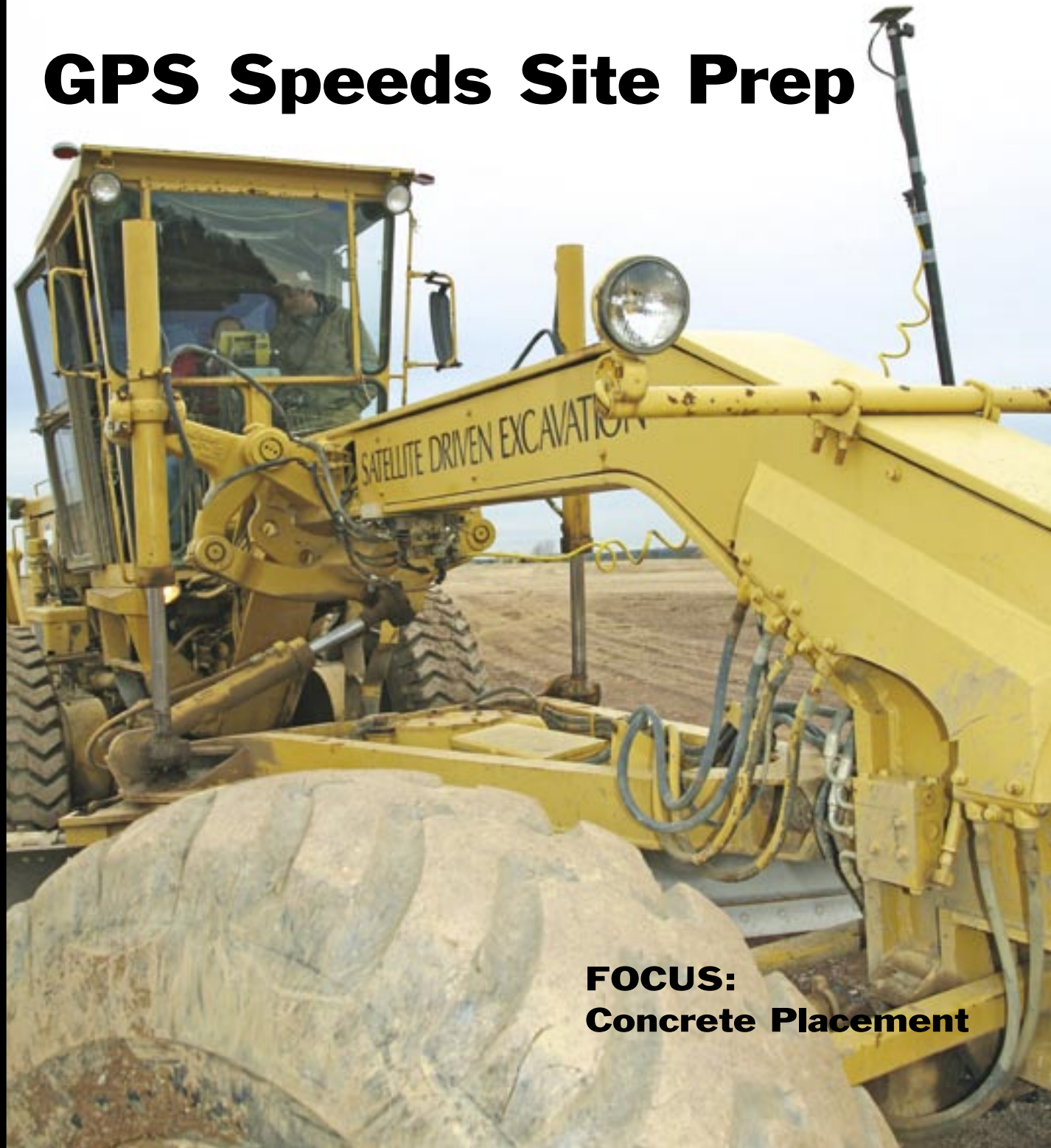


# Construction News

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## GPS Speeds Site Prep



**FOCUS:**  
**Concrete Placement**

# ACCURACY and EFFICIENCY: *The Keys To Makin' Money Movin' Dirt*

by David V. Dow  
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**A**All of us feel the impact of constantly changing computer and electronic technology every day. Faster, more capable computers. Cell phones that take pictures and play music. High-definition televisions that bring entertainment and news into our homes with real-life clarity. And cars that talk to you, providing exact driving instructions to any address, anywhere.

