Drive Technologies

Mine operator reduces cost with Siemens integrated drive systems

For years, a full service mining construction and engineering company has depended on a long list of vendors of drive train components. On a typical coal mine conveyor project, for example, one vendor may supply variable frequency drives (VFDs), another may be chosen for motors, and yet another specified for gearboxes and/or couplings. That’s not to mention the automation, instrumentation and electrical distribution product considerations.

The company routinely spent months engineering the components to work together, planning for inventory and then overseeing commissioning and startup. Additionally, it would contact each vendor individually when a problem arose with a particular piece of the system. This process was time consuming, costly and lacked vendor accountability.

Recently, the engineering company embarked on another mining conveyor project in Indonesia. However, instead of repeating the multi-vendor process, it tried something new that would dramatically cut the time it spent engineering the system, save thousands in product costs and hold a single point of contact accountable should issues arise before and after the installation is complete.

Siemens Industry, Inc. was selected as the single source supplier for the 13km-long, overland conveyor project. Siemens is not only supplying the drive technology products, but oversees all engineering and commissioning work, as well as quotation, LoA, legal review, technical review, purchase order and invoicing services, shipping and logistics.

Siemens mechanical and electrical drive products have been a critical part of the mining process for decades. Mining companies worldwide rely on the company’s gearboxes, drives and motors for efficient and reliable operations. Historically, these products have been individually specified and seldom bundled together – until now.
Like a big rubber band
The conveyor has been described as a 13 kilometer long rubber band that can stretch up to 21 feet as the system is started. A Siemens SIMATIC S7 300 controller and two VFDs located at the head shaft of the conveyor slowly ramp up the speed of the conveyor so the belt does not stretch too much, too fast, or snap. At the same time, the control system ensures the proper slowing speed so the conveyor does not bunch up at the end and cause problems at the head shaft.

“It takes about 20 minutes to get to full speed,” Patton says. “The full motor speed is 1,500 RPM, which goes through a gear reducer that reduces the speed to 107 RPM and moves 9,000 tons of coal per hour.”

There are two 2,950 HP / (2200kW) motor and B3SH21 gearbox with a 1200mm dia. x 600mm wide flywheel combinations, located at the conveyor head shaft, which simultaneously pull on the shaft. Each motor has a VFD in a load sharing configuration, which ensures that both motors continuously pull at the same RPM and the same torque. The load sharing configuration eliminates one motor trying to pull or push the other motor, and stops premature wear within the motor and gearbox, as well as wear or damage to the conveyor head shaft assembly.

“The SINAMACS VFDs have built in network protocols to communicate back through the drive to the PLC network,” says Shawn Baggerly, who manages Siemens inside sales group for low voltage drives. “There are a lot of these systems out there, but because Siemens is the master of the network protocol, even down to the motor level, we offer levels of expertise and ease of configuration that make this single vendor concept possible.

“There are no other vendors who can provide the total system like we did in this case,” Baggerly continues. “It allowed the customer to operate the way they wanted to, and meet their technical requirements with one manufacturer. Siemens was able to work collaboratively with the engineering firm and found a way to work with someone who otherwise could be competing for the same work. In the end, both companies found that it made sense to take the single source approach.”
Relationship and international presence
The relationship with the engineering company didn’t happen overnight. Rama Iyer, Siemens product manager, Flender gearboxes and couplings, recalls how he and other company engineers built a good rapport with the customer. “Our first job with them was in 2004,” Iyer says. “Since then, we have supplied products for more than 25 projects. They have become our best gearbox and fluid coupling advocates when other companies visit.”

This ongoing relationship convinced the company to try Siemens mechanical and electrical drive products for international projects at other locations too, ultimately leading to the single source solution.

Additionally, the arrangement allows the customer to limit the number of inventoried spare parts. “That is a huge capital investment savings,” Baggerly says. “Being an international company, we are represented all over the world. Other companies do not have the worldwide presence and support for all of the products, such as off the shelf power modules, like we do.”

All together now
“Normally, we would supply the products to the OEM and it would handle the rest, including engineering, commissioning and startup,” says Andy Patton, Siemens senior sales engineer specialist. “In fact, the customer originally approached us to separately supply products from two different businesses. We responded with an integrated system that relieved the customer from the stress and risk of ensuring all components were optimally integrated.”

Five Siemens teams from across the U.S. pulled together to engineer a single package that included Flender gearboxes, couplings and base plates, low voltage IEC motors, medium voltage IEC motors, low voltage IEC drives and medium voltage IEC drives.

“It was not that difficult to convince the company to try the single supplier approach,” Patton says. “We just explained that they would have one company responsible for the whole project, and there would be no finger pointing. We developed common terms and conditions to make it easier for the customer to process. We took responsibility for an engineered system and dedicated ourselves to flawless execution.”

Patton was Siemens single point of contact with the customer. Since this was the first time either company had implemented a single, engineered system for conveyor control, Siemens developed a single quote based on a packaged price, not individual products. Patton says the quote not only saved the customer money, it also allowed Siemens to offer a standard template which streamlined the process.

“It is a uniquely engineered, packaged system that cut the customer’s engineering time in half,” Patton says. “We took the customer’s different specifications, sent them to our experts, and they did the rest.”

The Siemens teams worked together with a technical review committee at Siemens Operation Engineering Center in Alpharetta, Ga. Chris Menocal, Siemens Drives Technologies manager of process improvement, oversaw the review process.

“The cross-functional technical review committee verified that the equipment specified would meet the requirements of this unique application.” Menocal says. “That is where the sole-source responsibility of one company comes in. After the installation was underway, we regrouped for a review of the project to see how we could further improve similar jobs in the future.”

Conclusion
Patton said a similar single-source project is planned at the same location, and is expected to be commissioned by the fourth quarter of 2013. As word of their success has spread throughout the industry, Patton says Siemens has received multiple orders for other sole supplier projects.

“Getting everybody to work together was an achievement,” Patton says. “This dedication of the cross functional team shows the mining industry that we are serious about their industry and we are here to stay.”
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