Trapped: Saving the Chilean Miners

Sixnet industrial Ethernet switches are prepared for installation at the San Jose mine in Chile. (Photo courtesy: Codelco)

Machine-to-machine networking solutions manufacturer Sixnet donated its industrial Ethernet switches to the rescue effort that saved 33 miners from a collapsed mine in Chile last year.

When disaster strikes, lives are at stake and rescuers sometimes have to enter dangerous situations blind. When the San Jose copper-gold mine collapsed in Northern Chile's Atacama Desert in August 2010, 33 miners became trapped for 69 days. Rescuers could only communicate with them through a six-inch hole that was drilled 2,300 feet down into the mine.

To help aid rescue efforts, Sixnet, a manufacturer of machine-to-machine (M2M) networking solutions, donated its SLX-5ES-2ST industrial Ethernet switches, which were mounted into the Phoenix rescue pod that was used to transport the trapped miners from the cave back to the surface. The assumption was they would be used for communication purposes with the miners.

"The SLX-5ES-2ST is our smallest and lightest switch with a port-type combination that provides optimal flexibility," says Scott Rose, manager, technical account team, Sixnet.

"When we handed it to the rescuers, we weren't really sure how it would be used, but we knew that if they needed any communications inside the mine it might come in handy."

Rose says the owners of the mine walked away when the initial accident happened because they didn't have the resources to mount any kind of rescue. At that point, Codelco took over the effort with Transworld, an existing Sixnet partner of the state owned copper-mining company.

Before Sixnet made it to the rescue site, the miners were communicating with

rescuers from a six-inch shaft. “Essentially it was a point-to-point connection,” says Rose, “so we decided to use an unmanaged switch that requires no configuration. We also chose the smallest one we had, knowing the size limitations.”

The SLX-5ES-2ST was also chosen because of its size, weight, power draw, shock and vibration specifications, and humidity and temperature resistance.

Inside the Phoenix capsule, the Ethernet switch was accompanied by a video camera and other Ethernet-based measurement devices that all transmitted data back to the rescuers.

“The switch provided an aggregation point for all the devices into one unit,” says Rose. “It sent the overall signal all the way to the top on a combined path. So basically, it offered a method of connecting the various devices in the capsule that were used to provide data on the surface.”

The SLX-5ES-2ST draws less than five watts of power, so it is easy to keep it powered with a small power source. Its small size and weight helped it fit down the hole. The switches’ relative humidity operates from 5 to 95 percent.

“I was told that the humidity was regularly higher than 95 percent inside the shaft and mine,” says Rose. “The temperatures were routinely pushing close to 100ºF, well within the switch’s -40º to +85ºC temperature range.

Sixnet industrial Ethernet switches are installed in the Phoenix rescue pod during the Chile miner rescue. (Photo courtesy: Codelco)

Rose was informed that the path in and out of the shaft was a pretty bumpy ride, so the switches had to be able to handle the shock and vibration without any negative effect to their performance.

During the rescue mission, one of the main challenges was putting together the Phoenix capsule. “The camera system and switch were put on the capsule, but the real challenge was controlling the weight,” says Rose. “Ultimately, the rescuers used the camera connected to the switch to verify the path of the drilled hole.”

Rescuers looked at the surrounding rock structures to verify the safety of the hole to determine if they could start pulling the miners up.

“Without the switch,” emphasizes Rose, “rescuers would not have been able to look at the route to determine if there was any crumbling or other potential problem as they started to pull the miners out. They would have been pulling them out blind, running the risk of having someone getting stuck in the capsule halfway up the path.”

Having the ability to pull data from various devices in the capsule before adding the human element gave rescuers a sense of confidence before entering the shaft. Using technology in these types of disastrous situations not only ensures the safety level of the surrounding elements, it also gives rescue teams an extra set of eyes before entering an unknown situation.

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