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Weather Challenges Mathiowetz On Highway 14

By Richard Rybka, Topcon -- 9/16/2005

"Since we started this spring, we've never worked more than three consecutive days without getting rained out. We did have one nine-day dry stretch right after the first of July." Brian Mathiowetz was clearly frustrated. To emphasize his point, he counted out four more days on his fingers: "Then last Sunday it rained, last Tuesday it rained, last Thursday it rained — and this week it rained again on Monday. That's what our last 10 days have been like — disaster."

Above-normal rainfall has been the major issue facing Mathiowetz Construction on the Highway 14 project near Janesville, Minnesota. But Brian Mathiowetz, third-generation leader of his company, is persistent and determined to recover the lost time and keep the project on schedule.

Eighty Years of Success

Mathiowetz Construction, now a progressive heavy civil and highway contractor, was founded in 1924 by Martin Mathiowetz. Martin was part of a farm family of energetic boys. Farm work couldn't keep them all busy, so he looked for other ways to make use of this resource. At the peak of agricultural expansion in Minnesota, Martin found that stump blasting for land clearing was in demand. To offer a complete scope of services, he rebuilt a junked out dozer.

His dozer work soon became popular with neighbors who needed their driveways raised above high groundwater levels and drifting snow. The local township began to call on him frequently to build and maintain public roads. Over the years, the company grew and offered road construction and site prep services to an expanding number of customers.

In 1953, Martin's son Richard took over leadership of the company. Under his direction, Mathiowetz Construction ventured into federal and state highway contracts, municipal projects, and site work for commercial and private owners. Richard's son Brian worked in the company during his high school years as an operator. Brian graduated from college in 1981 with a degree in civil engineering and came to work full-time with estimating and project management duties.

In 1995, Richard turned over the responsibilities for project management and day-to-day operations to his son. Brian's education equipped him for the years ahead as projects became more complex and technology became available to the contractor. This change freed Richard to become an advocate for transportation funding and reforms. He worked closely with transportation interest groups, MNDOT and the state of Minnesota.

Progress on Highway 14

Mathiowetz has a long history with Highway 14. Over the last six years, they have successfully constructed 30 miles of new four-lane segments under three prior MNDOT contracts. The company's base of operations is located in Sleepy Eye, approximately 50 miles away from the project sites. Reduced mobilization and supervision costs give them an advantage. Mathiowetz's familiarity with local soil conditions and available resources, as well as research before the bid, helps them precisely target their costs for earthwork.

Currently Segment B (SP 8103-47), a 13-mile stage connecting Smith's Mill to Waseca, is under construction. The \$34.4-million contract began in 2004 and is scheduled for completion in October 2006. There are several intermediate deadlines that must be met, such as the CSAH 2 & CSAH 3 Bridge and interchange. It must be completed and open to traffic by October 2005. CSAH 3 is the major roadway connecting outlying areas to downtown Janesville.

During the 2004 working season, Mathiowetz focused on muck excavation and replacement at several locations to build a firm base for the new roadway. Brian pointed out one section that had presented a major challenge. "See where that trackhoe's sitting?" he asked. "The black muck soils are 80 feet deep in this little bowl area. For some reason the glacier came through and gouged this bowl out and it washed in with black dirt. Right now, the roadway in this area is on about 100 feet of fill."

The major challenge of this project has been keeping the moisture content of the road subgrade within an acceptable range. The fill soils have high silt content, and ground water depth is only a few feet below the surface. Moisture wicks in and saturates the fills.

The above-normal rainfall complicated these tough conditions this season. Precipitation during May was twice the chronological monthly average. In June, it was three times the normal amount. As a result, Mathiowetz is making extended efforts to dry the subgrade by deep plowing and disking.

Topcon's GPS+ Offers an Advantage

Earlier this year, Mathiowetz decided to take advantage of GPS technology for machine control. The company's survey crews have been using Topcon GPS systems for layout over the past six years, so they are familiar with system operation. To reach the next level, Mathiowetz equipped two motor graders — a Cat 163H and a Cat 14H — with Topcon's System Five GPS+ fully automatic control systems.

Over the past winter, the Mathiowetz staff prepared the model surface files that would be used for the grader systems. He explained the main advantage that GPS offers his company: "One of the reasons we insisted on using the GPS technology and building our own file on this project was because the old way of doing it — eye levels and laser staking — had potential for error. You never know if they're on, or close — you have to check them every couple of days in case someone bumps them. We found that when building our slopes with tapes and eye levels, we could be as much as 6 inches off. Six inches in 13 miles is a lot of material."

While Mathiowetz is facing adverse conditions and a lot of extra work to maintain progress, they now have advanced technology to assist them. With Topcon's machine control system on their Cat 14H, they are able to bring reconditioned areas back to subgrade tolerance quickly. Without machine control, they would have to set grades multiple times. Topcon's System Five 3D-GPS+ machine control is eliminating a tremendous amount of layout labor and saving valuable time as they try to recover from weather delays.

Mathiowetz also uses Topcon's System Five 3D-GPS+ to construct the 20 detention basins on the project. The window of opportunity to grade, topsoil and seed the bottom before the next rain is very limited. MNDOT specifies that GPS machine control must be used on the pond, and provides 3-D surface files to the contractor. After the ponds are graded, Mathiowetz uses Topcon's system to collect topo data while running the machine over the finished areas. This as-built information is then transferred to a data disk and turned over to MNDOT

for review and approval.

The Next Few Months

In early August, Shafer Concrete, Shafer, Minnesota, will be assembling a ready-mix concrete plant adjacent to the new roadway. By mid-August, Schafer will be paving CSAH 2 & 3 and areas of Highway 14 where the subgrade has been approved.

Mathiowetz will continue to attempt to make up time lost due to the rainy weather. As they are working, Brian Mathiowetz is progressively building MNDOT's confidence in GPS technology. He commented on the progress they have made so far: "We began to use GPS technology to shape the road, not knowing how it would work. To check our grades, MNDOT came and put their blue tops in, like they always do. They matched up so nicely that they're impressed. Their bluetops and our grades were right on. So now they're reducing the number of bluetops they put in for quality control. And we're feeling good about what the grade control is giving us."

Laser Control, located in Bloomington, Minn., supplies Mathiowetz with Topcon construction products and technical support.

Highway 41 — SP 8103-47

- Embankment earthwork — 3,500,000 cubic yards
- Muck excavation — 500,000 cubic yards
- Granular fill (import) — 400,000 cubic yards
- Concrete paving — 441,000 square yards
- Bituminous asphalt paving — 63,000 tons
- Storm drain pipe and culverts — 383,000 linear feet
- Construction of three bridges
- Completion date — October 14, 2006
- Contract amount — \$34.3 million

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