

Laboratory Analysis of the Effect of Different Groin Angles on Depth in river bend

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Abstract

The preservation of rivers against the erosion and devastation caused by water flow through using groins is considered as on of the most common methods in river engineering . Changing the hydraulic conditions and creating laminar flow. The groins decrease the erosion power of water and its ability to carry the sediments and set the ground for sedimentation and stabilizing the banks of the rivers. One of the important issues in designing groins is studying scoring and determining the scoring depth in the head land of the groins.

One of the effective parameters on the scoring depth around the groins is the angle alternation in river bend.

In order to investigate the effect of different angles parallel to the groins across the bend on the scoring process. A number of experiments were conducted by using a flexible glass laboratory flume with 180 deg bend and a ratio of $R/B=4.7$.in this study by placing a groin in a laboratory flume at 30 deg position of the bend with varying angle of 70,90,100 and 110 deg to the direction of the water flow with flows of 20,24, and 28 L/S and fixed depth of 13 cm .the scoring phenomenon around the groin in purity water was studied. The material used for the bed of flume was harmonious granulated sands.

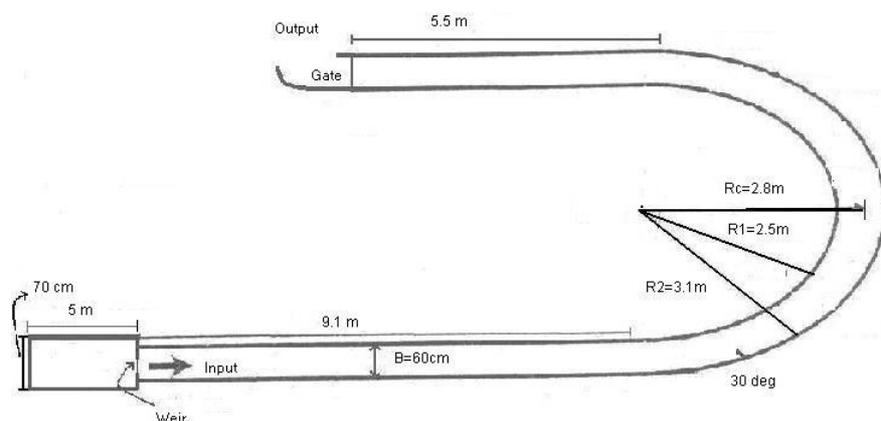


Fig. 1.Layout of flume for spur dike positions experiments



Fig. 2. Scoring and sedimentation in Spur dike downstream

Discussion and conclusion

Due to large difference in flow pattern on various positions in bend, the placing groin on different position has significant effect both on topography of bed and scoring peak around it.

Figure 3 shows a single groin in angles 70°, 90°, 110° at 30° position for discharge 20, 24, 28 Lit/S. transversal profiles show that there is a correlation between maximum scoring depth and groin angle and as the angle increases, the depth will increase.

