



Case Study

Wirtgen: Bauxite Mining with Surface Miners maximizes Profitability in Guinea

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West African Guinea is known for possessing the largest reserves of high-quality bauxite in the world. This potential has prompted the country to continually expand its bauxite mining sector in recent years, making substantial investments. Wirtgen surface miners are playing a decisive role in this development process, as many of the country's bauxite mining operations rely on Wirtgen's technology as their standard extraction technique.



During the mining process, Wirtgen machines produce level surfaces that serve as stable roadways, facilitating rapid transportation of the mined material. During this process, the LEVEL PRO leveling system collects and transmits data on the leveling process

and controls the cutting depth from the operator's stand.

Wirtgen supplies surface miners in a variety of performance classes for the selective mining of raw materials, such as coal, limestone, bauxite, gypsum, salt and phosphate. In addition to mining, these machines can also carry out routing operations for the construction of mining service roads and railway tracks, the rehabilitation of roadways and installation of tunnel floors. The range of applications further includes the precise cutting of trenches and channels as well as surface leveling. In 2001, the first Wirtgen surface miner was commissioned in a mine close to Kindia, a small town 120 km from the capital, Conakry. At this time, drilling and blasting was the main bauxite mining technique in use. Since then, however, the process has shifted to the more economical, safe and environmentally friendly surface mining, and today Wirtgen surface miners extract 100% of the ore. Since 2001, the Wirtgen technology has proven its additional benefit to the growing bauxite mining industry in Guinea, where 25 Wirtgen machines are currently in operation.

2200 SM and 2500 SM for consistently high Production Rates

The most commonly used models for bauxite mining in Guinea are the 2200 SM and the 2500 SM. The first is compact yet powerful, with a 2.2 m-long cutting drum and 708 kW of engine power. It is able to cut rock with unconfined compressive strengths of up to 50 MPa, ideal for medium-sized mining operations. The larger model, the 2500 SM, guarantees higher production rates and offers a cutting width of 2.5 m, 783 kW of engine power and can economically mine rock with an unconfined compressive strength of up to 80 MPa. Both models demonstrate their advantages in both productivity and product quality, guaranteeing lower production costs per ton compared to conventional mining. On average, 1.25 million tons of bauxite are extracted each year with the 2200 SM and 3 million tons with the 2500 SM. These figures are achieved because the machines work 24/7. The figures are all the more impressive considering Guinea's humid climate, with a monsoon season that lasts from June to November and is a major challenge for mining companies. During periods of heavy rainfall, cutting-to-ground or drilling and blasting expose the ore to precipitation, resulting in high transportation costs due to the ore's high moisture content resulting in other negative downstream effects.



Wirtgen's 2500 SM sidecasts the mined material, producing high windrows. The leveled sidecast material is clean, stable and ready to be transferred onto trucks with wheel loaders or excavators.

Wirtgen surface miners, which are equipped with a discharge conveyor, minimize such climactic effects by cutting and crushing the material with a special cutting drum and placing it alongside the machine (sidecasting) ensuring constant productivity while minimizing the environmental impact. The use of a surface miner also has a positive effect on water management in an opencast mine. The cut surfaces are leveled and can be cut at an angle. This further improves drainage and reduces water seepage into the ground.

Sidecasting and Haulage: More Tons per Hour

During side-casting, Wirtgen surface miners leave high stockpiles allowing a superb bucket fill. This protects most of the mined material from the rain and allows gravity to drain the piles. The major cost factor in opencast mining is haulage. Mining with Wirtgen surface miners produces level surfaces that serve as stable roadways, supporting the rapid transport of material. This increases the transport capacity of the entire truck fleet. Even the wear on tires, frame and suspension is reduced thanks to the quality of the roadways, also allowing the use of standard on-highway trucks. As a result, reduced transportation costs allow mining companies to achieve lower per-ton production costs. Mine operators benefit from several cost reductions when using surface miners. Dr. Ing Erik Zimmermann, Product Manager for Surface Miners at Wirtgen, explains: "Our machines allow efficient extraction of material from mines that could not be economically exploited with traditional techniques, creating added value for the industry. For the mining companies, this translates into significant financial advantages for mining and processing."

Avoiding Blasting means avoiding Hazards



Wirtgen surface miners can do much more than just extract pay minerals. In Guinea, they are also used to open routes and develop the infrastructure around the mines.

By using surface miners instead of drilling and blasting, raw materials can also be extracted effectively in the vicinity of residential areas, public roads, villages, rivers or other infrastructure e.g. pipelines or power lines. It is also possible to mine resources located in buffer and safety zones, maximizing bauxite yield within the concession area, generating significant additional revenue for the mine. In most cases, the planning and execution of blasting operations is

associated with considerable effort, high costs and regulatory restrictions. In fact, eliminating drilling and blasting relieves the people responsible of a number of challenges. The Guinean mine operators using surface miners no longer need to spend time obtaining the required permits, hiring certified blasting personnel or compiling the relevant documentation. What is more, dispensing with drilling and blasting has a very positive impact on public opinion, meaning that opencast mining operations can gain wider acceptance. In addition, Wirtgen machines enable mining companies to improve material quality. The material size produced by these surface miners is ideal for shipment by truck and rail, eliminating the use of the primary crushers commonly used when drilling and blasting.

Factory-level Service in Guinea

As Africa's top bauxite producer, Guinea has increased its production from year to year. In addition to the customized machine equipment, Wirtgen is providing factory-level local customer support through an office in the capital, Conakry, which offers complete on-site services such as technical assistance and service contracts using qualified personnel from Wirtgen's brand headquarters in Germany. Technical support is provided directly at the mine. The company's innovative logistics program ensures a smooth provision of original spare and wear parts. Wirtgen experts are also able to support customers around the clock with customized, on-site project planning specially tailored to their needs.