

PACIFIC BUILDER & ENGINEER



Kerr Contractors, Inc.

Embraces GNSS Technology for Better Production



A NEW SLANT ON CONTROL

Kerr Contractors Inc. Uses Tilt Bucket and GNSS Solution to Enhance Performance on Road Improvement Project

By Larry Trojak

While most companies have come to embrace the use of Global Navigation Satellite System (GNSS) technology in their dozers, scrapers, and motor graders, many hesitate when it comes to employing the same technology in their excavators. Citing reasons that range from a lack of information to a reluctance to change, this key piece of a complete job site solution is too often overlooked.

Kerr Contractors Inc. does not fall into that category of the uninformed. The Woodburn, Oregon, firm learned long ago that a GNSS solution can, and should,

extend to regular use in excavators. So when they recently augmented the performance of one of their excavators with a tilt bucket, they immediately inquired about equipping it with a GNSS solution. Today, that solution is in place and excavation projects such as slopes, ditches and embankments – efforts that could, at times, be challenging – have been both simplified and improved.

Early Adaptors

Kerr Contractors, Inc. (KCI) was founded in 1988 by Brent Kerr, who currently serves as the company's president. KCI is now one of the larger civil/highway contractors in the

metro Portland area. The company's specialties include major arterial and highway construction, freeway interchanges, airport improvements, large diameter water mains, subdivisions and more. Long recognized as one of the most technically advanced earthmoving, road building and underground utilities contractors in the region, it is no surprise that they embraced GNSS technology early on. According to Kerby McGinnis, KCI's Survey/Grade Control Manager, his position at KCI, in fact, is a result of their belief in GNSS.

"When I came onboard back in 2006, KCI had a single dozer running machine control and one base/rover setup," he said. "But

they recognized what that single system was bringing them in terms of performance and savings and, wanting to build upon that, brought me on to develop the program further. Today, we probably have \$3 million invested in GPS equipment and systems and are continually finding new ways to make it work for us."

The inventory to which McGinnis refers includes KCI's six motor graders running 3D-MC2 machine control from Topcon Positioning Systems, five John Deere 850K Dozers, also equipped with 3D-MC2, and 11 excavators that rotate between six available excavator kits. He said that one of the

key benefits they honed in on when first embracing GPS was the ability to eliminate use of a grade checker. "If we are digging a pond, for example, we would normally have needed a grade checker working alongside the excavator operator. That is not only costly from a manpower point of view, but, because that man is generally in the vicinity of the swing bucket, there was always a safety concern. All that's been pretty much eliminated since adding the GNSS capability to the machines, along with the risk of over- or under-excavating."

Digging on GPS

The concept of GNSS on an excavator is actually quite simple: antennas are located at the rear of the machine, on or near the machine's counterweights and when the system is being calibrated, the distance from the antenna to the bucket is measured. Then, tilt sensors, located along the body, boom stick and bucket, send a signal to a receiver which helps determine the precise position of the bucket teeth and send that info to the operator's screen. A base station set up nearby sends corrected RTK data to validate the machine's position on the job site.

"When we determined that a tilt bucket would be a nice addition to the fleet, we knew doing so would be taking that sensing component to another level," said McGinnis. "So we went to the Portland branch of the PPI Group, our local Topcon dealer, and spoke to Richard Hill, their Paving/Construction Sales Specialist about what we needed. Before too long, he connected us up with Edwin "Shorty" Schult, PPI's Machine Control Applications Specialist and he was configuring the machine with a Topcon X-53 3D indicate system which would handle the new bucket."

According to Schult, the installation of the additional sensor needed to accommodate the tilt function of the bucket was fairly easy. "For some machines, finding a place in which the sensor cable will not be affected by that tilt function is the biggest challenge. For that particular machine, a Hitachi ZX-245, it was fairly easy – we did the install and they were off and running."



Left to right: Kerby McGinnis, Survey/Grade Control Manager and George Bergstrom, Equipment Operator. Both are with Kerr Constructors Inc.





Production From a Different Angle

In one form or another, tilt buckets have been around for more than 40 years and proponents of the tool say having the ability to tilt the bucket affords them added capability in certain applications. Pairing up that advantage with the Topcon 3D system, said McGinnis, enhances the advantage even further – perfect for an ongoing road expansion project south of Portland.

The job, called the 124th Avenue Project, is designed to provide access to land designated for future industrial development and jobs on developable land between the cities of Tualatin, Sherwood, and Wilsonville. According to McGinnis, the Hitachi excavator, equipped with a CES Hydraulic Tilting Bucket, has proven excellent in, among other tasks, handling the project's side slopes.

"In many cases, we are never able to get the machine at the right orientation for shaping the slopes; the bucket is always off a bit," he said. "The alternative is to either reach down from the top or up from the bottom which is not always very convenient. With this system, the operator can be oriented sideways, reach out, tilt the bucket to the slope he needs, and pull material towards him. Because he can see every facet of the job on the Topcon GX-55 screen in his cab, with GPS-grade accuracy, his cuts are always dead on. Normally, the operator is trying to pull offsets, read stakes, or follow a grade checker, but with this system, he has an actual cross-sectional view of what is on grade. In addition, all through this project, there is a V-ditch on the edges of the



new roadway that can be easily constructed in one action using GPS and the tilt-bucket, versus cutting that ditch after the slope has been established. It's an excellent combination to have."

Things Get Rocky

In addition to the ability to reduce manpower and improve efficiencies, KCI is also realizing another GNSS-based benefit at the site. After beginning excavation, the company

discovered that they were working through far more rock than had been anticipated.

"That is not altogether unexpected," said McGinnis. "At the outset of the project, engineers did test drill borings to determine where rock was located and used that as their benchmark, so to speak. However, the rock is showing up in places where it had not been anticipated. Obviously, rock excavation is far more expensive and time-consuming than just general excavation, making change

orders necessary. Luckily for us, however, we've been able to use GNSS to quantify the situation. We first expose the rock and then use the end of the excavator's bucket to essentially take a series of survey shots. We then send that data to the engineers indicating the actual site conditions. Once again, this eliminates having a second man on the ground collecting the data with a rover during the operation."

KCI's ability to maximize their GNSS solution is truly reflective of what Topcon has called "the intersection of infrastructure and technology" – the point at which industry professionals have the solutions at their disposal to meet the ever-changing demands of today's projects. PPI Group's Richard Hill says that, if anyone is suited to doing just that, it is KCI.

"They've always been willing to ask more questions, explore new avenues and, ultimately, make the investment in new technology," he said. "That's what separates KCI from a lot of other companies and keeps them in the forefront. They've been involved in intelligent compaction for more than a year now and have recently made the move over to 3D Millimeter GPS in their asphalt paving operation. In addition, they have a person like Kerby who is committed to GPS and grade control on a full-time basis and it's paying dividends for them in so many areas. I couldn't be happier for their success."

The 124th Avenue Project is slated for a December 2018 completion.