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Analysis of Erosion and Sedimentation of the Karkheh River Using CCHE2D Software

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Abstract

Wall erosion is one of the main sources of river sediment production, which is significantly important due to its effectiveness on characteristics of the open channel and in development of flood zone and management of water resources. Lateral erosion of river leads to loss of fertile agricultural lands and structures adjacent to the river, causing many financial damages annually in different parts of the world. In the beginning of river erosion, vertical erosion is dominant, and its sediment transport capacity is greater than the amount of available material. Sedimentary load of the river gradually increases to the point that the amount of material received and carried by the river is equal to its capacity. In this condition, the period of vertical and fast erosion of the river is ended and the erosion is turned more lateral. Longitudinal profile of the river is tangent in the mode of the balance of the horizontal surface in this situation. In the present study conducted on 25-and 50-year-old floodwaters, the current condition in the mentioned period was evaluated using collected field data and knowledge about hydraulic and sedimentary conditions of the Karkheh river in Southwest of Iran and analyzing the data applying the CCHE2D software. Eventually, after the evaluation of current velocity, sedimentation and changes in the river bed, Froude number and shear stress, it could be stated that the dominant phenomenon in the 25-year-old floodwater was sedimentation with the value of 113,887 M^3 in the total period. On the other hand, the dominant phenomenon in the 50-year-old floodwater was erosion with the value of 97,671 M^3 in the total period.