THE IMPORTANCE OF GEOLOGICAL CHARACTERIZATION IN SLOPE STABILIZATION: THE EXAMPLE OF A RUPTURE AFFECTING AN OIL PIPELINE LOCATED IN SERRA DO MAR

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The technical and economic success of slope stabilization is strongly related to the correct identification and comprehension of the occurring mass movement process. The modern Engineering Geology supplies many methods and techniques for geological and geothecnical investigation and characterization for the analysis and control of landslides and correlated processes. This paper presents a methodological approach by applying these methods of engineering geology investigation in mass movements control. This approach is discussed inside a study of case. This case is related to a rupture affecting an oil pipeline located in the influence area of a mountainous region named Serra do Mar, in the municipality area of Cubatão, São Paulo State, Brazil. At first, the unstable area crossed by the oil pipeline was tentatively contained by the construction of a tie-back wall. Soon, this solution showed itself not adequate. In fact, the geometry, agents and causes related to the landslide process had not been enough investigated and understood. A new program of engineering geology investigations was undertaken from a viewpoint and approach directed to the determination of the landslide's geometry mass and moving control mechanisms. The results from the investigation program indicated the rupture was related to a large landslide, showing an ellipsoid shape, with extensions around 400 per 800 meters along its axes and almost 30 meters depth. These results pointed to a new mitigation measure, which involved a construction of a tunnel under the unstable mass and the reallocation of the oil pipeline to this tunnel. During the construction of the tunnel, new investigations were done to obtain parameters for this civil work. The achieved new data improved the knowledge about the mechanism of the landslide.