

# KEEPING GROWTH UNDER CONTROL

MINING GIANT VALE (VALE S.A.) OPERATES AROUND 10,000 KILOMETRES OF RAIL TRACK IN BRAZIL. ITS FOUR RAILROADS – VITORIA-MINAS, CENTRO-ATLANTICA, NORTH-SOUTH AND CARAJÁS – CROSS NINE STATES AND ACCOUNT FOR AROUND 16% OF ALL CARGO TRANSPORTED BY RAIL IN THE COUNTRY. TO KEEP PACE WITH SURGING VOLUMES OF FREIGHT ON THE CARAJÁS LINE, FED BY THE WORLD'S LARGEST IRON ORE MINE, A STATE-OF-THE-ART TRAIN TRAFFIC CONTROL SYSTEM, FROM MODULAR MINING SYSTEMS, INC. (MODULAR), LIES AT THE HEART OF OPERATIONS.

Established in 1985, the Carajás railroad (EFC) operates the longest train in the world, more than three kilometres long. The 1600mm gauge railroad extends for 892km, connecting the states of Pará and Maranhão. As part of an integrated logistics network, it comprises two railroads, eight ports, a coastal navigation service and warehouses. Besides iron ore, the fleet of 14,000 wagons and 230 locomotives carries additional materials such as pig iron, manganese, copper, fuels and coal, among other products. In 2009, the EFC transported a total of more than 93 million tonnes of products – 89,538 million tonnes of iron ore and 3,988 million tonnes of general freight.

The line also carries people, with its passenger train serving as one of the most important means of transport between the two states. It crosses 25 communities – 21 in Maranhão and four in Pará – transporting an average of 1,300 travellers per day.

In 2002, to keep pace with and expand its volumes, the EFC deployed SmarTrain®, the centralised train traffic control system from Modular. Within the mining industry, Modular is a leading global provider of information management solutions. After having success with Modular's DISPATCH® fleet management system in the Carajás mine, Vale approached Modular about developing a similar system for railroads. The result was the SmarTrain system, and it has remained at the centre of operations since. "Previously, we used partly proprietary technologies that were incapable of addressing our growing capacity needs and would have risked disrupting operations," explained Reginaldo Braga, maintenance supervisor at EFC's control centre. "The SmarTrain system uses the latest technology, and the information it provides helps us in decision-making. Also, it is

used to operate the interfaces between train and track, e.g. using GPS to track trains."

The patented system links each locomotive to a control centre for communicating data and control signals. Using on-board computers, GPS and two-way communication hardware, rolling stock continuously communicates position, health data and other information into a comprehensive, computerised control system and database. The latter includes train schedules for real-time display on train monitors. The current position of each train is compared to its planned schedule online to provide immediate information to the dispatcher. The dispatcher can then determine whether corrective action is necessary.

Furthermore, the SmarTrain system integrates with major existing subsystems, such as signalling, trackside devices, maintenance and corporate systems. This full-scale integration enables users to more flexibly manage the movement of all trains. It also facilitates accurate and uniform communication across departments, as a variety of users see the same information in a single, high-level, integrated view. This leads to faster and more reliable decision-making, reducing response time to actions, routine procedures and emergency events.

## MAXIMISING PERFORMANCE

Since its introduction, Modular's SmarTrain system has played a significant part in maximising the performance of the EFC by increasing the tonnage carried and reducing the transportation cycle of the cars. The system is expected to continue delivering benefits over the coming years. Although the EFC currently transports 100 to 110 million tonnes of freight (iron ore and general cargo) every year, Vale expects volumes to expand



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A Vale engineer uses the SmarTrain on-board computer

to 230 million tonnes by 2015-2016. "Our clients in China and other markets are demanding a lot of iron ore," explained Mr Braga, "but the line was built to carry no more than 100 million tonnes annually." In anticipation of this upsurge, the Carajás Railroad Expansion Project is underway to increase capacity by doubling the track, further building a new 150km branch and replacing the existing signalling system.

As a consequence of these major infrastructure improvements, the SmarTrain system is currently being upgraded as well. "It is continuously being developed to meet our changing requirements and greater needs," said Mr Braga. "Traditionally, such systems were about control and supervision, but the SmarTrain system enables us to use information to more efficiently manage the railroad, to interface with the on-board systems. And with goods carried expected to almost double, efficiency is an absolute must."

## MORE INFORMATION

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