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IMPACT OF COLLARS AND BARS IN LESSENING THE NEARBY SCOUR AROUND ROUND AND HOLLOW BRIDGE PIERS

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R. F. Ahmed
Department of Civil Engineering, Tarbiat Modares University, Tehran, Iran

ABSTRACT

In the current work, the productivity of single and twofold collar in decreasing scour rate and profundity around round and hollow extension wharfs was concentrated tentatively. To diminish the strength of wake vortices, various quantities of bars were likewise introduced at the downstream essence of the wharf in mix with a solitary collar. The best outcome was accomplished for twofold collar when the collars were introduced at the streambed level and one wharf measurement beneath bed level. With this game plan the lower collar was not sabotaged following 80 hours of trial, appearing around 56 % decrease in scouring contrasted and an unprotected dock. It was likewise shown that by utilizing collars, the pace of scouring diminished impressively. However establishment of bars didn't fundamentally diminish the greatest profundity of scour, it delayed the start of scouring at the upstream essence of the wharf.

KEYWORDS

Bar, Collar, Scouring, Time Improvement.

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INTRODUCTION

There are many scaffolds over streams on the planet. At large numbers of these extensions, disintegration of waterway bed is created around the dock establishments. Thus, a high level of scaffold disappointments lately have been credited to scouring. Dock scour is the disintegration of the streambed nearby wharf establishments because of complicated vortex framework. Component of scouring has been widely concentrated on before. Momentarily, move toward speed deteriorates at the upstream substance of the wharf, which this cause development of a down stream lined up with the dock face. At the point when down stream encroaches the streambed, it digs an opening before the dock and moves up and by communication with the methodology stream shapes a complicated vortex framework. This vortex broadens downstream and passes the sides of the dock. Inferable from its closeness to a horseshoe this vortex is called horseshoe vortex. The horseshoe vortex develops the scour opening before the dock until the shear weight on the bed material turns out to be not exactly their basic shear pressure. The speeding up stream at different sides of the dock makes two openings in the streambed, which work with the vehicle of eliminated silt from the scour opening at the upstream border of the wharf.

To safeguard wharfs against nearby scour, specialists have proposed various strategies in the previous years. There are fundamentally two strategies to control scouring around span docks: 1-shielding the streambed around the wharfs to endure shear stresses during high stream occasions, for example, utilizing riprap, grout-filled packs, gabions modifying the stream arrangement to separate vortices and lessen speeds nearby the docks, such methods incorporate the utilization of conciliatory heaps positioned upstream of the wharfs, collars built around the wharf, Iowa vanes, opening.

Use Of Collars And Bars

Tests show that a collar introduced at the streambed level shields the riverbed from the down stream and the speeding up stream at different sides of the wharf. A collar introduced on the dock partitions the stream into two locales above and beneath the collar. For the area over the collar, it goes about as an impediment against the down stream and the down stream loses its solidarity on impingement at the collar. For the locale beneath the collar, which is the aftereffects of approach stream entering underneath the collar, the strength of down stream and accordingly the horseshoe vortex is decreased. At the point when two collars are introduced, the lower one additionally goes about as a snag for the more fragile down stream, which is shaped beneath the upper one, could additionally decrease its solidarity, and safeguards the streambed. The scour opening downstream of the wharf is then broadened steadily towards upstream and subverts the collar. In the event that the scour opening compasses upstream of the wharf, stream would enter beneath the collar. Entrance of stream beneath the collar causes the development of the down stream and speed increase of scouring under the activity of horseshoe vortex. A second collar in a lower height could in this manner forestall further improvement of scouring underneath the primary collar. It might likewise be hypothesized that assuming using any and all means the strength of wake vortices is decreased, this might prompt decrease of scouring around the dock.

Exploratory System

Tests were completed in a 10m long and 0.74 m wide flat flume. Collars with a powerful width 'W' equivalent to multiple times the dock measurement 'D' were introduced at the streambed level. Size and rise of collars were chosen in view of the past experience. Albeit more extensive collars are more powerful,

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development of collars more extensive than multiple times the dock breadth is viewed as unfeasible. Besides, the effectiveness of a collar increments at lower heights. Be that as it may, bringing down a collar underneath the streambed level causes a more profound scour opening downstream of the wharf and more extensive scour opening around the dock.

Bars in various numbers were introduced at various points at the downstream essence of the dock. Bars were introduced so as to not broaden further from the extended region of the wharf looking from upstream . This plan was utilized to forestall extra drag on the dock and the chance of streaming flotsam and jetsam being caught by the bars when stream way to deal with the wharf at no approach. Bars were introduced in two even lines at 2 distinct points of 30˚, 45˚ relating to the stream heading. However bars with 90˚ point with the stream bearing are presented to coordinate effect of the stream, a further test was done with 90˚ point to contrast its outcomes and different points.

TEST RESULTS AND CONVERSATION

Scouring around an unprotected round dock began all the while at the upstream substance of the wharf because of the down stream and at the downstream of the dock under the activity of wake vortices. The scour opening upstream of the dock was then evolved under the activity of horseshoe vortex. Following 44 hours, greatest profundity of scour was estimated 92 mm at the upstream of the wharf. The greatest profundity of scour opening estimated in these tests was in great concurrence with observational conditions.

At the point when the lower collar was sabotaged at its upstream edge, the pace of scouring expanded once more. Following 100 hours the pace of scouring was insignificant in view of the definition by Melville, et al. Most extreme profundity of scour in this test at the upstream essence of the wharf was 45mm. As of now scour profundity along the edges and back of the dock were 60 mm and 40 mm separately. Hence, the most extreme scour profundity in this examination was at sides of the wharf. Event of greatest scour profundity at sides of the lower collar shows that the lower collar could all the more likely decrease the activity of horseshoe vortex at the upstream top of the dock than the high pressure zone at sides of the wharf.

This test showed that establishment of the second collar at 0.5 D beneath the bed level would additionally lessen the scouring rate and profundity. Time improvement of scouring at the upstream essence of the wharf and transient variety of scouring beneath the collar as is made sense of in Area 4.2. While scouring is developed and the subsequent collar is uncover a similar situation rehashes and scouring rate is diminished and a scour opening structures downstream of the lower collar under the activity of the wake vortices, expands upstream at the edge of the collar continuously and scour rate is exceptionally low till the lower collar is likewise subverted and one more down stream is framed beneath it. This down stream however is exceptionally frail yet it again builds the pace of scouring.

CONCLUSION

Proficiency of collars in decreasing neighborhood scour around span wharfs with roundabout and rectangular crosssections was displayed in past examinations. In the current work productivity of single as well as twofold collar was concentrated on tentatively on barrel shaped wharfs. All collars utilized in these examinations were multiple times more extensive than the dock measurement. Tests were done at the edge of dregs movement where greatest scouring is normal. By estimating the time improvement of scouring it was shown that collar diminished the pace of scouring by and large. As the collar was subverted, the pace of scouring expanded. In this way, to decrease both the rate and most extreme profundity of scouring a subsequent collar was introduced at a lower height. The most productive game plan was the point at which one collar was put at the streambed level and one more was introduced one

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wharf measurement underneath the bed level. In this course of action the lower collar was not subverted following 80 hours of examination and thusly, decrease of scouring was around 56 % contrasted with an unprotected dock. Then again, proficiency of a solitary collar and twofold collar with one collar at bed level and the second one half wharf width beneath the bed level was 23 % and 35 % separately. It ought to be seen that with decrease of the greatest scour profundity, the degree of the scour opening is likewise diminished.

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