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Vale deploys the Integrated Operations Center in Minas Gerais, Brazil

The Integrated Operations Center (COI, Centro de Operações Integradas) will synchronize and optimize the iron ore value chain to allow for maximization of Vale's margin

Vale has started the COI activities at Águas Claras mine (MAC, Mina de Águas Claras) in Nova Lima, Minas Gerais, Brazil. "The purpose of the project is to synchronize even more the various phases of the operation in Brazil and abroad bringing it closer to the sales area, thus gaining efficiency and price realization," says Vagner Loyola, Vale's Iron Chain director. "For example, we have to frequently manage the flow of about 300 vessels in several positions around the world; task that will be greatly facilitated by COI's integrated actions."

IOCs (in English) are facilities, generally in metropolitan areas, that combine people's competencies, operation processes, and technology to deliver exceptional levels of collaboration and excellence. Vale's COI performance model will combine various functions of the iron ore chain, such as planning, scheduling, and control. Therefore, the center will

promote collaboration, efficiency, and alignment with the company's strategy, allowing it to act even more proactively given the current market dynamism.

The structure will allow Vale to get a more integrated view including mine, railroads, ports, and maritime transportation until the final destination of the ore, making the decision process more effective and focused on optimizing process and asset performance, as well as business results. "We are always looking to reach the global optimum, which is best for Vale as a whole, rather than maximizing local optima in certain areas," says Vagner Loyola, Vale's Iron Chain director.

Vale also expects greater alignment between planning and execution, greater stability and predictability of the production chain, as well as potential annual gains of more than US\$600 million, among price realization, assets productivity increase, and cost reduction.

COI's Implementation Phases

In 2017, during the first phase of project implementation, the company set up an area at Águas Claras mine in Nova Lima, in the Minas Gerais state, to welcome the so-called Global COI. More than one hundred employees will be working in this area, making decisions in real time and being responsible for integrated scheduling, sales pricing and planning, shipping, distribution, and sales. Responsibilities of the Global COI include defining the combination of products to meet the demands of customers, as well as defining inventory, blending plans in Asian ports (Malaysia and China), and vessel allocation optimization.

This year, the company will also get started on the second phase of the project, with the definition and planning of Corridors COIs – its extension to Vale's North, South and Southeast corridors. These structures will establish the daily and weekly schedule from the mine to the port, coordinate the activities between the Scheduling teams and Control Rooms, promoting actions to improve planning deviations, and interact in real-time with local operations and the Global COI.

Vale will also create a Center of Excellence (CE) focused on the performance of the most critical assets and processes. CE will bring together experts who will generate knowledge to be shared along the value chain, establishing productivity goals and priorities on the improvements to be implemented, in addition to setting standards, sharing best practices, and supporting operations to improve productivity and efficiency.

Use of Digital Technology

One of the pillars to achieve COI's purposes is the intensive use of digital technology to promote collaboration among teams, making information exchange easy and reliable, as well as to improve effectiveness of value chain planning, which is complex and involves professionals from different locations and time zones. These principles guided the project from its conception, resulting in an environment that combines modern visualization panels, video conferencing rooms, and several collaboration tools.

In addition, some systems have been improved and others have been developed to streamline and improve the processes of planning and production distribution. Two systems should be highlighted: Ferrous Advanced Planning and Scheduling (APS) and Vessel Allocation Optimization System (SOAN, Sistema de Otimização da Alocação de Navios).

The Iron APS system is an optimizer that has recently undergone improvements. Today it gathers data from the cost and capacity of value chain (mines, railroads, ports, vessels, and distribution centers) and from the market prices dynamics, to indicate the best possible combination to meet customer demands, with the purpose to ensure the best margin for the company.

"Until last year this system used data only from mines, railroads and ports, and the priority was delivering the largest possible volume," says Fábio Souza, IT leader of the program. Now the focus is obtaining the best margin from the

extended chain, which may affect, for example, ore blending from the mines of Carajás and Minas Gerais as well as the Malaysia or China distribution center to serve a customer."

Another system developed by Vale was SOAN, whose purpose is to optimize the allocation of the vessels fleet serving the company in order to obtain the lowest total distribution cost. The program considers all variables that influence the cost, such as fuel price and demurrage (cost related to the time spent by the vessel waiting in line at the port terminal), and establishes the cargo and route for the vessels transporting Vale's ore to the customers. The distribution scheduling and location of each vessel is shared in real time via COI screens and mobile applications. Approximately 400 vessels can be displayed simultaneously.

New improvements and solutions have already been mapped out to be developed in the coming months. According to Jânio Souza, IT Innovation manager, "the purpose from the beginning was to invest on opportunities proactively and incrementally. We have more than 20 initiatives mapped out, including optimizers, dashboards, and advanced analysis solutions that will be developed in the next phases of the program, according to our learning from use and maturity of the processes."

More information



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