

## Heavy Sulphide Material Characterization of Grasberg Block Cave Mine, Mimika, Papua: Implication for Tunnel Development and Mill Issue

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**Abstract :** Grasberg Cu-Au ore deposit as one of the biggest porphyry deposits located in Papua Province, Indonesia produced by several intrusion that restricted by Heavy Sulphide Zone (HSZ) in peripheral. HSZ is the rock that becomes the contact between Grassberg Igneous Complex (GIC) with sedimentary and igneous rock outside, which is rich in sulphide minerals such as pyrite  $\pm$  pyrrhotite. This research is to obtain the characteristic of HSZ based on geotechnical, geochemical and mineralogy aspect and those implication for daily mining operational activities. Method used in this research are geological and alteration mapping, core logging, FAA (Fire Assay Analysis), AAS (Atomic absorption spectroscopy), RQD (Rock Quality Designation) and rock water content. Data generated from methods among RQD data, mineral composition and grade, lithological and structural geology distribution in research area. The mapping data show that HSZ material characteristics divided into three type based on rocks association, there are near igneous rocks, sedimentary rocks and on HSZ area. And also divided based on its location, north and south part of research area. HSZ material characteristic consist of rock which rich of pyrite  $\pm$  pyrrhotite, and RQD range valued about 25%-100%. Pyrite  $\pm$  pyrrhotite which outcropped will react with  $H_2O$  and  $O_2$  resulting acid that generates corrosive effect on steel wire and rockbolt. Whereas, pyrite precipitation proses in HSZ forming combustible  $H_2S$  gas which is harmful during blasting activities. Furthermore, the impact of  $H_2S$  gas in blasting activities is forming poison gas  $SO_2$ . Although HSZ high grade Cu-Au, however those high grade Cu-Au rich in sulphide components which is affected in flotation milling process. Pyrite  $\pm$  pyrrhotite in HSZ will chemically react with Cu-Au that will settle in milling process instead of floating.

**Keywords :** combustible, corrosive, heavy sulphide zone, pyrite  $\pm$  pyrrhotite

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