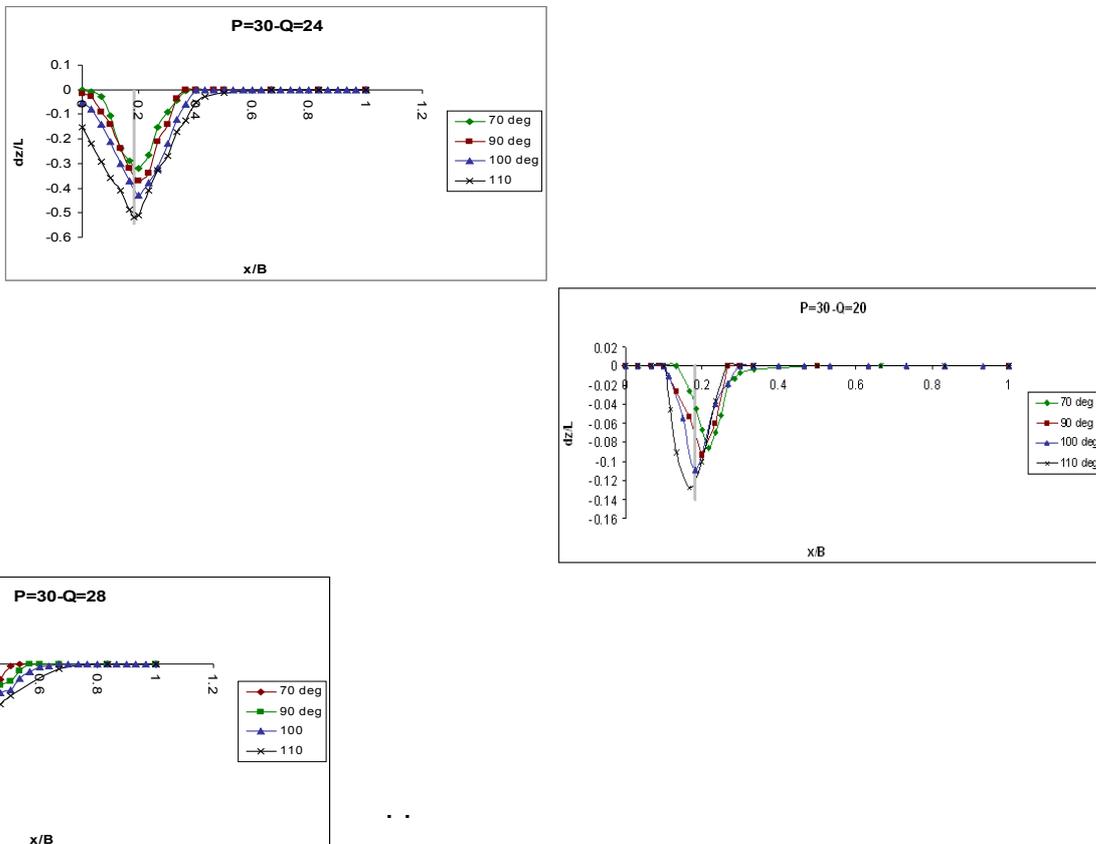


Fig.3. Transversal profile of maximum scoring in different angles at 30° position

The figure 4 shows transversal profiles of single groin in 30° positions where there is maximum scoring for discharge 20, 24, 28 Lit/S. there is also a direct correlation, and as the discharge increase in varying angles, the scoring depth will increase.

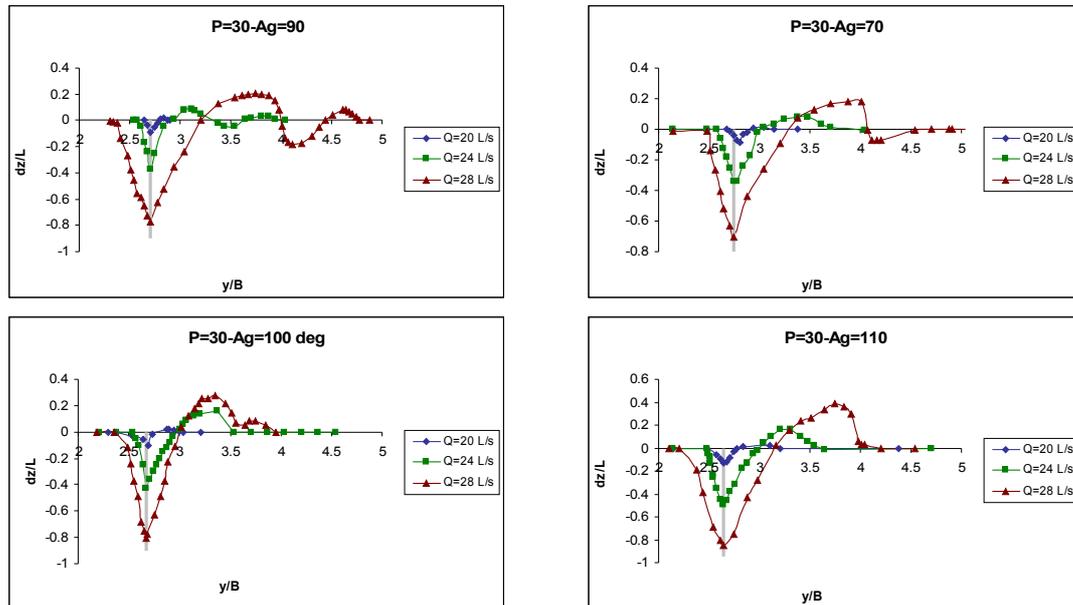


Fig.4. Transversal and longitudinal profiles of peak scoring at 30° position with different discharges & different angles

3. References

- [1]-Ahmed,M.,(1953),"Experiments on Design and Behavior of Spur dikes",Proc. Of Cong .of IAHR ,p.145
- [2]-Garde,R.J.,et al, (1961),"Study of Scour Around Spur-dikes", Journal of Hydraulic Division., Vol. 87 , No .HY6.
- [3]-Ghodsian,M, Tehrani,A.,(2001) ,"Scour Around Groins", International Journal. of Sediment Research V.16 N1 pp. 60-68
- [4]- Gill,M.A,(1972),"Erosion of Sand Beds Around Spur dikes", Journal of Hydraulic Division., Vol. 98 , No .HY9.
- [5]-Giri S.and , Shimizu Y,(2004)."Obzervation on bed variation in a meandering like flume with river traring.