

A DIGITAL DIRECTION



A Washington contractor shifts to 2D machine automation for safe, precise site prep.

BY VICKI SPEED

Eller Corp.'s Larry Connor has been a heavy equipment operator for more than 28 years. He's particularly skilled at highway excavation tasks and has an expert ability to guide giant excavators through the most complex tasks with ease and speed. He didn't want any automated help—that is, until he sat down and powered up his favored excavator after it had just been equipped with the latest in 2D machine automation.

"I was amazed at the edge the digital connection offers," Connor says. "From footings to road construction to utility work, I'm able to dig with even greater accuracy and speed."

The first demonstration of machine control and resulting excitement of the operators like Connor has led to a company-wide shift for Eller Corp. As the automated system has proved

Eller Corp. outfitted its Hitachi 450 excavator with the Leica PowerDigger 2D guidance system, which benefits complex grading projects, deep digs and sites where grade-checking crews are shorthanded.

itself on various projects, Eller's move to this digital direction will forever change the way the company excavates.

A Convincing Demonstration

Eller Corp., located in Newman Lake, Washington, about 15 miles northeast of Spokane, is a general contractor that specializes in earthmoving, utility installation and commercial/residential site-development services to the construction and utility industries. Eller's shift to 2D machine control came about at the recommendation of True Survey Supply Inc., a Leica Geosystems machine control dealer based in Colville, Washington.

True Survey Supply performed a demo for Chuck Eller, vice president of Eller Corp., on the Leica MC200 Excavator guidance system in late summer of 2007. Eller was interested and saw the advantages of the system, but took some time to consider the technology. True Survey Supply's machine automation technology expert, Keith Grittner, told Chuck Eller about Leica's new PowerDigger system scheduled to come out during the March 2008 ConExpo in Las Vegas. Grittner invited Eller to meet up

with True Survey Supply at the Leica booth during the show for a demonstration of the PowerDigger by Leica representatives.

PowerDigger is a two-dimensional guidance system developed for heavy equipment machines, including excavators, graders and dozers. Eller was impressed with the dual-slope capabilities of the system and the ease of use, as well as the system's ability to measure distances and slopes between points. Subsequently, Eller Corp. purchased and installed two of the Leica PowerDigger systems for use on its Hitachi 450 and Caterpillar 325 excavators.

Learn and Dig

Once the systems were installed, Eller says, "After a short one-half hour training session, we sent two of our operators out to work on a couple of small jobs. The benefits were readily clear, particularly when it came to complex grading projects, deep digs or sites where the grade check crews were shorthanded."

One of the first projects for Eller's machine operators and the guidance system-equipped excavator was on a lane-widening project along busy State Highway 290 and Starr Road.

Jobs like this require extensive grade checking because of complex side slopes and minimal material moving. This project would ordinarily have taken two full days. With the PowerDigger, the excavator started at 11:30 a.m. and finished by 7:00 p.m. the same day.

As the operator onsite, Connor says, "I was able to make up significant time by taking advantage of the system's grade control, offset and cross slope capabilities."

Mounted in the cab, the PowerDigger's real-time graphical control panel tracked depth, reach and slope information and displayed the bucket's position in relation to finish grade. As the bucket neared the desired grade, Connor referenced "near-grade" and "on-grade" tones emitted by the system and a highly visible LED light-bar that mimics a standard laser receiver.

"I simply entered the desired slope and let the PowerDigger guide me through the process," recalls Connor. "I did the job much like

I've always done it—by sight and feel of the bucket. It worked great for grades cut along asphalt, dialed in cross slope and cut all the way through the cut area on each move." He adds, "This particular job also had a step up for a walkway that allowed me to use the PowerDigger's vertical offset feature. The guidance system [tracked my work], providing highly accurate visuals of actual progress and then warning me as I got close. The whole process was very smooth."



Safety in the Trenches

Eller's excavator operators are particularly pleased with the PowerDigger's dual-slope option when working on highway jobs. With this feature, the heading of the machine and the tilt of the bucket are clearly shown on the screen, which allows for fast, accurate digging.

