LIDAR APPLICATION STUDY TO CALCULATE MINE EXCAVATION VOLUME

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Abstract: Indonesia is a vast archipelagic country with its great potential in mining industry. This potential has been developed by utilizing a variety of technologies. Nowadays, technology with optical methods are used as an alternative for more effective mine mapping, compared to a conventional methods. This technology is called Light Detection and Ranging (LiDAR). In this study, remote sensing technology will be used to calculate the volume of mine excavation from two LiDAR point clouds on the same area but different years. The default point clouds will be classified using Terrasolid software into two classes, ground points and non-ground points. Digital Terrain Models (DTM) will be generated from classified point clouds, and the volume is calculated using cut-and-fill methods which will be done after stacking both DTMs. Combined DTMs will create a new elevation grid which will show the clear differences between two existing DTMs. To confine the volume calculation into specific area, a polygon that encloses the open pit mine is made and a new area feature will be created. From this same area, the volume will be recalculated to compare the result. This study found that mine excavation volume can be calculated from two LiDAR raw data in the same area. The volume calculation results show a slight difference between the result generated by Global Mapper (cut volume is 101931.7 m^3), and Surfer (cut volume is 101938.0065982 m^3). This study is expected to provide a knowledge and assistance related to calculating the volume of mine excavation by remote sensing technology.

Keywords**:** LiDAR, point clouds, excavation, volume, cut and fill.