

Experimental Study of the Influence of Drawbell Geometry on Hang-Ups in Cave Mine Applications

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ROCK MECHANICS AND ROCK ENGINEERING

DOI: 10.1007/s00603-020-02247-4



Acceso anticipado: SEP 2020

Tipo de documento: Article; Early Access

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Abstract

Coarse arches are a common issue in caving mines where large fragments are expected. These arches interrupt ore flow in drawpoints, decreasing available draw area, and also increasing the possibility of non-uniform draw, which can increase fine migration, mud-rush risk, and induced stress in the caved column. Moreover, hang-up removal is operationally complex and dangerous. The literature on gravity flow indicates that coarse arches are mainly influenced by the ratio between the rock fragments and the size of the opening and stresses, but some key variables have not been quantified. Here, the influence of fragment-size distribution and drawbell geometry on hang-up formation is analyzed through controlled laboratory experiments in a physical model. Results show that drawbell parameters, such as length, width and angle are relevant parameters in hang-up events. In particular, the ratios $D(L)/d(80)$ and $D(W)/d(80)$ as well as $V(DB)/V(p)$ are key to hang-up events, the probability of which will decrease when these ratios increase.

Palabras clave

Palabras clave de autor: [Block caving](#); [Coarse arch](#); [Experiment](#); [Gravity flow](#); [Hang-up](#); [Mine design](#)

KeyWords Plus: [ORE](#); [FLOW](#)

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Financiación

Entidad financiadora	Número de concesión
CONICYT/PIA Project	AFB180004
CONICYT PFCHA/DOCTORADO BECAS CHILE/2019	72180000

[Ver texto de financiación](#)

Editorial

SPRINGER WIEN, SACHSENPLATZ 4-6, PO BOX 89, A-1201 WIEN, AUSTRIA

Información de la revista

- **Impact Factor:** [Journal Citation Reports](#)

Categorías / Clasificación

Áreas de investigación:Engineering; Geology

Categorías de Web of Science:Engineering, Geological; Geosciences, Multidisciplinary

Información del documento

Idioma:English

Número de acceso: WOS:000571241700001

ISSN: 0723-2632

eISSN: 1434-453X