



# Case Study

Layne Christensen Company

Computers that  
deliver in the  
harshest environments



noax Industrial PCs at Layne job sites world-wide

## Computers deliver a wealth of data at rugged job sites

In 1882, company founder, Mahlon Layne, combined hard work and ingenuity to devise better ways of drilling to coax water out of the arid lands of a community known as Old Swan Lake,

near what is now Hurley, South Dakota. Mahlon's neighbors quickly took notice and shortly thereafter, a company was born. Carrying on

"The noax computers were practically ready for our use right away and the company's experts were very understanding of our needs."

Mahlon's spirit of innovation, Layne Christensen now employs sophisticated software and hardware around the world to control and monitor their drilling process for massive construction projects in harsh, unforgiving conditions. These systems rely on rugged and versatile noax Industrial PCs. More than 130 years later, the Layne Christensen Company, now based in The Woodlands, Texas, continues to grow by offering the latest in drilling technology for water treatment and construction projects throughout offices spanning 5 continents worldwide. From working with the Army Corp of Engineers to build dams around New Orleans following Hurricane Katrina to devising and executing the ingenious plan that helped rescue the 33 trapped Chilean miners in 2010, Layne's expertise extends well beyond traditional drilling methods.

### Growth through innovation

Three years ago, Layne's GeoGroup Division, which provides sustainable, specialized geotechnical foundation construction services to the heavy civil, industrial, commercial, and private construction markets around the globe, acquired Bencor Corporation of America, North America's leading constructors in foundation and underground engineering. Bencor's capabilities, however, go way

beyond simply providing heavy equipment brute force. For years, the company manually collected geological data so they could determine the best placement for drilling. In an effort to achieve greater precision, oversight, and flexibility in their process, once integrated in Layne Geoconstruction division, Bencor began experimenting with software and computer hardware to produce and gather data. Quickly realizing the benefits of these improvements, Bencor worked closely with Layne Geoconstruction's latest acquisition, Fursol Informatica, a respected Italian company leading the way in project management software and systems automation. In 2012, Layne brought Fursol's CEO and job-monitoring software expert, Massimo Mucci, and his crew of IT experts to its Dallas headquarters.

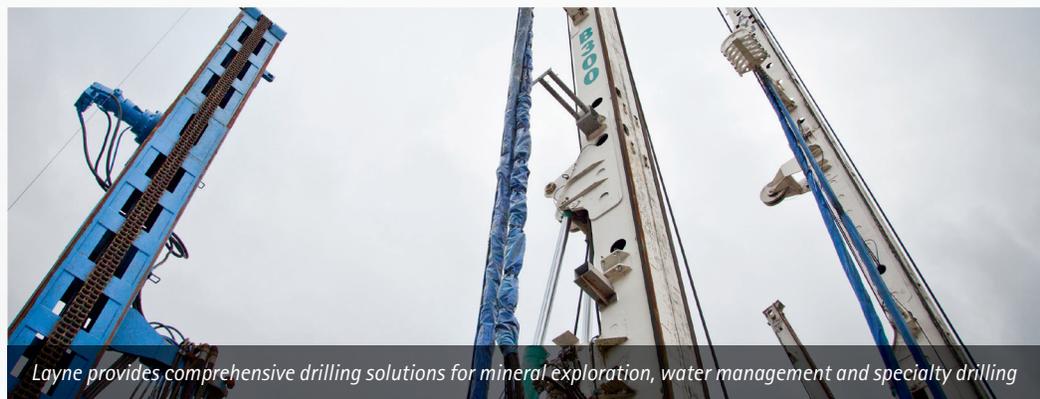
### Efficiency through automation

Layne Bencor is involved with massive dams, transportation projects and other structures that need solid support. To shore up the foundations for these projects, Layne Bencor uses the jet grouting process to pump sealing material into boreholes that measure roughly 20-meter to 40-meters deep. Depending on the project, construction

crews can use derricks with single-, double-, or triple-headed drills. Once the rig completes the hole, a pumping unit injects a grout mixture of cement and chemicals under very high pressure (400 to 500 bars to a depth of 20 to 30 meters), forming a two-meter diameter column. These overlapping holes run along the width of a dam, upwards of two thousand meters, to provide the needed reinforcement and prevent water infiltration that could eventually undermine a project. Each time the rig moves to the next drilling spot the GPS accurately spots its position, displaying the exact location on the computer. While the drill operates, information is fed to a computer from sensors mounted on the derrick. The computer screen provides the operator with crucial information on the up-and-down head movement, X and Y axis measurement, drill turning speed, and pressure. "We want the operator to know all of the drilling and injecting parameters at the same time," notes Mucci.

