

ELIPSE E3 IMPROVES CONTROL AT VALE'S SINTER PILOT PLANTS

Elipse Software's platform streamlines data acquisition, maintenance, and operation at the mining company's Ferrous Technology Center (CTF) in Nova Lima, Minas Gerais, Brazil

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Needs

Established in 1942, Vale is a multinational mining corporation and one of the world's largest producers of iron ore, pellets, and nickel. It also produces copper, gold, silver, cobalt, and platinum group metals. Sinter, a solid mass formed by bonding fine ores and other particles with heat below their melting point, is a key feedstock for blast furnaces in steelmaking.

To better simulate, study, and analyze its products and its customers' processes, the company created the Ferrous Technology Center (Centro de Tecnologia de Ferrosos, or CTF). Based in Nova Lima, Minas Gerais, Brazil, the CTF initially relied on an outdated SCADA system that had no database and could not communicate with other automation equipment.

As a result, Vale had to use an external executable program to supplement the obsolete system's functionality, a workaround that was inefficient and complex to operate. To solve these issues, the company decided to adopt Elipse E3. Developed by Elipse Software, a global software developer of real-time and remote process management platforms, the solution has brought greater efficiency and safety to operations at the CTF.

Elipse E3's ability to communicate and interact with the different types of automation equipment at the research center has freed Vale from relying on external programs to access these systems. E3's database, a feature the previous SCADA system lacked, has also allowed the company to monitor a much larger volume of data. The software was implemented at the CTF by Simatec Tecnologia em Automação, a leading company in automation, IT, and motion control.



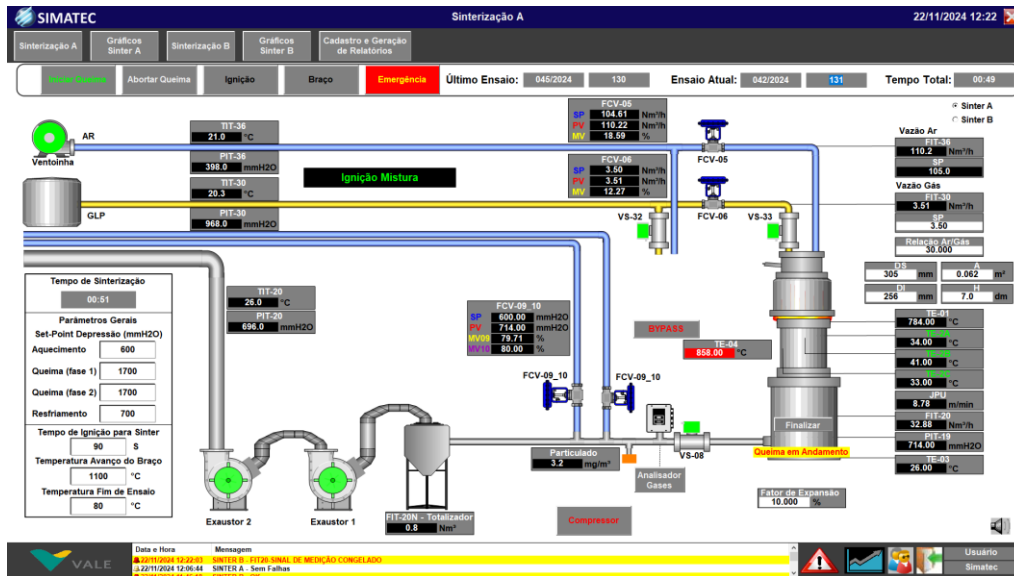
Vale's Ferrous Technology Center (CTF) in Nova Lima, Minas Gerais, Brazil

Solution

The application developed in Elipse E3 for this project is a brand-new standalone system, designed to communicate directly with the PLC (programmable logic controller) already in place in Vale's infrastructure. With it, the company can now control, analyze, and edit the sintering processes at the CTF both remotely and centrally, with no need for other external programs.

The research center has two laboratories, each with a sinter pilot plant where sintering is carried out. Their analysis and test results are made available by Elipse E3 and serve as the basis for the same processes at other Vale plants. With the software, Vale can now control the temperatures, pressures, and flow rates of air and LPG (liquefied petroleum gas) measured during the burns at units A and B.

