The Companhia Vale do Rio Doce (CVRD) is the world’s largest iron ore and pellets producer. To bring the ore to seaports, hundreds of kilometers of railway tracks were constructed to the mining centers. ABB has planned and implemented the related communication networks, which not only serve operational purposes but are also prepared to carry CVRD’s corporate applications.
Companhia Vale do Rio Doce – a leader in iron ore production

About CVRD

Companhia Vale do Rio Doce (CVRD) is the world’s largest iron ore and pellets producer and exporter and is also the largest diversified mining company in the Americas. Its diversified line of high quality iron-ore products covers all steel production processes. In addition to iron ore, CVRD has significant interests in bauxite, aluminum, steel, manganese, pulp and paper, gold, copper, kaolin, potash and other natural resources. CVRD is the world’s lowest cost integrated producer of primary aluminum. It is a major logistics player in Brazil, owning and operating railroads, maritime terminals, and a shipping company.

Over the past few decades, Carajás has not only become one of the world’s biggest mining areas, but also has a considerable infrastructure for transporting minerals. Access to the sea was made possible by the construction of the 900 kilometer Carajás Railway, which crosses near-virgin territory, and which obliged the government to construct port facilities for this specific cargo.

More than 1600 km of railroads

ABB signed a contract with CVRD to supply the Optical Communication System of the Vitória Minas Railway, which links the State Capital of Minas Gerais, Belo Horizonte, to the Port of Tubarão in Vitória, State of Espírito Santo.

The optical SDH STM-1 system transmits data, voice, image and all the railway’s control and signalling for approximately 110 stations (Relay Houses) along 700 km of railway. The new system replaces the existing coax-based communication system which has been in operation for 30 years. ABB’s scope of supply covered the supply, installation, and commissioning of optical equipment.

In another project, ABB supplied the optical system for the second most important CVRD railway track, the Carajás-São Luís Railway. It was extended in 2001 by further 15 PDH/SDH equipment making a total of 55 stations over the 900 km of railroads of the northern track.

Figure 1: CVRD Railways
Optical Communication System along the rails

One network - various applications

The following aspects were important drivers for the installation of CVRD’s integrated communication system:

- A new sophisticated train-traffic control and signaling system was needed to improve the train-density on the network. This resulted in the requirement for more bandwidth and higher redundancy in the communication system.
- Remote video surveillance services.
- Voice communication for operational purposes.
- Integration possibilities for installed assets based on traditional interfaces such as RS-232 or V.35.
- Prepare for upcoming IP-based LAN extensions.

Especially the last aspect turns out to be important: more and more applications are based on Ethernet & TCP/IP connectivity. With this network functionality ready, CVRD’s subsidiaries can now interconnect their business-services over their mother companies’ own assets. This provides the following advantages:

- No payments to third party network providers
- High network availability and performance
- Less danger from threats to security

How CVRD sees the benefits

Filipe Borba, an analyst for CVRD and project coordinator comments as follows:

„The new communication system helps us to improve productivity enormously as it is the base for train control and the better control we have, the higher train-density we achieve, means more mineral-transport capacity. As all the signalling and indirectly also the communication to all our trains is running over ABB’s solution, availability and security is the key. The additional IP-connectivity opens doors for new applications like interconnecting corporate LANs and running IP-based video-systems. With substituting the old analogue system, which has been in use for nearly 30 years, we also can reduce maintenance and cost dramatically."

Mr. Filipe Borba
Analyst and Project Coordinator

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Figure 2: Partial View of CVRD’s northern network: the FOX515 with its redundant 1+1 STM-1 trunks form the backbone, whereas smaller stations are served with 8 Mbps. This set-up adds additional resilience to mission critical communication network.
The communication devices used in brief:

FOX-family: Versatile combined Access- & Transport-Multiplexer for utility applications, including protection, legacy data, voice and LAN-connectivity. Fully supports STM-1 capacity and all the related traffic protection schemes.

MUSIC: Stand-alone XDSL-Terminal, that allows to connect LAN (4 ports) and other services remotely to the FOX-Multiplexer via telephone-line, based on latest XDSL-technology. Bandwidth of more than 2 Mbps can be achieved over more than 12 km.

LEMU6: Plug-in card into the FOX-Multiplexer, connecting up to six MUSIC-devices via XDSL. LEMU6 offers in addition a LAN-interface and full switching/routing functionality.