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Greg Maziarz did not need to be convinced about the benefits GPS could have on his company. As chief surveyor for West Seneca, N.Y.-based UCC Constructors Inc. (UCC), he says his experience with a previous employer opened his eyes to GPS-based boundary surveys, topo work and more. But an ongoing project to extend both ends of the runway at the Chautauqua County Airport near Jamestown, N.Y. and the purchase of a full GPS package from Topcon (www.topconpositioning.com) allowed him to see its real potential. UCC's investment impacted its business processes and opened new doors to bigger, more complex projects previously thought unattainable.

Working the Runway

UCC is one of the larger general contractors in western New York with more than 130 employees and annual sales in excess of \$40 million. Adept at a broad range of projects, the company

has established itself as one of the area's best in bridge work, excavation and highway reconstruction. While those proven strengths helped it land the \$12 million Chautauqua County Airport expansion, Maziarz says UCC's decision to make the move to adopt GPS capability is helping ensure its success on the project.

"The project involves major safety improvements to the runway in both directions, modifications to existing roads, apron work, utility work, wetlands relocation—even construction of a 525-foot tunnel for road traffic under one end of the runway," Maziarz explains. "The airport already handles a decent amount of commercial air traffic from FedEx and UPS, but I believe they want to increase the number of passenger flights into and out of this site. Upgrading the runway will help them do that."

The full scope of the job involves moving more than 480,000 cubic yards of dirt. It is easily the biggest dirt job UCC has ever done. But Maziarz says moving that volume of earth is not as

challenging as building the contours and special features into that movement.

"We made the decision going into this project that we would commit to a GPS-based system for survey and dozer control and could not have been more on the mark," he says. "Adding that capability helped avoid what could have easily been a nightmare."

The Stakes Are Minimal

The system to which UCC committed involves a pair of 3D GPS-equipped Caterpillar (www.cat.com) dozers working off a Topcon GR-3 base receiver, a rover receiver and a number of FC-200 data collectors.

Communication between all the system components is done via spread-spectrum radios. Before the airport job began, Maziarz says he spent some time creating a CAD model of the project using existing engineering plans, downloaded it into his data collector and, in a virtual sense, built the site.

"Generally, that step can be made even easier by downloading data directly from the engineer's model. In this case, that wasn't possible," he says. "However," he explains, "once I built the model, the system's efficiency became obvious. This is a huge volume job, with several unique features and contours—challenges that could easily keep two full-time survey crews busy. The contract recommends putting [in] a stake and gridding every fifty feet—we haven't put a stake in the ground yet. With the data loaded, now we simply set up the base, plug the dozer in and the operator builds the entire job. Because they see it all on display in the cab, they know exactly what has to be done."

The Perfect Fit

The strengths inherent in the GPS system became obvious during a wetlands relocation facet of the project. Complex

In-cab readouts proved beneficial to UCC dozer operators working on the Chautauqua County Airport expansion project near Jamestown, N.Y. Opposite: A pair of GPS-equipped dozers worked off a single base station located mid-point on the site, allowing both ends of the runway to be worked at the same time.

WESTERN NEW YORK FIRM SOARS ON AIRPORT EXPANSION PROJECT WITH THE HELP OF GPS.

