

The Application of Unmanned Aerial Vehicles (UAV) for Slope Mapping with the Determination of Potential Slope Hazards

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ABSTRACT

In our modern world, the application of small unmanned aerial vehicles (UAV) for monitoring work or slope mapping expanded and is widely used by people in the construction field and researchers. Slope mapping can be considered challenging when using traditional surveying methods since most slopes especially in forest regions are high and considered risky if monitored by human themselves. Other than that, mapping by using UAV need a lower number of manpower to operate the device itself which is more than enough to be conducted by a single person only. This paper discusses the applications of unmanned aerial vehicles for mapping and also its important parameters including perimeter, area and also volume of certain selected area. With the development of modern technology, the utilization of UAV to gather data for geological mapping is becoming easier as it is quick, reliable, precise, cost effective and also easy to operate. High imagery quality and high-resolution images are essential for the effectiveness and nature of normal mapping output such as digital elevation model (DEM) and also orthoimages. With the help of established software, the parameters of three selected study areas (stockpile, slope A and slope B) can be determined easily which can be considered as one of the main interest in this study. In addition to that, the horizontal and vertical cross section of every selected area can be obtained which help to determine the highest and lowest point of each area. From this cross section, the slope path profile can be determined. Other than that, from this path profile, the potential slope hazard will be determined based on the slope angle (slope classes) as suggested by the United States Department of Agriculture (USDA). Overall, the application of unmanned aerial vehicles for photogrammetry together with slope mapping and slope hazard monitoring can be considered as a reliable modern technology which ease the work with proper assurance of analysis due to its advancement and powerful technology. This modern surveying device helps workers and researchers to simplify and fasten their work.

KEYWORDS: Unmanned aerial vehicle (UAV), Slope mapping, Slope parameters, Slope cross section, Digital elevation model (DEM), Slope hazard

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