For this purpose, the application includes two process graphics screens for the sintering units, where operators can monitor variables and equipment, such as ducts, furnaces, exhausters, and valves. On these screens, operators can also start or abort a burn and check the dimensions of the sinter pots, where the raw materials are placed before being burned and sintered in the furnaces. Elipse E3 also allows the burns to be analyzed graphically.



Process graphic screens for sintering unit A

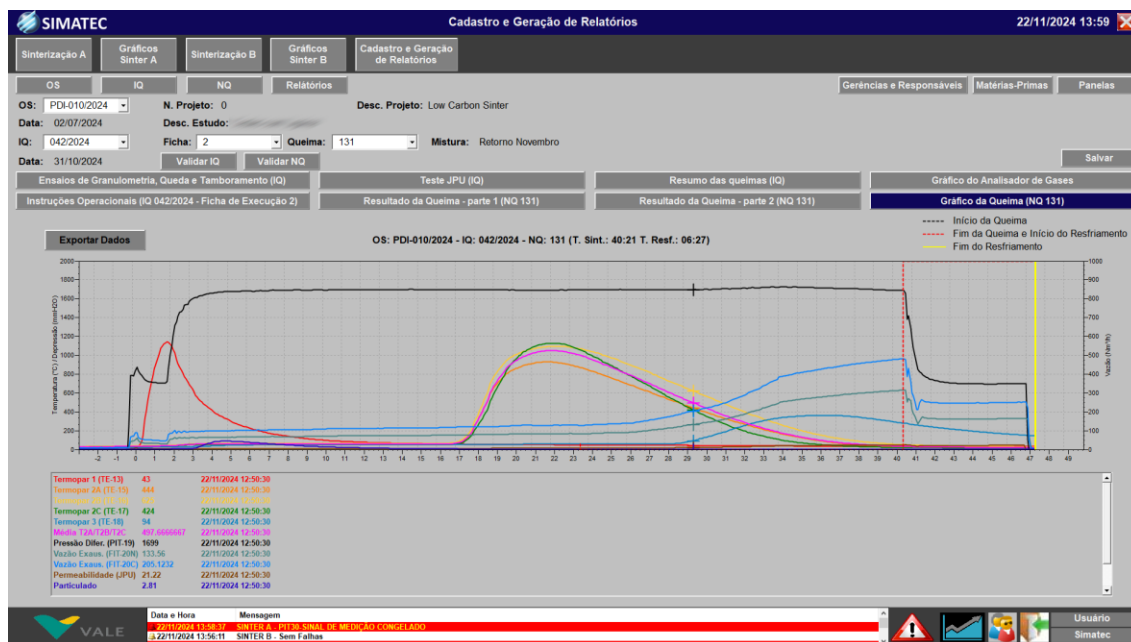
Along with control via the process graphics, Elipse E3 allows Vale to edit and expand its application, something the previous system could not do. With the software, operators can now not only modify existing work orders but also add new ones. They can also add and edit both burns and burn instructions.

Burn instructions are the different raw material recipes used in sintering, that is, the components burned in the furnaces to obtain the desired sinter. Raw materials can also be added to the application via Elipse E3.

The figure shows three screenshots of the Elipse E3 software interface. The first screenshot, titled 'Cadastro de Queimas', displays a table of burn orders with columns for 'Codigo', 'Data', and 'Status'. The second screenshot, titled 'Cadastro de Queimas', shows a detailed view of a burn order, including fields for 'Tipo', 'Data', 'Status', and 'Observação'. The third screenshot, titled 'Cadastro de Queimas', displays a table of burn orders with columns for 'Ficha', 'Queima', 'Val.', and 'Data'. The interface includes various buttons for 'Salvar', 'Imprimir', and 'Localizar'.