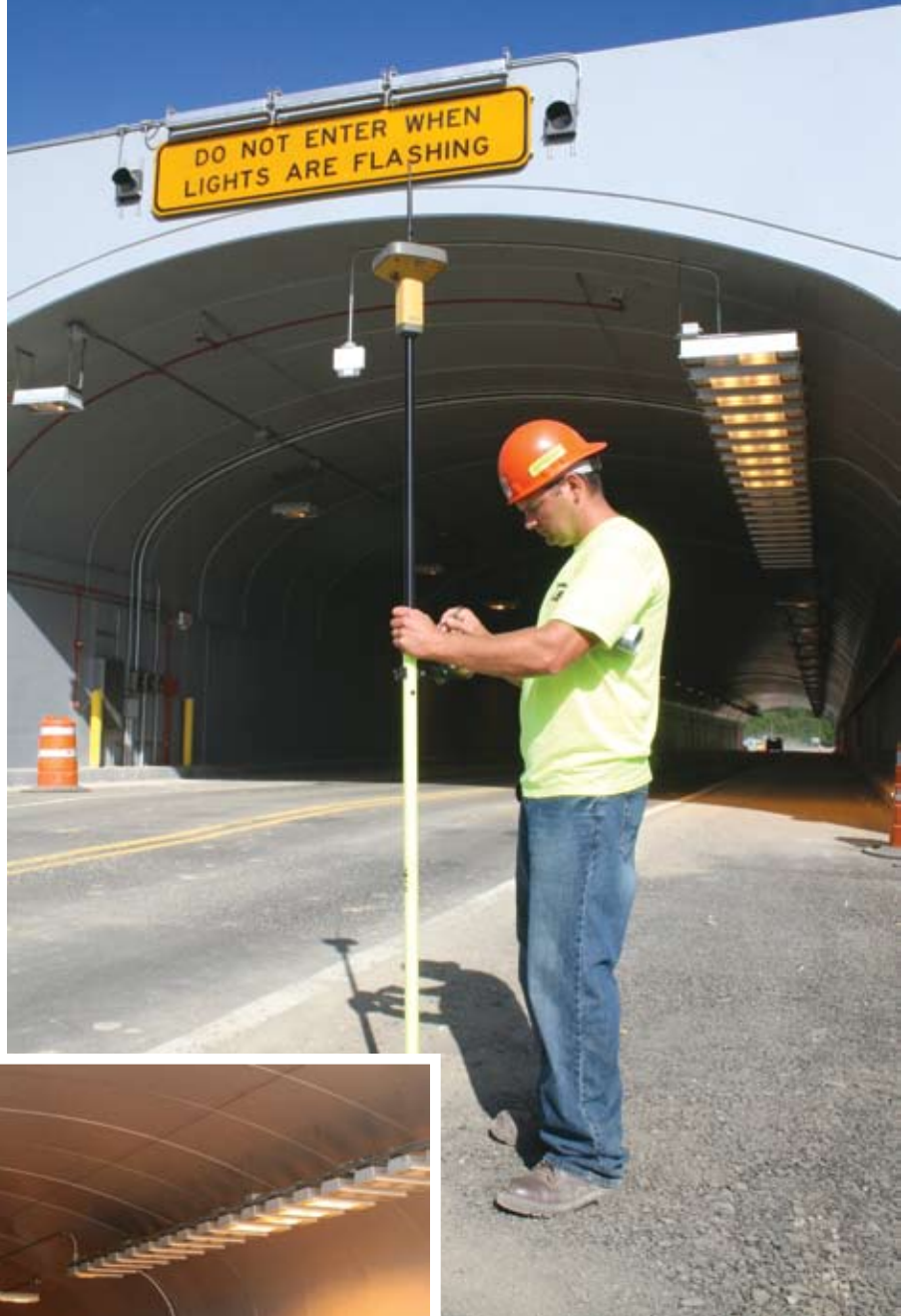
BY LARRY TROJAK



UCC Chief Surveyor Greg Maziarz takes read-outs at the newly constructed airport tunnel. Below: UCC's GPS capability was used on the tunnel footers, to grade the footer pad and for profiling the structure itself.

in design, the pond featured finger-like projections and berms—one of which has a gas main on it—projecting out into the pond. As with the initial phase, Maziarz created a model in AutoCAD (www.autodesk.com) based on the existing plan. At the same time, a member of UCC's crew was out shooting a topo of the prospective pond site.

"This part of the job is as good a fit for GPS as you will ever get," Maziarz claims. "If we were to try to build this using traditional techniques, it would be intense. However, after about three hours of topo work, I loaded those points into my AutoCAD [model] and built a surface off what was shot. That gave me both an existing ground and a finished ground. A push of a button revealed the difference between the two, or how much cutting the operator would need to be doing, in this case, about 20,000 yards. So now, with the finished grade model



built, we simply set up a base out there, the operator brings in a GPS dozer, and we leave. Even on a complex part of the job, the person in the cab of that dozer will be the superintendent, the surveyor, the operator and the laborer." He adds: "There's your savings."

Still another benefit that can't be overstated, Maziarz shares, is the degree to which UCC's operators have become knowledgeable of the survey-

ing function. "Now when I talk to an operator, he or she is *telling me* about what needs to be done. Having that level of project knowledge from your operator is invaluable. In addition, my time as a chief surveyor is maximized. Almost every day, I have no fewer than three different jobs ongoing, yet don't feel I need to be at any of them. The Topcon gear makes it that easy for our crews to manage the jobs themselves."

Finishing the Job

Because UCC has two sites in progress at the Chautauqua Airport site (one at each end of the runway), they've set up their base station in the middle of those two sites; two dozers run off that one base. It has worked out extremely well, Maziarz says, allowing them to move 4,000 to 4,500 cubic yards of soil a day.

