

**Abstract:**

The only source of water supply in Sistan plain is Hirmand River that is from Afghanistan. Flow conditions have been determined from outside of the country borders due to specific position of Hirmand River. The Hirmand River is divided into two branches Sistan and Paryan in the border of Iran and Afghanistan. One of the main objectives of the agricultural sector development in Sistan plain is flow increase in Sistan River. The HEC-RAS software is known software in river engineering in recent years. In this research, hydraulic effect of Zahak dam and increase of bed level of Sistan river on flow increase was evaluated in the reach from two branches of the Hirmand River to Zehak dam. In this regard, hydraulic and geometric data of Sistan River such as flow rate, cross sections and Zahak dam were collected. Then all data was entered in HEC-RAS model format. Water surface level profiles were calculated based on the steady flow simulation using standard step method Then different scenarios of river bed level decrease and operating Zahak dam gates were simulated. HEC-RAS model calibration results in the Jarykhe station show that the average of relative error of simulated depth is 0.1046 meters and also validation results of HEC-RAS model in Kohak stations show that the average of relative error of simulated depth is 0.1826 meters. The simulation results show that different scenarios of bed level decrease to 25 and 50 cm increase Sistan river flow rate to 36.1 and 54.7 percent respectively. The simulation results of the operation scenarios of Zahak dam gates at average discharge show that completely closed Zahak dam gates and open intake gates of Shahr and Taheri Channels don't have any effect on reducing discharge in Sistan River.

**Keywords:** Water Surface Profiles, HEC-RAS, Zehak Dam, Sistan River



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**The Thesis Submitted for the Degree of Master of Science  
(in the field of water structures)**

# **Hydraulics Effect of Zahak Dam Operation and Bed Level on Increase of Sistan River Inflow**

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December 2017