The dual-slope option provides extra information to really lock in the machine and bucket cutting-edge orientation. It includes a pitch/roll/heading sensor to directly measure the orientation of the machine in all three axes: pitch, tilt from front to back, roll (tilt from side to side) and heading (the direction the body is pointing).

This information enables the PowerDigger to compensate for the existing ground slopes and their relation to the machine position. This capability is especially critical to excavators performing dual-slope cuts, common on street work.

“I was amazed at the edge the digital connection offers. From footings to road construction to utility work, I'M ABLE TO DIG WITH EVEN GREATER ACCURACY AND SPEED.”

**—Larry Connor, heavy equipment operator
Eller Corp.**

The operator simply programs in the slope of the crown (2%) and the slope of the street (variable), and the system knows how the bucket line of travel matches up to the directions of the slopes through the range of machine body rotation.

The dual-slope option may be used by itself or in conjunction with the cross-slope option, which puts an additional slope sensor on articulated (or "wrist") buckets that provide cross-slope control. Having the cross-slope option can allow the operator to compensate for cross-slope due to existing ground slopes, or to maintain a specific cross-slope on the cut surface. Combined with

The PowerDigger's real-time graphical control panel is mounted in the cab. It tracks depth, reach and slope information and displays the bucket's position in relation to finish grade.



Eller Corp. currently uses its PowerDigger-equipped excavators on the most complex jobs but anticipates that guidance systems will become standard on all equipment in the future.

the dual-slope option on an excavator with an articulated bucket, the cross-slope option gives PowerDigger every measurement needed to precisely orient the bucket's cutting edge in all dimensions and directions for excavator precision.

Eller's crews regularly use the cross-slope option when working on storm pipe digging highway jobs for safety and speed. Typically, this kind of job would require at least two crew members—the operator and an independent grade checker who is assigned the often dangerous position of helping to guide the excavator to the proper depth.

"This capability gives my grade checker the flexibility to step away from my task to support another part of the job, while I continue to work with confidence. I'm not reliant on the grade checker any more," Connor says. "I still use the grade checker occasionally to check work because I haven't developed complete trust in the system, but it hasn't failed me yet."

On the Road Again

A \$2.5-million S-curve realignment project in Spokane offers the ideal opportunity for Eller construction crews to put the new machine automation systems to work.

The Broadway S-curve currently extends eastward from the intersection of Springfield Avenue and Freya Street, near the south end of the Freya Street Bridge, then winds north one block, turning into Broadway Avenue. To improve driver and pedestrian safety, the city will move the traffic signals at Springfield a block south to the intersection of Alki Avenue and Freya, and create one block east of there a new S-curve link to the intersection of Broadway and Julia Street. It's a two-year project that will include lane restrictions and periodic closures along Alki, Freya and Broadway.

As the prime roadway excavation crew, Eller Corp. is charged with the excavation of the old roadway and then cutting the new grade to subgrade. As work began this past summer, PowerDigger-equipped excavators, operated by Larry Connor and others trained on the system, moved onsite to begin site preparation.

Shifting Ahead

"The value of the machine automated system to date is impressive," Eller concludes. "I'd say we save 10-15 percent time-savings—sometimes more—on every job."

Because of the operators' excitement and demand, Eller has a new problem on his hands. "Now the guys want the technology on every piece of equipment. I wish I had more of the them," he says. "I want them on every job, so it's always a problem figuring out where I'm going to send those machines!"

For Eller Corp., the two PowerDigger-equipped excavators are used on the most complex jobs, such as grading site services. However, Eller construction crews see the day when the guidance systems are a standard piece of equipment on every excavator, dozer or grader—and, for the first time, they look forward to a complete digital shift. **SP**

Vicki Speed is a freelance technical writer based in Dove Canyon, California. She can be reached at vickispeed1@cox.net.

Manufacturer Information

Caterpillar, www.cat.com

Hitachi, www.hitachiconstruction.com

Leica Geosystems, www.leica-geosystems.us