

## Influence of Dynamic Loads in the Structural Integrity of Underground Rooms

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**Abstract :** Among many factors affecting the stability of mining excavations, rock-bursts and tremors play a special role. These dynamic loads occur practically always and have different sources of generation. The most important of them is the commonly used mining technique, which disintegrates a certain area of the rock mass not only in the area of the planned mining, but also creates waves that significantly exceed this area affecting the structural elements. In this work it is analysed the consequences of dynamic loads over the structural elements in an underground room and pillar mine to avoid roof instabilities. With this end, dynamic loads were evaluated through in situ and laboratory tests and simulated with numerical modelling. Initially, the geotechnical characterization of all materials was carried out by mean of large-scale tests. Then, drill holes were done on the roof of the mine and were monitored to determine possible discontinuities in it. Three seismic stations and a triaxial accelerometer were employed to measure the vibrations from blasting tests, establish the dynamic behaviour of roof and pillars and develop the transmission laws. At last, computer simulations by FLAC3D software were done to check the effect of vibrations on the stability of the roofs. The study shows that in-situ tests have a greater reliability than laboratory samples because of eliminating the effect of heterogeneities, that the pillars work decreasing the amplitude of the vibration around them, and that the tensile strength of a beam and depending on its span is overcome with waves in phase and delayed. The obtained transmission law allows designing a blasting which guarantees safety and prevents the risk of future failures.

**Keywords :** dynamic modelling, long term instability risks, room and pillar, seismic collapse

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