But one of the most unlikely areas where “high tech” is having a major impact is in the rather “low tech” business of moving dirt. More specifically, the grading and filling portions of construction site preparation.

Today, the cutting edge of dozer and grader blades can be controlled by cutting-edge electronic communications supplied from space: The network of signal-generating satellites orbiting the earth known commonly as the Global Positioning System (GPS). Three groups of satellites are available today in the United States for machine automation: The U.S. government’s GPS system, the Russian government’s GLONASS system, and the newest satellite constellation to get off the

Garrett Excavating used GPS for speedy site preparation on a 50-acre parcel for a church in Little Rock.



ground, the European Community’s GALILEO system. The latest GPS receivers from Topcon Positioning Systems take advantage of all three satellite systems, meaning that operators

on the ground have even more data to pinpoint their exact location and elevation. More satellites also mean more coverage in hard-to-reach places [narrow streets with tall buildings, under tree or other obstructions, rugged terrain, etc.]. In a phrase, GPS-guided earth-moving equipment is making contractors throughout the

United States more productive, more efficient, less reliant on outside vendors, and, most important, far more profitable.

## **Smaller Can Be Better ... Much Better**

In a bit of an ironic twist, many smaller operators – not the large firms with huge jobs, lots of equipment, usually bigger budgets – have been “early adopters” of the latest GPS machine-control technology. It often gives them, they say, competitive leverage against the large contractors. Case in



Garrett moved 170,000 cubic yards of dirt on the project.



“Without GPS capabilities, we wouldn’t even be in business,” says Grant Garrett, third-generation contractor.



point: Garrett Excavating, Inc., in Hot Springs, Ark. Grant Garrett is a third-generation contractor.

“Without GPS capabilities, we wouldn’t even be in business. Satellite technology provides us the competitive edge we need to continue to grow our business every year,” Garrett said.

In the fall of 2006 Garrett Construction began site preparation on a 50-acre parcel for a church in Little Rock. The church pad portion of the job “put a whole new meaning to the concept of moving dirt,” Garrett said. The hilly site presented its own special problems: Some areas required more than 30-foot cuts; others needed more than 25-foot fills.

“We had to have the pad ready in a month. It was a big job – really big – and it had to be done quickly.”

Garrett solved the problem of moving more than 170,000 cubic yards of dirt in a short time. The company’s crew used two Caterpillar D-11 dozers and one D-9 to complete the major work. “We slapped Topcon’s GPS+ (system) on the D-9 and one of the D-11s and got to work.”

In the rough grading phase, the crews ran the three bulldozers side by side, using the two in-cab Topcon GPS+ controllers to set the angle and depth of the cuts. The third dozer shadowed the movement of the other two, with amazing results – a 60-foot-wide, 9-foot-high “wall of dirt” moving across the pad site. “I’ve been around dirt work all my life,” Garrett said, “and that even impressed me.”

Due to the contour of the site, the “shadow” dozer operator “eye-balled” the blade position in relationship to the position of the other blades of the GPS-equipped dozers. When the machines were close to final grade, the two GPS+ dozers only were used, and “we were within 1/10th of a foot consistently,” Garrett added. The church pad was finished three days early.

“Without using satellite positioning, the 30-day limit to finish the pad would have been impossible,” he said. “but using satellite positioning, ingenuity, and the right people on the crew gave us a big competitive edge.”

### Your Future Success = Your Technology Choices

Ray O’Connor, president and chief executive of Topcon Positioning Systems, in Livermore, Calif., said he believes that, while the construction industry has lagged behind the technology curve compared to other business sectors, the industry is changing ... and in a hurry.

“You’re going to see more and more machines – especially bulldozers, motor graders, scrapers, and excavators – being automated quickly.” The future success of earth-moving operators will be measured by their technological choices, he noted.

“If you don’t have the technology, the bottom line is: You can’t compete. Within five years, there’s no doubt that any



major construction work in the world will use this technology and equipment. To compete, [construction companies] have no choice.”

Construction, O’Connor noted, is really a manufacturing business – roads, buildings, bridges, highways, pipelines. All are “manufactured.” And “every job is custom,” he added.

For contractors, the decision to jump on the technology bandwagon boils down to three central questions, O’Connor said. “Can I save time on every job? Can I increase productivity on every job? Will [machine-automation technology] put more money on my bottom line?”

