

A Review of Scouring at Hydraulic Structures and its Protection by Gabion

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Abstract— For safe and economical design, scour surrounding the hydraulic structure is required to be prohibited. The present of any scour protection / controlling device surrounding hydraulic structure depends on how the device counters the scouring process. Efforts have been made to decrease the depth of scour by placing the gabion around bank and bed. In this paper, a detailed review of the work on scour reduction around bank side slope is presented including all possible aspect, such as water losses in canal and its reduction measures, scour and erosion countermeasures in waterways, design consideration of gabion wall for stream bank. This paper presented the relevant literatures on scour protection by using different methods.

Key words: Hydraulic Structures, Gabion

I. INTRODUCTION

Scour is defined as the erosion of streambed around an obstruction in a flow field. The amount of decrease in the streambed level below the bed level of the canal to the commencement of scour is referred as scour depth. Non cohesive soils resist erosion only by their buoyant weight and the friction between particles; the behavior of cohesive soils against erosion is complex and depends on many factors including electrostatic. Fine grained soils composed of or containing significant fraction of cohesive materials. Therefore, scour in cohesive soils is much slower and more dependent on soil properties than that in non-cohesive soils. In attempting to prevent scour near canal slope and embankment by different methods like a gabion, concrete block, rock riprap. Gabion mostly used in a canal protection, river training, bank protection and safety for inlet and outlet structures. The gabions have many different advantages over of other revetment method such as strength, permeability, flexibility, ecology and economy. It is especially economically because of little maintenance, easy installation, easy for suitable fill material or site near by quarries.

II. LITERATURE REVIEW

A. BIKRAMSAH Et Al.:

In this paper water losses in canal and its reduction measures. Explain water loss from canals has major impacts on surface water supplies and needs managing, and should be minimized. There are special materials which have been used in canal lining to reduce this water loss. In this paper give a special empirical equation in determination of seepage losses, and also comparison of water loss in lined and unlined canal

1. High density polyethylene is the geomembrane whose natural life is more than any other membrane.
2. Lining reduced the water loss on an average by 18% to 19%.
3. concrete with geomembrane can be used to increase the durability of lining.
4. however, material commendation for lining canal depends on the locally presented material,

finances, most significantly soil characteristics to infiltration and the environmental condition of the site. Polyolefin material has high breaking strength and can be used as lining canal for the reason that simple placing, low weight than any other material.

B. Michael HEIBAUM Et Al.:

Study in scouring and erosion. To save from harm bank and bottom of waterways from erosion a cover up layer is needed that defend against the hydrodynamic action they used joined elements route, partial grouted riprap, riprap, stone mattress, concrete cushion mattress, paved concrete basalt columns, Bitumen grouted riprap, grid concrete mattress, cable joined concrete blocks, articulated concrete blocks. To care for bank and bottom of waterways from erosion a cover up layer is needed that resist the hydrodynamic proceedings. as well the surface of any cover material has to be resistant beside abrasion. Depending on the arrangement of the protective system. Transient layers in between the armor and the subsoil are necessary. Such as filter layer, cushion layer, impervious lining etc. the armor layer may consist of particular elements, mattresses or continuous blankets.

C. Feerriolo Et Al.:

Presented the details regarding the use of flexible gabion structure for landslide, bank protection, road protection and river training works. The authors explained the phenomena of landslide and erosion as modification of equilibrium condition of soil as particular surface due to normal arrangement or due to a person activity. Gabion mattresses being flexible structures have added benefit in their apply in these areas. It is also mentioned that the internal structure details of the gabion such as opening size, wire diameter, extent of galvanization, hexagonal shape, double twist mesh, diaphragms and joint information play an main role in the working of the structure as a entire.

D. Shiah Guan – Chyun Et Al.:

In this paper gives summary of technical guidance for the design of gabion wall used in stream bank. Before carrying out the design of gabion wall, the designer should make sure that the geotechnical condition under the foundation of the gabion wall should have been properly investigated to facilitate the erosion control design. This paper mainly focused on general idea of the design principles of stream bank safety in order to make possible the designer and to speed up the popularization and purpose of gabion retaining structure technology.

III. CONCLUSION

From study of these various literatures related to A Review on scouring at hydraulic structure using by gabion and other material like water loss in canal and its reduction measure, scour and erosion countermeasure in waterways. It is

concluded that gabion wall mostly used in stream bank, river training works, etc. Design engineer must pay attention to save from harm the toe of gabion wall against erosion caused by the current along the turning point of stream channel; this is the most common cause of bank failure.

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