

ABSTRACT

This laboratory investigation has been performed on the model of channel confluences with fine non-cohesive sand as bed material to study the confluence scour with and without pier. Experiments were conducted with the flow of clear water in a masonry flume of 10m long, 2m wide and 0.75m deep, constructed in the laboratory of Water Resources Engineering in the department of Civil Engineering. Expressions in terms of dimensionless parameter for maximum confluence scour with and without pier for braided streams were determined.

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The results were compared with ^{prev} ~~the findings~~ by past researchers in this field. It has been observed that the dimensionless scour depth in the channel confluence for fine non-cohesive uniform sand bed material increases from 3.15 to 5.85 with the increase of the angle of confluence of the tributaries from 30° to 120° for almost equal discharges in the tributary channels and from 4.85 to 5.85 with the increase of the relative discharge from 0 to 1.33 for 90° angle of confluence of the tributaries. It is found that the confluence scour depth for fine uniform sand is less than the confluence scour depth for coarse uniform sand but the scour depth for the same is great in case of coarse non-uniform and cohesive sand. Scour depth near pier in the channel confluence is found to be greater than the local scour near bridge pier.

As a result of present experimental investigation, finally, it can be said that the scour relationships could be applied in the related field by the designer because of the similar characteristics of the braiding channel, although the steep slopes used in the model to produce braided channel are not found in the natural alluvial channel.

Key Words : Confluence, Braided, Turbid, Flume, Confluence scour, Local scour, Non-cohesive sand, Discharge, Angle of confluence, Meandering, Froude number, Sediment, Scour, Pier.