

Braiding Channel Pattern Due to Variation of Discharge

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Abstract : An experimental investigation has been carried out in a tilting flume of 2 m wide, 13 m long, and 0.3 m deep to study the effect of flow on the formation of braided channel pattern. Sediment flow is recirculated through the flume, which passes from the headgate to the sediment/water collecting tank through the tailgate. Further, without altering the geometry of the sand bed channel, the discharge is varied to study the effect of the formation of the braided pattern with time. Then the flow rate is varied to study the effect of flow on the formation of the braided pattern. Sediment transport rate is highly variable and was found to be a nonlinear function of flow rate, aspect ratio, longitudinal slope, and time. Total braided intensity (BIT) for each discharge case is found to be more than the active braided intensity (BIA). Both the parameters first increase and then decrease as the time progresses following a similar pattern for all the observed discharge cases. When the flow is increased, the movement of sediment also increases since the active braided intensity is found to adjust quickly. The measurement of velocity and boundary shear helps to study the erosion and sedimentation processes in the channel and formation of small meandering channels and then the braided channel for different discharge conditions of a sediment river. Due to regime properties of rivers, both total braided Intensity and active braided intensity become stable for a given channel and flow conditions. In the present case, the trend of the ratio of BIA to BIT is found to be asymptotic against the time with a value of 0.4. After the particular time elapses off the flow, new small channels are also found to be formed with changes in the sinuosity of the active channels, thus forming the braided network. This is due to the continuous erosion and sedimentation processes occurring for the flow process for the flow and sediment conditions.

Keywords : active braided intensity, bed load, sediment transport, shear stress, total braided intensity

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