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Assessment of Sedimentation in the Lined and Unlined Secondary Channels

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Abstract—Irrigation channels play an important role in transport of sediment. Many irrigation development projects require accurate estimation of sediment volumes transported and deposited by irrigation channels. However, sedimentation data is quitting seldom especially in lined and unlined channel. Therefore, this study aimed to assess the deposition and transportation in the Latif and Qaiser minor. Beside, also evaluate the sedimentation transport in Qaiser minor by using HEC-RAS model. In order to determine the sedimentation in the selected minors, the data of sediment transport bed and suspended load was collected at three different reaches under both selected channels. The discharge and sediment measurements were carried out at the selected locations during the high flow season. Our experimental result showed that the maximum average velocity and discharge at all three reaches was recorded under Latif minor as compared to Qaiser minor. However, the suspended sediment load (SSL) of Latif minor was recorded higher followed by Qaiser minor. Moreover, results indicated that the highest suspended sediment discharge was recorded at three different locations under Latif minor as compared to Qaiser minor. There was positive linear relationship between SSL and flow rate under lined minor. Therefore, it was indicated that as flow rate increases simultaneously the SSL also increases in a similar trend. The results of HEC-RAS simulating the model showed that the maximum sediment accumulation was occurred at 1st reach of Qaiser minor. It is concluded that the sediment deposition affected the flow velocity in unlined minors, as deposition increases velocity decreases. Also, HEC-RAS simulated values shows that the minor bed level increase long with length has been widely observed during the model simulation period.

Keywords—Lined, Unlined Irrigation Channel, Sedimentation, HEC-RAS Model, Grain Size