### In control with noax computers

Tracking job-site progress is crucial for the success of these projects, and not just any computer can do the job. These sites are places



Layne provides comprehensive drilling solutions for mineral exploration, water management and specialty drilling

*The foundation services provided by the Layne Bencor division of the international construction firm of Layne Christensen Company are crucial to the success of massive infrastructure projects worldwide. Rugged noax computers enable Layne Bencor to complete these challenging projects with the precision and efficiency their customers have come to expect from the recognized industry leader.*

*Layne employs specialists to understand specific site characteristics and proactively plan for challenges*



where a combination of dirt, mud, and water and the high-pressure sprays used to blast off this caked-on grime can attack unprotected circuitry, combined with performance-threatening intense heat and humidity. When Mucci first began working on the Layne Bencor projects, he considered an Italian brand of industrial computers. After two months of testing, he concluded that although these units could handle the plant-floor environment, they would not withstand unforgiving field conditions and certainly would have problems with vibration during drilling. Mucci and his team encountered noax while attending the Hannover Fair in Germany. "The noax computers were practically ready for our use right away," says Mucci, "and the company's experts were very understanding of our needs." A noax C12 computer with its 12-inch screen is mounted on the single-head drill rig. On machines with multiple heads, the bigger 15-inch C15 allows for easier viewing while accommodating the larger number of sensors. Mucci and his team have also set up a system so the operator can use the responsive noax touchscreen to easily change the way the data is displayed. On the multiple-head rigs, the operator can view information for each drill head and scroll through different pages of data simply by using the touchscreen. The operator is able to observe both the operation of the drill and the information on the noax computer screen. This requires that the PC be mounted directly on the derrick, subjecting it to jarring vibrations during the drilling. Mucci is well aware of these demands. "We are not only working in remote locations, but we are also working on strict schedules and there is normally tight coordination with the subcontractors on projects. Failure is not an option."

### Reliability where it counts

One of Layne Bencor's toughest challenges, the Belo Monte Dam project located on Brazil's Xingu River, where an army of 20,000 workers are on the job, using equipment that had to be transported hundreds of miles through rugged country. When completed, this will be among the largest hydro-electric dam projects



*Layne's experience and engineering capabilities enable them to develop and provide unique solutions*

in the world, generating 11,233 megawatts and adding to the country's energy self-sufficiency program. On top of the impressive size, this project is in the middle of a remote, lush jungle. During many months, the temperatures can reach in the upper 80s, with high, oppressive humidity and frequent rains that can be damaging to electronic circuitry. The weather-resistant, environmentally sealed IP65 (NEMA 4) rated noax computers with heavy-duty cast aluminum casings, give Layne Bencor the confidence they need to keep their projects running on schedule and on budget. Despite the

punishing heat, extreme humidity, and heavy vibration, their noax PCs have never failed.

### Real-time data in remote locations

Back at the contractor trailer, an engineer is wirelessly connected to the noax computer and is looking over the shoulder of the operator as the work progresses in real time, communicating through a speaker so proper instructions can be communicated to on-site operators. Along with job site control, the noax computers feed the data captured on the site to the computers in the job trailer and at the main office. With each project, Layne Bencor and the contractors gain a greater understanding on how to create process efficiency, to improve the use of resources and to provide traceability.

*"What we were looking for was reliability and with noax computers, we got it."*

### Dependability that can be trusted

Mahlon Layne's rugged spirit helped him conquer the Dakota plains and led to the founding of the great company that bears his name. He would certainly appreciate the same spirit that goes into the noax computers that enable his company surmount even bigger challenges today, and into the future through the power of data. "The noax computers," says Mucci, "enable us to provide contractors with a complete understanding of the process going on at job sites. We can tell customers if the job is going according to spec and can provide any information when needed." This gathering of information must be ongoing every second while on the job site. "What we were looking for was reliability," says Mucci, "and with noax computers, we got it."



## Layne Christensen Company

### Company profile:

Layne, Inc was founded in 1882 in Hurley, South Dakota by Mahlon Layne. With a focus on water drilling services, the company quickly expanded nationally spurred by the country's agricultural expansion. In 1996, Layne merged with the Christensen Boyles Corporation to become Layne Christensen Company which is now a global water management, construction and drilling company; operating throughout North America, as well as worldwide. Customers include government agencies, utilities, industrial companies, mining companies, consulting engineering firms, heavy civil construction contractors, oil and gas companies and agribusiness.

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## Requirements and applications

### Objectives:

- ✓ On-site monitoring of drilling operations to enable operator control
- ✓ Real-time communications and data collection from the job site
- ✓ Ability for on-going process control and increased visibility
- ✓ Precision quality control information to ensure traceability

### IPC requirements:

- ✓ Wireless communication
- ✓ Completely sealed casing in accordance with protection class IP65
- ✓ Reliable communications in a harsh, demanding environment that includes extreme temperatures, high humidity, shock and vibration
- ✓ Integrated, resistive touch panels to ensure simple and reliable operations
- ✓ Dustproof, splash proof and water resistant

## An overview of components

### Hardware:

- S12, C12 and C15 Industrial PCs
- In-house developed noax all-in-one motherboard
- Input: chemically-hardened resistive analog touchscreen
- Bright, high-contrast TFT display
- Protection class IP65 (NEMA 4)
- Completely sealed, with internal fan

### Software:

- Operating system: Microsoft Windows XP Embedded
- Application programs: Proprietary software developed by Layne: Ultimate Grout Control (UGC)

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