

OPERATOR FRIENDLINESS IS THE KEY

Review of Leica Geosystems Digger 3D Machine Control System for Excavators.

Crossing the Sydney Harbour Bridge and pressing north to Queensland - the California of Australia - motorists make a choice. Either inland through the wine growing areas and broad wheat fields, or the coastal route on Highway One, the Pacific Highway.

Eight hundred kilometres north where palm trees and the scent of frangipani proclaim the imminent approach of the Queensland border, another big project is underway in the campaign to upgrade the Pacific Highway to motorway conditions.

"Is that all there is to it?"

The question, "Is that all there is to it?" sums up the surprised reaction by many other operators on the site who've been coming over to stickybeak inside Clay Badenoch's excavator cab on Abigroup's four-lane bypass of Brunswick Heads, a sleepy coastal town.

One of several excavator operators around the country, Clay of Baden Plant Hire is putting Leica Geosystems new Digger 3D to the test where it counts most, out on a major construction job - prior to its worldwide release at the Paris Intermat show in a few weeks.

This reaction of surprise is a tribute to Leica's development team at the new world-wide research and development centre in Brisbane. We all know how complex a GPS (oops, GNSS) excavator system is - lurking behind the extraordinarily simple operator interface is a powerhouse of computing and data analysis. That's the whole point. Leica set out to make Digger 3D more operator-friendly than any other system on the market.

The Digger 3D display presents only a few big, bold arrows. They change colour from red to green as the bucket digs towards its required position on the design surface of the new road, supplied by the onboard computer file. One set of arrows shows the direction the bucket needs to move, horizontally. The other gives vertical guidance.

An operator rapidly gets accustomed to this display staying in his peripheral vision while he watches his bucket - the colour change becomes something he senses rather than studies. A quick glance at the screen will give him measurements if he wants them, again presented in larger-than-life figures.

"Our objective was to allow the excavator driver to concentrate his attention almost exclusively on the bucket in front of him," emphasises Adam Forsyth, Leica's product manager. "We didn't want him to have to switch his focus back and forth between the bucket outside, and a screen full of complicated images and figures inside the cab. The benefit is, of course, better workflow and speed."

Clay Badenoch tells a story that amply demonstrates this point of simplicity. While he was off site, his backhoe operator had to climb into the excavator to perform a task that came up unexpectedly. "I was able to talk him through the Digger 3D routine over my mobile phone, and he immediately grasped the principle." "Is that all there is to it?", echoed the backhoe jockey, getting stuck into the job.

Cutting-Edge Technology

Abigroup's Brunswick Heads Bypass is pushing through hilly terrain. So Clay Badenoch has been concentrating on some very high batters. "It's a simple fact that Digger 3D is reading the satellites much more consistently than the GPS gear in a couple of machines working nearby. For hours on end I retain lock, while they have nothing."

The high standard of these GNSS receivers is illustrated by the process of calibration of an excavator that many will be familiar with. When the machine is initially commissioned, a common routine is to test the accuracy of the 'in cab' GNSS by setting up four points in a quadrant around the excavator, at the limit of its boom reach. These points at 12-o'clock, 3 o'clock, 6, and 9 are 'shot' with a GNSS back-pack rover. The excavator is then swung in a circle, the bucket teeth stretching out to touch each point in turn. A comparison is made of the results from the rover, versus what's seen in the cab. Digger 3D easily achieves 10-15 mm accuracy at each point, and that's a big improvement on the 50-60 mm that we used to hear about only a couple of years ago.

Integrated with Leica's 1200 Survey System

Part of the philosophy of this new machine control system is that it shares the same 'smarts' as the Leica 1200 survey system - the database and algorithms are identical.

Just as it has been possible to take a flashcard out of the 1200 total station, put it straight into a 1200 GPS, and continue working, so the transferability now extends to Digger 3D. And will indeed extend to future Leica machine control products.

With design software such as 12D now incorporating modules of Leica's relational database and Road Runner data processing, engineering designs can now be exported in Leica format to go straight to work on Digger 3D as well as a site's 1200 survey equipment.

This is an issue of weighty importance. On the many GNSS job sites we've visited over the years, a common complaint is that the gear in the machine's cab works just fine, but inappropriate data originating from the design engineer is causing all sorts of glitches. Leica's 'universal data' approach removes this problem.

When GNSS Isn't Needed

Finally, it needs to be pointed out that Digger 3D 'sits on top of' Leica's MC-200 Digger. The MC-200 is a fine well-proven 2D excavator system that's been in the field for a couple of years, giving machine guidance (and laser augmentation) in a whole range of tasks such as the accurate excavation of trenches and forming of batters. Operators we talk to are constantly remarking that once you get accustomed to working with a 2D system, you're using it practically all the time - it helps in many unexpected ways.

When GNSS isn't needed, this considerable asset is still available to you. And in the event that satellites are lost, on most jobs it's possible to take a line off the GNSS-built structure and just keep plugging away. All in all, a powerful productivity package.



Clay Badnach pictured on site, AbiGroup Project



Leica Digger 3D being used by an operator on site.



Leica Digger 3D screen.

Article reproduced with permission. © 2006, Peter Kerville
Kerville's Moving Dirt magazine