

Landslide monitoring at hillside residential area using GPS static and inclinometer techniques

Abstract :

Landslide is one of prominent geohazards that continuously affecting the tropical countries including Malaysia. Frequent occurrences of landslides at hillslopes during the heavy rainy periods have resulted in public fear for the safety of their life and properties. For the past 25 years, many landslides have occurrences have been reported in Klang Valley especially at the hilly terrain residential areas. A landslide monitoring scheme is therefore very crucial and should be carried out continuously. Various studies have been conducted to monitor landslide activities such as conventional geotechnical and geodetic techniques. Each of these techniques has its own advantages and limitations. Therefore, this study focuses on the effectiveness of the combination approach of GPS technology and inclinometer techniques for landslide monitoring. The study area is located at residential area Section 5, Wangsa Maju, Kuala Lumpur, Malaysia. The inclinometer instrument has been placed at five (5) selected monitoring points and three (3) epochs of inclinometer measurements were made. At the same time, the GPS observations have also been carried out for three (3) epochs separately using GPS static techniques. This GPS network consists of four (4) control points and eleven (11) monitoring points. The GPS observations data were validated, processed and adjusted using two (2) adjustment software namely Trimble Geomatic Office (TGO) version 1.6, and GPS Adjustment and Deformation Analysis (GADA). The results have shown that the GPS technique can be implemented with inclinometer technique to detect horizontal displacements up to ± 30 mm and vertical displacements less than ± 50 mm.