



# New Life in Brazil

Words: Chuck Mahnken | Pictures: MTU do Brasil, Mauritius

Tags/Keywords

A line of giant haul trucks kicks up a cloud of dust as it snakes up a hill deep in the Brazilian rainforest. The lush green jungle extends for miles. Below, a vast open pit is carved out of the red earth by an army of machines. It's just another day at the Carajas Mine Complex, the world's largest iron ore mine. Here, years of heavy work add up quickly. It's just a matter of time before a mining truck gets weary. Fortunately, there's a way to revitalize these weary workhorses with a repower from MTU.

Carajas Mine is in the state of Para in northern Brazil. The region has the richest concentrations of iron ore anywhere in the world, discovered entirely by accident. In the late 1960s, a U.S. Steel helicopter was forced to land on a hill in the area to refuel. Surveyors on board noted something special about the soil. The team discovered that the iron content was as high as 66%, well above the world standard.



Now fully owned by Vale, a large Brazilian mining company, Carajas is the biggest iron ore mine in the world. Iron ore is used to make steel and accounts for over 90% of all metals used in the world. The mine is also rich in ores for manganese, copper, tin, aluminum and gold. The operation is vital to Brazil's economy. Since the mine opened, Parauapebas, a city of 180,000, grew up nearby. Today, Vale and its contractors employ 46,000 people in Para. By 2018, Vale is expected to produce more than 110 million tons of iron ore at the site. And plans are underway to expand capacity even further.



### A bustling operation

It's a major challenge to keep up with the enormous, evergrowing workload at Carajas. Demands for increased productivity are constantly on the rise. Across its gigantic complex of open pits, Carajas Mine resembles a small city, bustling with non-stop activity. But there is efficiency and order to the chaos. While excavators, haul trucks and wheel loaders do the heavy lifting, conveyor belts whisk the material to processing units. Then, the ore is transported 554 miles by train to the port of Sao Luis. More than half of what Vale produces is loaded on cargo ships headed to China. A fleet of 140 haul trucks keeps things moving along at Carajas. Weighing in at 181 tons and capable of hauling 240 tons of ore, Komatsu 830E trucks are commonly seen crawling up and down the winding roads of the mine pits. At more than two stories high, the trucks are hard to miss. And the deep rumble of their diesel engines is unmistakable. Komatsu 830E trucks are designed to operate 24/7/365. But no engine lasts forever—especially in the hot, dusty conditions of northern Brazil. Fortunately, when the time comes, new life can be attained—with an engine repower.



### Finding a better way

In 2016, two of Vale's Komatsu 830E truck engines approached their maximum number of operating hours before overhaul. The end was near. And the risk of a breakdown was growing every day. Both Komatsu 830E trucks were powered by an MTU competitor's engine. Always on the lookout for a better way, Vale explored their options. Since the MTU Series 4000 powers many wheel loaders at Carajas, Vale was familiar with the advantages of MTU engines. "Vale recognized the MTU Series 4000 was the right fit, with the right technical factors," says Marcio Etrusco, service manager, MTU Brazil. "They had a great experience with the engine's reliability and fuel economy with their wheel loaders. The combination of productivity and low lifecycle costs really appealed to them."

Vale selected 16-cylinder Series 4000 C21 engines, providing up to 2,500 bhp, for the repower project. For mining companies, productivity is everything. At the same time, they must keep a watchful eye on costs. It's a tricky balance. Haul trucks maximize productivity by operating at all hours. But the steady workload consumes a lot of fuel and puts a strain on engines. For Vale, the Series 4000's fuel efficiency, high time between overhaul and exceptional availability would pay off over the long run.



#### A powerful support system

"In addition to all the specs, after sales support was a big factor in their decision. Vale was impressed with our expert field service, along with the inventory of genuine MTU parts and overhaul kits. We have a specialized technician available 24/7 for Vale," says Marcio. "We're committed to customer satisfaction. If one piece of equipment is out of operation, it leads to high financial losses. So we do everything we can to speed up the service process and keep downtime to a minimum." MTU presented the repower plan to Vale in May 2016. Shortly after, it was finalized and approved. Success would depend on teamwork, utilizing MTU expertise and resources across the globe. MTU America supplied the Series 4000 engines. MTU Brazil provided mechanical kits. MTU South Africa supplied electronic kits, and supported MTU Brazil with additional field service and engineering. The repowering process was handled quickly and efficiently in order to keep downtime to a minimum. In September, installation began. In just two weeks, the first truck rumbled back to life and was ready for field testing. The project went so well that the second Komatsu 830E truck was repowered. In December, it passed a thorough engine examination and reported for work.



### Springing to new life

Revitalized and repowered, both Komatsu 830E trucks are now performing at a higher level. Compared to the previous engines, the Series 4000 engines are a dramatic upgrade. “The trucks are operating faster, more reliably and with lower maintenance costs,” says Marcio. “The biggest advantage is lower fuel consumption. With the new engines, the trucks are close to 10% more fuel-efficient. For an operation of such a large scale, those savings are going to really add up.” “The second repowered truck started operating on Dec 15th, and after 135 days of continuous activity, our engine completed exactly 3,000 hours. These numbers gave us a daily average of 22.2 hours a day, which is an extraordinary fleet availability,” says Marcio. Vale is happy with the results, and has confirmed to MTU the approval of the repower project. Two more repowers with MTU engines were scheduled for spring 2017. In its previous life, the Komatsu 830E was showing signs of age, on the verge of a breakdown that would cost Vale truckloads of money. Today, under the broiling Brazilian sun, it rumbles along the winding dirt roads and switchbacks of Carajas Mine with new life.



Unburdened by heavy loads, it powers across the red earth at speeds up to 40 mph. Fully loaded with 240 tons of ore, it makes the climb back to the top of the mine nimbly and swiftly. Perhaps the location of the Fountain of Youth is not a mystery at all. It's right here in the Brazilian rainforest.

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