoenix Curb Machines

The curb machine was able to pave tight radius curbs on automatic setting, something that larger curb machines cannot do.

collapsing pavement, and the job was characterized by tight radiuses. Last but not least, the project supervisor, Donnie Hawkins, had just one day of training on the 7500 prior to the project.

The Phoenix 7500 was developed to be the first midsize slip form curb and gutter machine. The machine's inventor, Ed Taylor, had worked as a contractor for many years when he designed his first manually steered and controlled curb machine in 1974. In his own work, he saw a need for grading around a 3-foot radius on automatic setting—something that large curb machines cannot do. Taylor points out that contractors traditionally have used large needed to use a motor grader or tractor to handle such tight radiuses and set out to design a single machine that could do both straight and radial curb work on automatic. The key feature of the machine that allows automatic paving of radius curb, Taylor says, is a trimmer that is located only a foot ahead of the machine pivot point, in contrast to larger machines that have trimmers located 5–6 feet behind the mold. In addition, the Phoenix 7500 has a tight radius sensor that is located about 18 inches from the back of the machine and tracks the tight radiuses in automatic.

This configuration reduces the need for manually constructed formwork,

Phoenix Curb Machines

Taylor pointed out. That comes in handy in situations where curb must be installed all the way up to a wall, for example. The typical alternative scenario is installing curb to within about 10–20 feet of the wall with a slip form curb machine and then completing the section of curb with formwork and manual processes.

For the university parking lot, the under-10,000-pound machine was delivered to the site on a flatbed trailer pulled by a one-ton truck. The machine was ready for operation in 30 minutes. The rubber tires were suited to this project because the machine had to travel very close to where the asphalt was cut down to the new curb without collapsing the asphalt. Additionally, the rubber tires eliminated the need for rubber tracks that are typically used to prevent damage to the asphalt.

The System Five, a standard feature on the Phoenix 7500, maintained the height and cross-slope of the curb work. The system is equipped with a slope sensor designed to allow slope capabilities up to 100 percent. On this project, the grading system allowed Green River to place curb while turning, going uphill and leveling against different pitches on the roadway. Taylor said he first outfitted a curb machine with the system back in 2004.

"You still have to set stringline, but the sonic senses the stringline height and you

Phoenix Curb Machines

The corner curb work was done quickly and with less formwork than would have been possible with a large curb machine.

can dial that up or down and then it automatically controls off of that stringline," he said, adding that real-time elevation adjustment capability via the control panel paid off on the West Virginia project. "If the inspector sees that maybe the concrete is a little wetter than the last load and says you're a quarter-inch low, you can click it up a hundredth of a foot at a time. So you don't run the whole job and then find out that you've got a high spot and a low spot—you can constantly check it and make adjustments on the fly to make sure it's where it needs to be."

The curb placement was characterized by several obstacles. For instance, several concrete light bases were located only about an inch from the curb and Green River had to place concrete around them. To do this, the contractor had to swing the sonic sensor away from the stringline, which caused signal loss. The finished curb work did not show any variation in elevation next to the light bases, though. For corner work, the hopper's 20-inch lift came in handy. The machine slip formed curb up to a corner and backed up, leaving a 90-degree curb for the next section that was placed at a right angle. The machine could then back up to within about a foot of the last placement and resume slip forming.

Large curb machines would not be able to negotiate corners in the same way, Taylor pointed out. They could pull to within 10–20 feet of the end of the curb. "And then, to try and back in a corner, number one, they won't do the tight radiuses and number two, you can't back up close enough to really make it worthwhile," he said. "So it was really an ideal job for our 7500 and the Topcon system made it that much easier."

"The Topcon system was instrumental in maintaining the proper height on the curb," Taylor continued. "Technically, it was a fairly difficult job, given the height of the curb, the fact that it was down in a ditch and the radiuses. The cross-slope varied quite a bit, so we just set the machine at a percentage of slope that would keep the machine auger from touching the pavement and maintain the same profile all the way around the turns."

Automated grade control was particularly useful in one roughly 100-foot section of the parking lot where 10-foot sections of pavement had been excavated for removal of drainage lines and utilities. Road base material had been placed in the excavated section, but it was raining when the curb installation took place and the grade dropped a couple of inches. The machine was still able to maintain the top of the curb and cross-slope along this section, though.

As it happened, although the curb work did not occur continuously, Green River placed an average of 10 feet of curb per minute and completed the project in five days, including the day of training for Hawkins. Only one other worker was needed, communicating with the ready-mixed concrete truck driver from the front of the machine.

Taylor contended that precision grade control was critical in preventing tear-outs and rework—and saving money. "Say you're hypothetically charging $10 a foot to put that curb in—if you've got one bad area that's 10 feet long, you're going to charge $100 a foot to tear out any curb because of any inaccuracy or discrepancy in where the curb was supposed to be," he said. "I'd say that's a big savings."

Hawkins came away impressed with the equipment he used. "That was as perfect a curb as you'll ever find, performed on time, under budget, and with fewer labor costs," he said. MC

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