Case Study
Plexus PowerNet™

Maestro
Digital Mine

The first gigabit network providing both data and power using coaxial cable.

VALE

Vale Canada's Garson Mine is an underground nickel mine located in Canada's historic Sudbury Basin. It started producing ore in 1908 with its first shaft. It opened the second shaft in 1942. The deep mine is 5330 feet below collar and produces 2,200 tonnes of ore per day. Developments are underway to access new sources of ore with the discovery of the McConnell deposit. *Vale*'s Ontario Operations are recognized around the world as one of the largest fully integrated mining operations in North America.

Vale's continuous evolution into the digital age of mining and integration of digital technologies into their underground operations has been facilitated by *Maestro Digital Mine*. *Maestro* has worked with *Vale*'s Garson Mine to understand the challenges associated with traditional communication backbone solutions (broadband and fibre). Recognizing potential for substantial improvements *Maestro* took immediate action and installed the *Plexus PowerNet™* system. The *PowerNet* system extended communications using existing infrastructure to where it is needed the most, i.e., *the last mile to the face*. This innovative extension increases production, reduces cost, and enhances worker safety.

The Challenge

Garson Mine uses Blasthole Stoping (Slot/Slash) and Uppers Retreat mining methods. Currently the underground mine has a combination of broadband throughout the mine and some fibre optic cabling communications infrastructure. Fiber optic cabling is a fast and reliable communication network, however presents a number of challenges to the underground mining industry. Extending fragile, fiber optic cable to the high traffic headings where the data is needed is problematic due to the nature of the drill and blast cycle. In high traffic areas, fibre optic cable can get damaged and often require complex and time consuming repairs. The dusty, wet environment makes splicing and repairing in the field, extremely difficult and time consuming. It is also expensive to repair and requires external highly skilled professionals to repair, taking time and can often bring production to grinding halt.

Broadband was once embedded throughout the mine and as technology advanced is slowly being replaced by fibre. When broadband fails, it can be extremely difficult to trouble shoot the problem from the control room on surface. Sending repair crews down to the affected level with the right tools to repair the cable also requires highly skilled professionals, who are not always on site to complete the task rapidly. If an inexperienced repair crew goes down with the wrong tools, this further delays the repairs and slows down production and increases costs.

As part of the mine production schedule and ground support requirements, paste fill needs to be set and cured into the empty stopes before mining the adjacent areas. For safety requirements, an Ethernet PoE camera is pointed over the bulkhead to monitor the fill operation. This will confirm that the paste fill is entering the stope and not another area due to an abrasion pipe break. No working camera, no pouring paste backfill. Safety comes first. So, when the broadband stopped working one day, so did the cameras and production came to a stop.

Challenge Elements:

1. Lack of power and data to the pour point camera
2. Delays in production; costs increasing
3. Limited to existing infrastructure – Broadband with CISCO switches
4. Limited in-house resources of high skilled professionals to repair
5. No easy method to repair, explain, and maintain

The Solution

Mr. Steve Mainville, Instrumentation and Automation Technologist at *Vale*'s Garson Mine, contacted *Maestro* to solve the problem immediately.

Maestro to the rescue, of course. *Team Maestro* in collaboration with *Team Vale*, were able to add a power supply and a *Plexus PowerNet™ A*-node to the existing broadband infrastructure. The team then connected the *Plexus PowerNet™ C*-node with their existing coaxial cable and then plugged in their existing IP camera. They got the pour point camera back up and running just like that within 24hrs!

> *"Maestro understood the urgency of the task at hand and brought their team of experts over right away and essentially, pulled a rabbit out of a hat!"* said Steve Mainville of Vale

Maestro designed a communication system that simplified the installation, extension, and maintenance of the network, while enabling high bandwidth, low latency, low jitter data and endpoint power using tried-and-true coaxial copper cable. The termination process now becomes easy and cost effective, utilizing basic tools. A termination can be completed by any tradesperson in less than 2 minutes. *Maestro Digital Mine*'s *Plexus PowerNet™* is the world's first powered coaxial Gigabit network.

The Plexus Advantage

By applying a new technology to an existing platform, "Our entire infrastructure has a new life because of the Plexus. In a mine, fibre has its place." said Mainville. "Fibre needs to be secured and well protected, but in high traffic areas where you have scoops and trucks moving around, the durable coaxial cable is the most effective at providing data to the face of the mine. What I realized through this application was that the *Plexus PowerNet™* simplifies the problem making it as easy as, core, plug, done! If the cable gets damaged now, the team in-house can splice it and get it back up and running! It's about immediate in-house repairs. I'm seeing the benefit of the *Plexus PowerNet™* in high travelled areas."

Outcomes

Currently, Garson Mine is using the *Plexus PowerNet™* at the 5000 level to power and collect the data from the pour point IP camera. Already, several other levels and applications are being added. The *Plexus PowerNet™* can be connected to anything that is Ethernet based. Whether it be business, process automation, tracking, tele-remote, analytics, or seismic. If the backbone is there, it can be implemented. Downtime is minimized. Cut, strip connect!

Plexus PowerNet™ delivers a high speed, low latency digital communication network that provides PoE+ power to Wireless Access Points (WAPs), cameras and any other IP based device. The system eliminates the need for costly outside fiber optic contractors and can be installed and maintained by any internal tradesperson.