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Transmission of the topographic system and orientation from the surface to an underground mine using 2 vertical shafts. Comparison between the classical and gyroscope method

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Extended Abstract

One of the most difficult operation in the surveying filed in underground mining is the transmission of the coordinates and orientation from the surface to the underground drifts, especially when there is only a connection by vertical shafts. This process was studied by Chrzanowski and Robinson (1967) and widely used over time (Benecke and Kalz 2006).

This study analyses different aspects related to a case study were this methodology was applied. A mine with 2 shafts of 700 meters depth. A part from the classic method the gyroscope method is also studied and compared both.

1.Two plumbs method: This process needs a previous study in the surface to transmit the coordinates to the top of both shafts. The coordinates are projected throw the shafts and subsequently, a polygonal is done to connect both shafts. The projection surface-underground can be done by means of a cable and a plumb attached or with a laser. In the case study it was used the cable and plumb option due to the length of the shaft, among other technical conditions.

2.Gyroscope method: It is a widely used system for the transmission of the orientation with high accuracy, being able to define absolute directions at any measurement point and eliminate systematic errors (Benecke and Kalz 2006). This method only needs one shaft.

This study is focused in the on the advantages and disadvantages of using a plumbing method, with its variations, and a gyroscope, as well as the conditions of the mine that determine which system is more suitable in each case.

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