



Taking out the guesswork

by Gerard Lamarre

Canada's new Rt. Hon. Herb Gray Parkway isn't a typical transportation project. The six-lane, seven-mile curvaceous expressway on Canada's busiest land border crossing will eventually connect to a bridge in Detroit, serving as a primary entrance and trade corridor between the U.S. and Canada. The total cost for the project is an estimated 1.4 billion CAD (1.07 billion Euro). The project has a lot of layers, from excavation to open graded drainage, asphalt and concrete. Getting the dimensions, grading and paving right on the first try is imperative. Dominic Amicone, president of Amico Affiliates, the civil contracting firm leading the parkway's construction, was

looking for something exceptional – a machine control system to take them through the construction process that provided the flexibility they needed to be accurate and efficient. After evaluating several industry leading providers, they chose Leica Geosystems as their strategic technology partner and began using the Leica Nova MS50 MultiStation and SmartNet RTK correction network to continuously check grades and refine information in real-time.

"The parkway itself is curvilinear in virtually every direction. There are really no straight lines and [there are] a number of tunnels and bridges with a road that meanders through," said Dominic Amicone. "Grade stakes and traditional layouts are pretty much archaic





■ GNSS correction data by SmartNet, helped Amico to easily and accurately carry out grading tasks.

ic in this environment.” “This real-time ability, combined with the entire machine control operation, allows us to provide operators with real-time information that they can implement and use to get tolerances of 1 to 2 millimetres (0.04 to 0.08 inches), which would be unheard of without using these controls,” said Amicone.

No more guesswork

Using traditional surveying methods, a project of this size would typically require grade stakes marked for elevation and a painstaking, manual process of checking grades against the markers. Crews would have to follow behind the paver, for example, constantly checking the grade and letting the operator know about upcoming high and low spots.

When there was a drastic change in grade – like a manhole lid or pothole – and the “checker” wasn’t fast enough to catch it, work would have to stop and the paver would have to go back and fix the mistake.

Today using the Leica Nova MultiStation and SmartNet as pavers move forward, operators have a sonic sensor that lets them know immediately if they need to go higher or lower based on the pre-programmed model. The machine’s blades are controlled automatically, adjusting the thickness of the material.

“The thing I like most about it is being able to predict the surface. Operators have a surface display on their tablet that lets them see exactly what they are getting into, which makes the whole process easier,” said Brian Laramie, Amico’s head surveyor. “Before, our process was reactive and required surveyors to

perform grade checks every 20 metres (66 feet). It was slow and tedious, and we were constantly chasing grade. Now we’re setting grade.”

This automated process is more efficient and eliminates the number of crew members involved, which saves money and improves safety. But perhaps most impressive is the technology’s speed and accuracy.

“We are seeing an incredible level of accuracy between similar points on two set-ups and the actual scanning process is very, very fast,” said Laramie. “We are shooting granular surfaces, so you would think there would be at least an inch of discrepancy between the two scans, but we haven’t come across that.”

With the Herb Gray Parkway project, which is expected to be complete in the summer of 2015, Amico’s work won’t end with the design and initial construction. As part of the deal, the firm will maintain the structure for the next 30 years. This level of commitment requires the highest standard of quality and productivity, which encouraged Amico to seek out innovative equipment and technology not readily used in the marketplace.

“Here on the parkway, one of the biggest challenges we had was the frequency of changes,” said Amicone. “Having a total GPS network system in place allowed us to change cross-sections, lines and grade on a regular basis, virtually daily. And with 14 crews on the jobsite at the same time, it allowed us to really control the material we were moving and the pavements we were placing.”

Why Leica Geosystems?

"When it came time to select a GPS-controlled system, it was evident that Leica Geosystems not only had state-of-the-art technology and equipment, but they were willing to reach out of the box and come up with solutions for our unique project," said Amicone. "It was an interactive partnership from the very beginning."

Amico was particularly impressed with the innovative Leica Nova MS50 MultiStation and its ability to capture high-definition point clouds and provide crews with averages.

"It has allowed our crews to control grade and correct for sub-grade errors on the go," said Amicone. "The ability to correct that has not only minimised the oversight needed on a job, but it has also allowed us to hit production levels that would have otherwise been impossible to accomplish."

Using the Leica MultiStation and SmartNet process in the field enables surveyors to program the machines with operators on a daily basis. Changes can be easily accepted and modified, and operators have visibility into how machines are coordinated across the jobsite.

Though some crew members were apprehensive and sceptical at first of the new technology and control systems – even checking and double-checking grades to make sure they were accurate – they have now come to fully trust the numbers and are very confident with the new equipment and process.

"It is pretty impressive when you go onto one of our project sites and don't see a single grade stake," said Amicone. "This experience has definitely inspired us to keep pushing boundaries and strengthen our commitment to emerging technologies." ■

More information on Rt. Hon. Herb Gray Parkway can be found on the dedicated project website at: <http://www.hgparkway.ca/>

Watch the video at: www.leica-geosystems.com/amico_parkway_canada

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The new industry standard

Though implementing innovation is often difficult, Amicone credits the company's accepting culture and the open-mindedness of his crews for their ability to embrace the new technology so quickly.

"The actual transition and implementation of the machine controls has been virtually seamless. Our people have accepted it because it's an extension of the way they think," he said. "The younger people that come into this industry now use computers as an extension of their right arms. They were really keen on adapting this new technology and using it on the jobsite. It really defines and integrates the entire team."

Are MultiStations, laser scanning, GPS and machine controlled solutions on their way to becoming the new industry standard? To the next generation of surveyors at Amico, it certainly looks that way.

"With this modern technology, construction is a completely different process now," said Laramie. "I drive through construction sites now and see batter boards and stakes popping up everywhere and everything looks like a smashed-up puzzle. I've been blessed with this technology. I don't even have to set up base stations – I just turn on the machine and go. All of my information is at my fingertips and loaded on to my data collector. I think back and can't imagine how crews did it without this."