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Topographic and photogrammetric techniques applied to the study of the morphology of ravines in Campana city, Buenos Aires, Argentina

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Abstract

The comprehensive study of the stability of ravines includes various aspects to be considered. One of them, interesting in this case, is the characterization of the morphology of the slopes, which due to their high inclination, presence of vegetation and irregularity in the surface, making it difficult to achieve this objective.

In the present study, we proceeded to study a ravine, located on the right bank of the Paraná de las Palmas river, in the town of Campana, northeast of the province of Buenos Aires. This work was focused on the surroundings of the coordinates 39°9'30.40 "S 58°57'14.60" where lays a slope with structural conditions of interest. The morphology of the ravine in this area was studied in order to obtain a more precise assessment of the exposed surface and therefore a correct geometric and mass estimation of the slope.

For this propose, an analysis of elevation models obtained from topographic surveys carried out with Drone and Total Station and, georeferenced with GPS equipment along the slope, was carried out. From there, the reliability of the applied methods and the results obtained could be evaluated comparatively.

All this information was complemented with a photographic record and available information on the environment to achieve a complete evaluation of the condition of the ravine in this area.

The importance of this work lies in the possibility of testing different methods and contrasting the results obtained using topographic and photogrammetric equipment and a combination of them. This will allow the characterization of slopes to be scaled over larger portions considering that this is part of a larger study along the Paraná river ravine. The greater reliability in the morphological results obtained is considered to be of significant utility for estimating the stability of the slopes, an aspect of interest to evaluate the geological danger and evaluate different engineering solutions.

Key Words: Ravine, Slope, Río Paraná, Argentina, Geological Risk, Drone.