

Influence of Altimetric Errors in the Determination of Hydraulic Parameters for Structure Sizing. Case of Study in Uruguay

Rodolfo Méndez-Baillo and Rosario Casanova (Uruguay)

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SUMMARY

The behavior of an artificial or natural channel can be modeled with specialized software obtaining results that condition the sizing of a hydraulic structure. These results, among others, are the flow depth, velocity and flow rate of the watercourse in one or more cross sections.

The inputs required for modeling are hydrologic and topographic data, which have random errors as any observation. The present work will take into account the errors in the topographic data, in particular, in height ones.

The objective of this project is to determine what vertical accuracy of survey data is required without sacrificing technical requirements, in order to find less demanding and costly way to determine the heights.

In general, hydraulic modeling is performed by means of specialized software such as HEC-RAS. Using this tool, it is possible to determine flow depth, velocity and flow rate in any part of the watercourse studied. The calculation is deterministic and unique values are obtained, so they do not allow inferring the uncertainty presented.

By introducing a random perturbation in the topographic data, using the Monte Carlo method, and repeating the calculation, the desired hydraulic parameters are obtained. By having these values calculated probabilistically and their dispersion, it is possible to determine whether it is indeed necessary to enhance certain accuracy requirements in the topographic measurements in the field.

The results obtained show that in certain geomorphological and hydraulic conditions in Uruguay, it is possible to take data with a lower accuracy than usually required. In this sense, the hydraulic

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parameters obtained by this method do not show a significant variation with respect to the data assumed as reference, so it can be concluded that the field work can be reduced, and altimetric data even can be extracted from a Digital Elevation Model.

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