

Special Issue on  
**Engineering Design and Analysis of Sustainable Mine Fills**

# CALL FOR PAPERS

Mine fill is defined as material employed to replace the excavated zone created by mining operations, often using soil, overburden, tailings, waste rock, and metallurgical by-products. It is a vital component of most modern underground mining operations where copper, lead, zinc, gold, and other metals are extracted. Mine fill aids the stabilization of mining-related openings and the disposal of mining waste. Cementitious materials are added to mine fill materials to improve the strength and stability of underground excavations. The design, operation, and control of mine fill systems are key for sustainable mining operations. There are three types of mine fill: rock, hydraulic, and paste, based on aggregate, cement, and water content. The delivery and placement vary between these mine fills, from pumping through pipes and casting, to hauling with trucks and dumping mine fill material in mined-out voids. Each mine fill operation is unique in terms of the implemented mining method, the strength required, the material used, and the reason behind the mine fill operation. The use of mine fill systems boosts the material available for filling, affording more flexibility in the mine fill mix design and creating capable mine fill systems for ground support.

Considering capital, reliability, and operating and maintenance costs, the optimal mine fill system consists of multiple stages and processes, from preparation to placement, for sustainable mining operations. These costs are most often a result of poor design due to a lack of understanding of the material properties and geomechanics, of the balanced processes in engineering and hydraulic design, and of safe placement styles and cost-effective operational management plans. Mine fill design and pipeline system are of great importance in delivering mine fill to underground mined-out voids. There are several technical and operational problems in mine fill slurry transportation, which create extra maintenance costs, blockages, and production delays. These can be a result of a physical restriction in the pipeline, a major change in raw material properties which affects rheology and prevents the mine fill slurry from flowing through the pipeline system, or a rupture, causing the downstream column of mine fill slurry to be difficult to remobilize. Thus, when the pipeline is blocked by one of these factors, it can lead to serious damage to the mine's economic benefits.

The goal of this Special Issue is to collect the latest research and in-situ applications of mine fill. In addition to this, the Special Issue will provide information on the theory, testing, practical design, and operational aspects required to implement mine fill systems and improve distribution operations. Contributions on subjects such as the applicability of integrated design approaches of mine fill, analytical and numerical modeling to assess failure modes of mine fill support systems, and failure mechanisms in mine fill exposed faces are strongly encouraged. We kindly invite you to submit both original research and review articles.

Potential topics include but are not limited to the following:

- ▶ Rheological and sedimentation properties of mine fill
- ▶ Pipeline design, characteristics, and operations of mine fill
- ▶ Transportation modeling and simulation of mine fill material
- ▶ Assessment of time dependency and thixotropy of mine fill
- ▶ Engineering design and reticulation systems for mine fill material
- ▶ Investigation of mine fill delivery, placement, and curing monitoring
- ▶ Industrial applications and case studies of mine fill distribution systems
- ▶ Improvements in the stability of mine fills considering stope configurations
- ▶ Assessment of rock mass-wall closure-mine fill interactions for ground support
- ▶ Shear strength effects of mine fill considering wall roughness and stope conditions
- ▶ Study of mine fill performance considering the variation in its key ingredients
- ▶ Application of economical and effective mine fill designs for the mining industry
- ▶ Analytical and numerical modeling incorporated into the mine fill design process

Authors can submit their manuscripts through the Manuscript Tracking System at <https://review.hindawi.com/submit?journal=ace>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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