



Graduate Management
School of Water and Soil
Department of Water Engineering

Master's Thesis
In the field of aquatic structures

Determination of Stage-Discharge Relationship of Kohak Hydrometric Station in Sistan
River

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January 2019

ABSTRACT

In hydrometric stations, the discharge-stage ratio is extracted from measured data related to non-flood conditions due to the problem of measuring the discharge in flood conditions then discharge-stage ratio is extrapolated to flood conditions. The use of an outsized discharge relationship to estimate floods may estimate less or more quantities. The reason for this is that in flood flow conditions, the shape of the bed form may be changed and the flow resistance can be changed. Therefore, in order to better predict of the relationship between the discharge and depth, it is necessary to use relations in which bed form is considered. Therefore, in this study, Einstein-Barobarosa, Shen, White et al, Engelund, Brownleigh and Van rijn methods were used to estimate the relationship between the discharge and depth at the kohak hydrometric station located on the Sistan river. In this regard, after collecting the required data including cross sections, sediment gradition, discharge and depth measured at the hydrometric station of the kohak, the experimental relations between the discharge and the depth were calculated based on different methods. Finally, the calculated and measured flow data in the period 1370 to 1394 was compared on the basis of RMSE and MBE evaluation criteria. The results showed that the Einstein -Barobarosa method is well estimated in low discharge and non-flood conditions of the measured discharge, but there is a great difference in the high discharges. One of the reasons can be due to the change of bed form in flood conditions. The method of White and colleagues, which is based on laboratory data, does not show good results in the Sistan River. Since the particle size of the Sistan River bed material at the site of the kohak is in the range of particle size of the sedimentary material used in the brownleigh relation (0.88 to 2.8 mm), this method offers the best results in the Sistan River.

Key words: Discharge, Stage, Bed Form, Experimental Relations, Sistan River.