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Vale expands production of Sustainable Sand in Brazil

Coproduct from iron ore processing can now be produced on an industrial scale at Viga mine in Minas Gerais, reducing the use of dams

Vale began industrial-scale production of Sustainable Sand at its Viga mine in Congonhas, Minas Gerais (Brazil), in the second half of this year. With capacity to process 200,000 tons of sand per year, it is expected to produce 80,000 tons in 2022, reaching 185,000 tons in 2023. Obtained from the treatment of iron ore tailings, Sustainable Sand is one of the company's initiatives to reduce the use of dams in its operations in Minas Gerais. The material can replace natural sand, extracted from river beds, with a wide application in the civil construction market.



Sand processed by Vale in Congonhas has high purity content

"Due to the geological characteristics of the mine and the mineral processing technology applied, we developed a coarser sand, with low presence of fine particles in the material, and high purity content, having in its composition between 89% and 98% silica and less than 7% iron," explains Jean Menezes, operations manager of the Viga mine plant. The company is already conducting tests of the material with concrete and mortar producers in the Southeast Region, with the Sustainable Sand flowing between the production site and the clients by rail, taking advantage of the existing logistics at the site.

Vale's Sustainable Sand is transported by rail to other states

The Viga mine is Vale's second unit to manufacture Sustainable Sand on an industrial scale, following the same quality controls as for iron ore production. The first was the Brucutu mine, in São Gonçalo do Rio Abaixo, Minas Gerais, which processed 250,000 tons of the material last year. The company's projection is to produce 1 million tons of the input this

year, doubling the volume in 2023. Each ton of sand produced represents one ton less of tailings being disposed of in piles or dams.



Vale's Sustainable Sand is exported to other states by rail

Another initiative adopted by Vale to reduce dependence on dams, and which also favors the production of Sustainable Sand at the mines, is the tailings filtering system. The technology reduces the moisture of the tailings, enabling both dry stacking of the material and the manufacture of sand for the market. Four tailings filtering plants have been implemented in Minas Gerais, being one in the Vargem Grande Complex (in 2021), two in the Itabira Complex (between 2021 and 2022) and one in the Bruçutu Mine (in 2022).

Investments in research and innovation

Vale has already invested more than 50 million Brazilian Reais and established partnerships with more than 40 organizations, including universities, research centers and domestic and foreign companies, to study applications for material from iron ore processing. The objective is to make Vale's operations safer and more sustainable, promoting the circular economy and benefiting society.

In 2021, Vale began marketing Sustainable Sand for use in concrete, mortar, precast, artifacts, cement and road paving.

Since 2020, the company has also been operating the Pico Block Factory, the first pilot plant for civil construction products whose main raw material is tailings from mining activities. Installed in the Pico mine, in the municipality of Itabirito (MG), the plant relies on the technical cooperation of the Federal Center of Technological Education of Minas Gerais (CEFET-MG) for the development of blocks and floors. Ten researchers from the institution are working on the research during this period.

In March this year, the first road in Brazil to use Vale's Sustainable Sand in all four layers of pavement was inaugurated. The 425m-long track at Cauê mine, in Itabira (MG), will be monitored for two years with 96 pressure, temperature, deformation and humidity sensors. Tests carried out during five years in the laboratory indicated that the increase in useful life is of the order of 50% and the cost reduction of 20% when compared to materials more commonly used for road construction, such as sand extracted from the environment. In addition, each kilometer of pavement can consume up to 7,000 tons of tailings.

The following month, in April 2022, a study released by the University of Queensland (UQ), through its Sustainable Minerals Institute (SMI), the University of Geneva (Unige) and the United Nations Environment Program (UNEP) pointed out that the sand from the iron ore production process, called "ore-sand", can contribute to solve two important environmental issues by reducing both the extraction of natural sand from the environment and the generation of mining waste. The study had a contribution from Vale, which provided samples of its Sustainable Sand produced at Brucutu mine (MG) for the universities to perform an independent analysis of the material. The results of the material characterization indicated that the sand extracted from iron ore processing does not present toxic potential and can be applied in pavement, concrete, glass, among others. In addition, the study indicated that Vale's sand could reduce greenhouse gas emissions by 10 times compared to sand from riverbeds.

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