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Bankfull Discharge in a Small Scale Laboratory Channel

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The bankfull discharge is considered to be the channel forming agent that maintains channel dimension as it is called dominant discharge or most effective discharge.
A series of five experiments were carried out, which eventually developed as stable channels with different discharges, to investigate in detail the bankfull discharge concept in a laboratory channel.
The experiments were carried out in a flume 22m long, 2.5m wide, filled with uniform sand of 0.9mm median size. The initial conditions were similar in all experiments in this series. However, they developed under different steady discharges between 5.4 to 6.2 l/s, which encompasses the channel in different conditions of inbank, bankfull and overbank, to determine bankfull discharge according to different criteria. It was found that the resulting channel remained straight for different discharges. The channel left to develop freely under steady discharge until the channel became stable. It took between 7 to 9 hours that the channel becomes stable.
The bank profiles of these stable channels are compared with each other to understand effect of bankfull discharge on channel form. Although the steady discharges were different, the final stable sections are similar. These differences are in the tolerance of equipment. In addition, this similarity in the final geometric conditions provides good opportunity to investigate the concept of bankfull condition without any effect of diversions of cross-section. This range of discharges covers all of the criteria of bankfull discharge.
The result shows that different bankfull indicators defined the bankfull channel discharge between 5.7 and 6.0 l/s for this series of experiments. Although the elevation of water for 5.4l/s was lower than the top of the bank, the part of channel bank higher than the elevation of water widened. Therefore, the channel forming discharge can be less than 5.4 l/s. Therefore, the channel widening is not limited to the inundated regions.