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Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies



Reclaimer system used for quality management of the final product in the Erzberg mine.
© VA Erzberg, August Zuebl



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SLIM consortium is led by **Universidad Politécnica de Madrid** in Spain. Research institutions involved are **Luleå tekniska universitet** in Sweden, **Montanuniversität Leoben** and **Technische Universität Graz** in Austria.

Validators in relevant environments are **MAXAMCORP International SL**, **Minera de Orgiva SL** and **Benito Arnó e Hijos S.A.U.** in Spain, and **3GSM** and **VA Erzberg GmbH** in Austria.

Bureau de Recherches Géologiques et Minières in France, **Investornet Gate2Growth APS** in Denmark, **MINPOL GmbH** in Austria and **ZABALA Innovation Consulting SA** in Spain are responsible for environmental and economic assessments, communication and dissemination activities and social awareness actions.

Project duration:

November 2016 – October 2020

- 1 Blasting of three benches with 120 blastholes and 60 t of explosives. © VA Erzberg
- 2 Manager Celso Amor and other mining workers at Minera de Orgiva S.L.
- 3 Sandvik Pantera down-the-hole drill-rig used for analysis of measure-while-drilling data during the SLIM project. © VA Erzberg, August Zoehl
- 4 Mining processing plant located underground at Minera de Orgiva S.L.

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The main economic, technological and environmental challenges of small mining include reducing high investment costs, reducing generation of waste and large tailings, addressing environmental impacts, and improving flexibility, automation and safety of operations. However, at the moment, there is no quick-fix available to reduce the environmental impact from mines, and it is neither realistic to expect production solutions very distant from today's technologies. Considering that the present mining technology is based on rock blasting and mobile mining equipment for loading and transportation, the major challenge is to generate a new sustainable systemic solution.

SLIM aims to develop a cost-effective and sustainable selective low impact mining solution based on non-linear rock mass fragmentation by blasting models, airborne particulate matter, vibration affections and nitrate leaching mitigation actions for exploitation of small mineral deposits (including those with chemically complex ore-forming phases) through a new generation of explosives and an advanced automatic blast design software based on improved rock mass characterisation and fragmentation models for optimum fragmentation and minimum rock damage and far-field vibrations.