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Monitoring of geological site by automatic total station, remote sensing and digital photogrammetry techniques

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In the last years automatic total station technology has shown very large improvements, both in the instrumental aspects and in software for data processing and visualization. It is nowadays really suitable to be applied in geological surveying and monitoring, representing a very interesting issue both in natural and artificial slopes. In this paper the application concerns the survey of the Quarry of Pedogna, located at Villa a Roggio (Lucca, Italy). The quarry has been monitored in order to check its stability nearby faults and joints at the geological boundary between rocks with different geotechnical behavior. The geological setting have been studied by integrating previous geophysical and geotechnical data with recent fieldwork information and results coming from a QuickBird satellite imagery interpretation and digital stereophotogrammetry techniques applied to recent color aerial photos. The possible slope movements have been checked through the automatic recognition of quartz targets appositely plugged in selected sites. The data has been analyzed, reported plus edited and post-processed by the Leica^{tm}Geomos software which allowed creating real-time charts showing rates and speed of targets displacement. The application allows online controlling the measurement, checking the limit, messaging the status in a way to properly setting alerts and alarms for the workmen safety.