A Vale agora

Imprensa

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Vale completes 100 million tons handled by autonomous trucks at the Brucutu mine with safety and environmental benefits

In five years with vehicles without an operator in the cab, there were no accidents caused by trucks, carbon emissions have been reduced and productivity has increased

Autonomous off-road trucks, which travel without an operator in the cabin, completed this month of June 100 million tons of material being moved at the Brucutu mine, that produces iron ore in São Gonçalo do Rio Abaixo (Minas Gerais, Brazil). Since the beginning of the project's implementation in 2016, there have been no accidents caused by autonomous trucks, carbon emissions have been reduced due to lower fuel consumption and the mine's productivity has increased.

With a capacity to transport 240 tons, the trucks are controlled by computer systems, GPS, radar and artificial intelligence, covering the route between the mining front and the unloading area. The result of six years of research and testing, autonomous vehicles began to be used in 2016 in test mode. In 2019, all 13 trucks circulating in Brucutu were already using the new technology, making it the first mine in Brazil with 100% autonomous operation.

The amount of 100 million tons transported in this period is equivalent to the weight of 35 thousand football stadiums like the Maracanã, in Rio de Janeiro. The trucks have already covered 1.8 million kilometers, which represents 46 laps around the Earth.

Over the last five years, it has been proven that the fuel consumption of autonomous trucks is 11% lower than that of crewed trucks, resulting in a reduction of 4,300 tons of CO2 per year in the atmosphere. The maximum speed of the trucks, which was 40 km/h, reached 60 km/h. Hourly productivity, measured by the amount of iron ore transported per hour, increased by 11% – five percentage points more than expected.

The autonomous operation also favors the maintenance of equipment. Tires, for example, had a 35% increase in their useful life – ten percentage points more than expected. In addition to saving the company, this number generates less waste disposal.

Operators who used to stay in the cabin received training and were relocated to other functions, one of them being the operation in the control rooms – with air conditioning, without vibration and noise –, kilometers away from the mining front. With this, risk situations involving truck operators, such as tipping and collision, were eliminated.

"There are many results and lessons learned to be celebrated with the current level of maturity of the autonomous mine", explains the executive manager of the Brucutu and Água Limpa Complex, Jefferson Corraide. "Certainly the most important advance provided by the implementation is the reduction of people's exposure to risk. The mine was made safer both by the embedded technology and by the discipline required to make the process sustainable and fluid. The autonomous operation optimization processes go beyond the truck and encompass the complex as a whole".

The Operation and Infrastructure Manager in Brucutu, Klêber Gonçalves, explains that within the mining area, manned and autonomous vehicles are in constant interaction and, in order for it to be safe, all vehicles are adapted. This allows autonomous trucks to plot their routes and, preventively, reduce speed or even interrupt their route, avoiding accidents. "The equipment also has sensors that continuously map and identify the terrain, objects and people, so that the autonomous technology can paralyze the operation of one or more trucks in case of changes that were not foreseen in the path determined by the center control," he says.

New professional opportunities

People continue to play an important role in the autonomous operation. The teams that oversee the entire process can be comfortably installed miles away from the vehicles. Equipment operators from Brucutu were transferred to other functions at the mine itself or at other Vale units in the region. Part of the team was used in the management and control of autonomous equipment, after having gone through training courses.

The trend, with the greater use of autonomous technology, is for Vale to create more opportunities for highly qualified professionals in the technical and engineering areas of automation, robotics and technology within the operation.

Expanding technology

Vale's self-employed program continues to expand. At the moment, tests are being carried out with autonomous trucks in Carajás. Vale also invests in autonomous drills. There are currently 11 of them in operations in Minas Gerais and Pará. Another ongoing project is to automate yard machines, which has already been completed in Malaysia and is being implemented in four Brazilian states.

It is important to emphasize that the conversion of a mine to autonomous operation requires a significant investment, therefore, Vale is working on the feasibility analysis of all units to prioritize where improvements will be implemented.

Safety Innovation

Innovation is key for Vale to improve people's lives and transform the future together with society. In its strategy, the company prioritizes safety, reliability, low carbon agenda and generation of shared value. Ongoing safety innovation initiatives aim to remove employees from risk or reduce their exposure through the use of technologies such as autonomous vehicles, among others; identify and resolve causes of accidents with motor vehicles and energy equipment through operator fatigue detection systems and proximity alerts, for example; and elimination of risk scenarios.

Media Relations Office – vale
imprensa@vale.com
https://saladeimprensa.vale.com/press-releases

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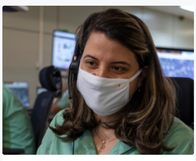

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