

3D SIRT tomography application case study: Microseismic data to delineate cave boundaries in DOZ block cave mine pt. Freeport Indonesia

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It is already known that tomography has great impact for analyzing and mapping unknown objects based on inversion, travel time as well as waveform inversion. Therefore, tomography has been used in wide area, not only in medical but also in petroleum as well as mining. Recently, tomography method is being applied in several mining industries.

A case study of tomography imaging has been carried out in DOZ (Deep Ore Zone) block caving mine, Tembagapura, Papua. Block caving is a mass mining method by applying a combination of both gravity's force and internal rock's stresses to break the rock mass in small pieces using blasting activity in beneath mass rock in order to get the ore rocks which contain minerals. Many researches are undergoing to investigate the characteristics of both of rock deformation as well as cave produced. Tomography takes a part for determining and mapping the velocity and characteristic of cave in DOZ.

To acquire travel time data, we use microseismic data monitoring system in DOZ. There are 11 geophones buried in several areas covering in DOZ . The sources are natural from the seismic events caused by rock's burst and rocks deformation activity, therefore it is called as passive seismic. Then, these travel time data from microseismic are processed by Simultaneous Iterative Reconstruction Technique (SIRT). The result of the inversion shows the anomaly of velocity image near block caving production area. By tomography velocity imaging, the cave boundary in DOZ can be imaged clearly. This information is useful for identifying weak zone surround cave. In addition, these results of tomography can be used to determine cave surface information.

Biography

Woen Wely is an undergraduate student from Institut Teknologi Bandung , Indonesia with the major Physics science. He focuses on Earth Physics study. At present, Wely is finishing his thesis with the title "3D SIRT Tomography Application. Case Study : Microseismic Data to Delineate Cave Boundary in DOZ Block Cave Mine PT. Freeport Indonesia" under supervised by Dr. Bagus Endar Bakhtiar Nurhandoko and Mr. Erwin Riyanto S.si. This research has been carried out in DOZ block cave mine PT. Freeport Indonesia in early 2012. He is the member of WISFIR Laboratory and Physics Student Affiliation from 2009. He also teach in several academic institution from 2008.

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