### Why It Makes \$ense

The benefits of learning about, acquiring and using machine-control technology are numerous:

- Efficiency is enhanced. Machinery operators always know exactly where they are on the site, and where the work tool is in relation to the final grade.
- Fewer and fewer grade stakes. While survey points will still need to be marked, typically 90 percent of the stakes formerly needed are eliminated.
- Lower survey costs. This is especially true when deep cuts and/or fills are required.
- No more waiting for surveys. Machinery that is setting idle doesn’t make any money. Because less surveying is needed, there’s less waiting for surveys to be completed.

- Re-staking? What re-staking? Because there are fewer stakes to run over, the time and cost of re-staking are both significantly decreased.
- Operator productivity goes up. Way up. Operators don't have to find and read scribbled notations on stakes that are mud-covered, damaged or missing. Instead, they read a clear, bright, color screen right in their cab, which provides precise information on their location and grade. Costly re-work to correct errors drops dramatically.
- More gets done with less equipment. The number of passes required to get to grade are often reduced, resulting in lower fuel and equipment maintenance costs.
- Fewer people mean decreased personnel cost and increased safety. Because fewer people and potentially less equipment are on-site, contractor costs drop, while safety statistics go up.

### Efficiency/Productivity/Bottom Line

And that brings us back to Grant Garrett in Arkansas. He credits GPS technology with keeping Garrett Excavating in business.

In the six years since embracing the numerous benefits of tapping into the GPS system for his equipment, Garrett said confidently that on "many jobs, we have been able to triple our production. Twenty years ago, the company used about 25 people on any given job. Now, we have 12 to 15."

Knowing that there is always a shortage of good heavy-equipment operators, Garrett's philosophy is "buy big equipment and use it with good technology."

But Garrett also expressed some concerns about where some in the construction industry stand with this emerging machine automation. "Everybody needs to embrace positioning technology: engineers, general contractors, dirt operators, and the paving guy. We all need to get on the same page ... the page of progress."

Garrett said he takes a hard-nosed approach to bidding jobs. "We generate the site model and submit it to the engineers for approval. I simply got tired of taking engineering plans and doing the work to the specs, then finding out later that we were off by a foot on part of the job because of an engineering mistake. If I'm going to make a mistake and lose money, it's going to be my mistake, not somebody else's."

Years ago, Garrett related, before GPS, "you increased production by coming in early in the morning and staying late. Now we still work hard, but we're working a lot smarter." ■

*TrenchSafety and Supply, Inc. (www.trenchsafety.com) has locations in Memphis and North Little Rock, and supplies Mid-South contractors and utilities with machine-automation technology, as well as trench shoring and shielding equipment, confined space equipment, steel road-crossing plate, pipe lasers, and pipe plugs and test equipment. Additionally, TrenchSafety provides a full complement of safety training, services all construction lasers and maintains an extensive rental inventory.*

### Good People + Technology = The Winning Mix

*"The construction industry typically resists change."*

That statement from Grant Garrett of Garrett Excavating, Inc. is true of most segments of the business world. But, he emphasizes, "it's doubly tough in our business."

Being a "change merchant" in an industry that likes to do things "the way we've always done it," as Garrett puts it, is not easy. "You have to have somebody who believes that new technology will benefit them. Then you have to train people to believe the same way. And this is the hard part – you have maintain consistency in your key operators so you're not constantly training people."

Making the change from gashing the earth to "precise positioning of machines and moving dirt with minimum effort takes a certain mindset," he said. "You have to recruit employees who will open up their minds and look at the possibilities."

Garrett found such an employee in his job superintendent, 25-year-old Joe Kilzer.

"When Joe came looking for a job, he had some construction experience, but not the kind that we really needed, which was real dirt work. As far as I know, he

had no computer training. I told him what I had open and how much it paid, but promised him if he would work hard and learn new skills, he'd do just fine."

That was four years ago. Today, Kilzer is managing a crew of 15 people and "can do any job you give to him."

Garrett spent "some time early on teaching Joe the GPS system. Within a few months, as his productivity increased, he became a top-notch finished grade hand. He does all our layout and is one of the top people I've ever worked with.

"The secret to Joe's success? He wasn't afraid of the technology. He found out that it's not that hard, and by learning it and applying it on the job, he could advance quickly. I'm so proud of him and what he has accomplished."

Kilzer, a quiet, reserved young man who feels at home on any piece of construction equipment, said, "Without GPS I wouldn't be where I am. Garrett gave me a chance and I grabbed it. Our equipment – from the base stations to the rovers, to the blade consoles – lets us work faster and smarter.