Adding work orders, burns, and burn instructions

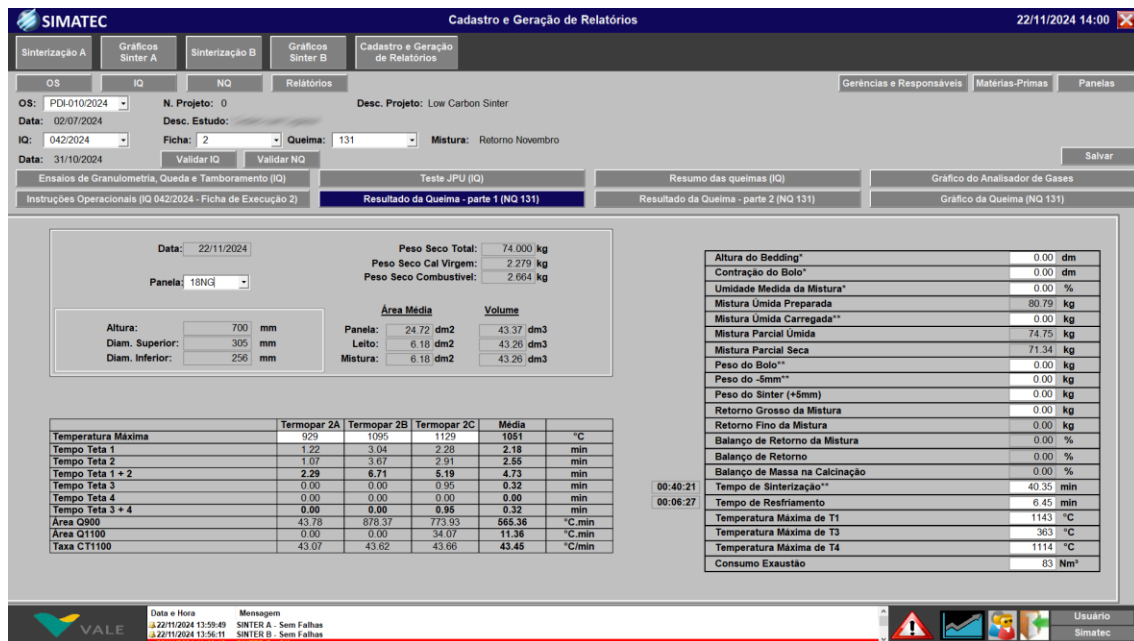
In addition to this data management, Elipse E3 allows operators to graphically analyze the behavior of the variables measured during the burns, such as temperature, pressure, and flow rate. The same graphical analysis can also be used to evaluate the different concentrations of gases used in sintering.



Trend chart of a burn

Elipse E3 also monitors alarms and events, displaying their status in real time, including at the bottom of the process graphics screens. Beyond monitoring, it automatically generates reports with the results and a summary of the burns associated with each instruction. Finally, it provides further information about the JPU (Japanese Permeability Unit) flow rate tests and displays the results of particle size distribution, drop shatter, and tumble tests.

Before Vale adopted Elipse E3, these reports were produced almost entirely by hand, which slowed down the process. Now, with Elipse Software's platform, reports are generated automatically, allowing faster diagnoses and decision-making. As a result, Vale has streamlined sintering operations and maintenance at its research center.



Report summarizing the burns

Benefits

According to Edmar Rosa, Automation Engineer at Vale, Elipse E3 has brought several advantages over the SCADA system previously used at the CTF. In his view, what stands out in this solution is the software's ability to communicate with a wide range of automation tools.

"With Elipse E3, we no longer rely on external programs to interact with the other equipment at the CTF, which has made maintenance and data collection easier," says Rosa.

Rosa also highlights Elipse E3's reporting and database features.

"Previously, we needed to dig through the old SCADA system's screens for results and put the reports together in Excel. Now, the reports are generated automatically by Elipse E3, which speeds up diagnoses and decision-making. Additionally, having a database allows us to monitor a much wider range of information," adds Rosa.

Other benefits Elipse E3 has brought to Vale's research center include:

- **Easy integration and maintenance:** Elipse E3's broad compatibility with the different types of automation equipment in use at the CTF has

simplified and streamlined maintenance and operation, since Vale no longer depends on external programs to provide this integration.

- **Data control and reliability:** burn data are now supplied with more precision and reliability, which contributes to better-informed decisions.
- **Efficiency and sustainability:** better reports and an optimized burn process contribute to more efficient production and reduced pollutant gas emissions.
- **Database:** Elipse E3 features its own database, which allows Vale to monitor a much wider range of information.
- **Faster decision-making:** automatic remote report generation enables Vale to obtain diagnoses and make decisions faster, optimizing operations and maintenance.
- **Greater flexibility:** unlike the software previously used at the CTF, Elipse E3 allows Vale to edit and expand its application whenever necessary.

Datasheet

Client: Vale S.A.

Solution provider: Simatec Tecnologia em Automação Ltda.

Elipse product: Elipse E3 v6.5

Platform: Windows 11

Number of copies: 1

Number of I/O points: 663

Drivers: Allen-Bradley CIP v3.0.26