

Upscaling of the RoStar ultra fine grinding mill for liberation of high valued ores



RoStar - 15042

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Grinding of ores and the further processing is a wide field in metal production with challenges in wear, energy consumption and recovery of the valuable materials. Maelgwyn Mineral Services (MMS), a small company from Wales, developed a demonstrator mill for the treatment of pre-concentrated gold bearing sulphides. Next step is the up-scaling of the demonstrator mill into small-industry-scale. For this challenge MMS decided to work with several partners for better integration in research and development, industry and mining. First is CEMTEC as engineering partner with know-how in fine-grinding processing. Institute for Mechanical Processing technologies (TUBAF) take over the role of project management, process development by lab works and supply of periphery for the setup of the pilot and finally on evaluation of the results. Other partners in the project are the University of Liege represented by the geology, mining and metallurgy research group, Sandvik as a high-technology engineering group in tools and tooling systems for mining, products in steel/alloys and others and As-sarel-Medet, operator of the largest open pit mine in the Balkan peninsula with about 15 Mt/year of ore is mined.

The objective of the RoStar project is creation of a pilot ultra-fine grinding mill by up-scaling and improvement of an existing demonstrator mill. The project concerns operating of the pilot mill with optimized rotor-stator geometry, setting up a flexible and mobile unit to be integrated in local production process and demonstration of mill performance at several mining sites.

One problem of strategic importance is that fine dissemination of high-value particles in ores and low liberation degrees can cause low resource efficiency in mechanical sorting and flotation processes. Particularly in times of decreasing ore grades the optimal liberation of polymetallic ores is a major customer preoccupation. The problems we have to solve by developing this new type of mill are energy efficient fine milling and improved performance towards liberation of finely disseminated minerals in the treated ores.

The problem solution will be a vertical fine grinding mill. The gravity force enables a higher filling level than in horizontal mills and a hydraulic pressure on the grinding beads. So it is possible to work with lower rotation speed without moving the grinding beads. Deliverables of

the project will be a containerized pilot plant, a fine milling process with very low energy consumption, material related process parameters for an excellent ore liberation, a specification of output materials and an indication about the influence of the milling process on the entire flotation and downstream metallurgy. The performance of the mill will be tested at the copper mining site of Assarel-Medet and will be also evaluated on different crushed ores provided by Sandvik-Mining.

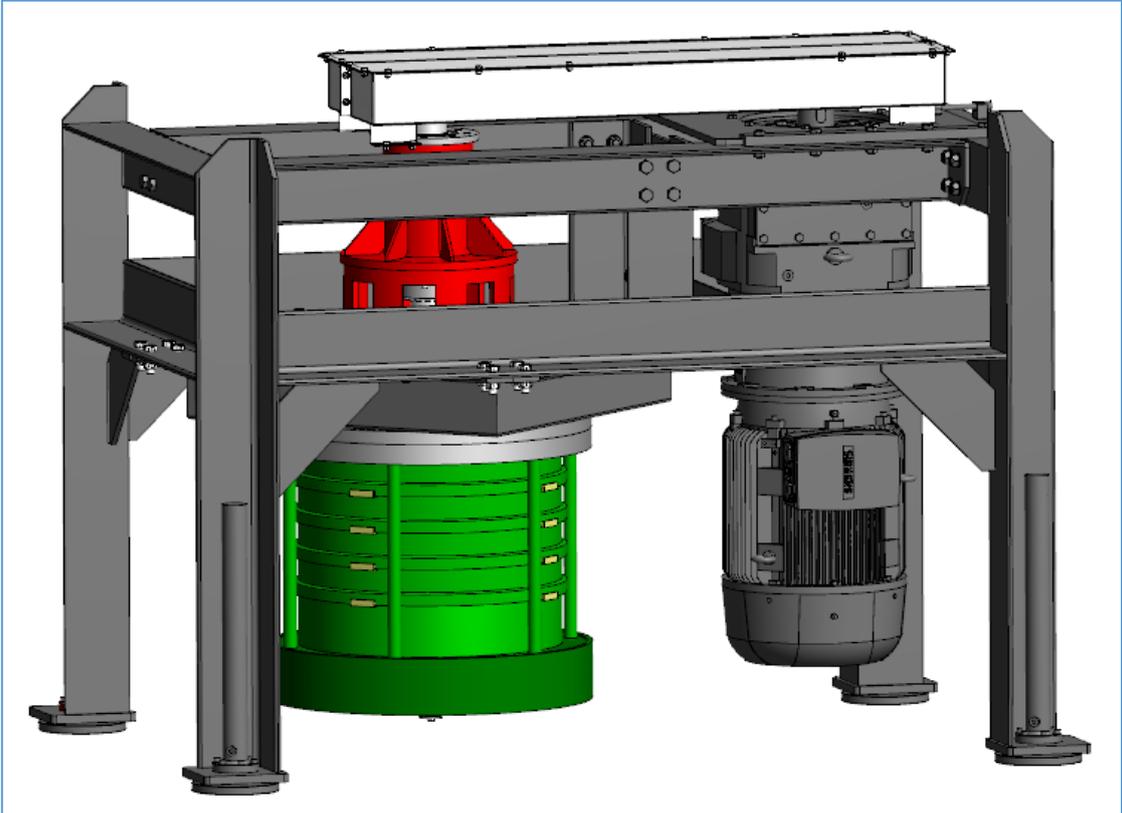


Figure 1: 3D-construction plan of the RoStar mill fixed in a metal frame with driving System.