"This is really only the second project on which we've used the Topcon system," Maziarz says, "so we are almost constantly impressed with what we are able to do. On the tunnel, for example, in addition to earthmoving, we also used GPS to build the footers and grade the pad on which the footers sit. This job also entailed a lot of utility work, so we would dig up the utility,

shoot the top of the pipe, locate it with regard to elevation and horizontal location, and give that info to the airport and respective utility for future use. That wasn't in our contract, but it took no time for us to do so and will probably benefit everyone in the future."

Getting to finished grade, generally one of the more time- and labor-intensive parts of a project, has been dramatically affected as well, according to Jeff Bauer, UCC's Southern Tier general manager. Bauer serves as project manager for the airport job. In a normal situation, as grades change, UCC would constantly be re-staking the site, then bringing in a survey crew to finish it. He says that has all changed with UCC's new GPS system.

"There were several areas in which we had a dozer fine-grading about a hundred feet behind an eight- to ten-foot cut," he explains. "So we went from breaking ground, down to finished grade to spreading topsoil—even as the lead machine continued to excavate. Normally on a job like this, you have the operator, a grade foreman on the ground and someone to manage the trucks. Between eliminating the delays and maximizing the productivity of one operator, the savings are dramatic."

Dozing in 3D

UCC's intro to the equipment and its capabilities stem from Maziarz's attendance at a seminar in nearby Rochester, N.Y. At that seminar, Admar Supply Company, the Topcon dealer for central and western New York, demonstrated to Maziarz the level of dozer control that was possible using a Topcon-based GPS system. Maziarz passed that information along to the company principals.

"I told them I definitely felt it could save us time, help us keep better costs and, with the increase in efficiency, increase the volume of work performed each year ... so we contacted Admar," Maziarz explains. "To remove any doubts, they modeled one of the sites we were working, brought a Topcon



GPS-controlled dozers at the airport site proved so efficient that UCC had a machine restoring just 100 feet behind the machine making the lead cut.

3D GPS-equipped dozer out along with a Topcon HiPer Lite+ receiver and impressed all of us with its capabilities."

Convinced by that initial demonstration, UCC principals committed to Admar. But by purchase time they found themselves in an even better position than they had thought.

"This was about the time that Topcon was introducing its new GR-3 receiver with additional capabilities and we wanted the newest technology," Maziarz says. "So we bought the GR-3 demonstration package—along with the dozer package—before they even had a chance to take

it out of the box. We were so pleased with what we could now do that we followed up with the purchase of a HiPer Lite+ system. Then, when the airport job became a reality, a second full GR-3 system and 3D dozer package."

He adds that, throughout the purchase and setup process, the crew at Admar have been outstanding for service and support. That level of confidence stems, no doubt, from how strongly Admar feels about the role the equipment can play on today's jobsites.

"It is exciting to be a part of Topcon's three-dimensional grade control technology because of the substantial efficiency gains it offers," says Richard DiMarco II, Admar's vice president. "Our customers are telling us that they are getting better than twenty-five percent increases in productivity—some as much as fifty percent—on many of their earthwork and grade management operations. Admar Supply has made a strong

By project's end, UCC will have moved more than 480,000 cubic yards of material at the Chautauqua County Airport site.



commitment to the development of 3D GPS and machine control in New York state by adding trained experts to our support and training staff.”

Smart Growth

Maziarz says UCC made the move to GPS confident that the new technology would improve efficiencies onsite as well as in other facets of the business. But, he says, he envisioned those benefits impacting the company gradually over a period of time. Needless to say, he has been pleasantly surprised.

“When I came to the principals and projected that we could increase our workload, I was foreseeing that happening over about a five-year period,” he says. “Already, in the first year, it has exceeded my initial expectations. Similarly, I felt this technology would pay for itself in five years, but wouldn’t be exaggerating to say it’s done so on this job alone. As to how it has impacted us on an onsite level, the airport job is, perhaps, the best case in point. When we took the job, we knew the time frame in which we had to get it done was going to be tight and probably could have met that demand without the GPS-based system. However, that would have meant bringing in additional equipment and working double shifts.”

He is quick to add that the efficiency UCC now has with its systems did not decrease labor—quite the contrary.

“Due to the increased level of productivity, our volume of work is also up,” he says. “So we’ve increased the number of surveyors we have, we’ve purchased more equipment and we’ve hired additional people to run that equipment. We are bidding on projects that, in the past, we would have easily passed on. So we’re growing, but that’s a direct result of our ability to do things more efficiently, and that all points back to the GPS.”

Larry Trojak of Trojak Communications is a Ham Lake, Minn.-based marketing communications specialist who has written extensively for the construction, recycling, demolition, scrap and aggregate processing markets.

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