

GIS INTELLIGENT SOLUTION FOR MINERAL RESOURCES ESTIMATION OF NARROW VEIN TYPE ORE BODY AT BOGALA UNDERGROUND GRAPHITE MINE, ARUGGAMMANA, SRI LANKA

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Bogala Graphite's mineral resources and reserves underpin the strategy of the company to become a vertically integrated producer of graphite. It is therefore necessary that the estimation and reporting of mineral resources and reserves frequently, using a transparent and globally accepted reporting standard. The existing mineral resources estimation and updating method is enormously time consuming and exhaustive work. Human error factor associated with the process is too high since it involves numerous laborious analysis, decision makings and feedings for calculations.

This main objective of research was structuring a solution and developing using GIS intelligent to perform quick and reliable mineral resources estimation and updating works for narrow vein type ore body at Bogala Underground Graphite mines located in Aruggmmana, Sri Lanka.

The modified method transforms Geologist's manual workflow in to the GIS process model built using model builder. Custom built model builder tools were used to develop the mineral resources estimation workflow of the GIS intelligent solution. Mineral resources estimation then conducted for five adjacent ore blocks using both conventional and modified method to compare results as well as the accuracy. Maximum block tonnage calculation disagreement is -0.637 % in the modified method using GIS intelligent solution compared to the conventional method. Possible reasons for these non agreements can mainly be the minor deviations of the area and thickness calculation of two methods. The modified method can effectively transform Geologist's manual workflow in to a GIS process model. More importantly it avoids human error factor by considerably reducing laborious analysis, decision makings and feedings for calculations in the existing method. Geologist will be able to perform mineral resources estimation updating works monthly using GIS intelligent solution and it will improve planning and implementation of mine production activities in future.

This method can be recommend to any other type of manually mined narrow vein ore reserve other than graphite, where continuous mine surveying is practicing. However, this GIS intelligent solution based modified method can be recommended to use for mineral resources calculation work in the Bogala mines since the disagreement percentage is the acceptable range, which is less than 1%.