عنوان مقاله:

3D SIMULATION OF THE EFFECTS OF ACCUMULATIONOF FLOATING WOODY DEBRIS ON FLOW FIELD ANDAPPLIED FORCES ON BRIDGE PIERS

محل انتشار:

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نویسندگان:

.Mohammad Nabavianpour - *Manager of River Engineering at Padidab Sepahan consulting Engineering Company*

.Seyed Meysam Moshashaie - *MSC Water Engineering Graduated From Shahrekord University. Iran*

Hossein Samadi Brojeni - *Assoc. Prof., Water Engin. Dept., Faculty of Agric., Univ. of Shahrekord, Iran*

Behnam Motamedi - *MSC Graduate of Water Engineering*

خلاصه مقاله:

Floating woody debris reduce rivers cross-section of the river divert flow direction andincrease the flow velocity bridge piers. So, they increase the intensity of vortices in frontand behind bridge piers as well as increasing the rate of degradation. This study usedFLUENT software in 3-dimensional state for simulating the flow field, and the effects ofaccumulation of floating woody debris in front of square bridge piers or square piers withsharp nose on flow fields, intensity of vortices and parameters such as drag coefficient orlift coefficient were investigated. Results showed that when the floating objects over thewater surface are at the same level of water on the surface or under it, the flow speeds forsquare piers are increased max. 1.1, 1.36 and 1.54 times, and for square piers with sharpnose are increased max. 1.2, 1.5 and 1.67 times respectively, in comparison to the controlsample. Moreover, the magnitude of formed vortices behind piers and along the affectedarea of intensified flow fields under floating objects in front of square piers are greaterthan that in front of square piers with sharp nose. Also, when the blockage rate (ratio ofthe occupied area of the flow by floating objects to the flow cross-section area) is 20.58%and the floating objects under the water surface are in front of bridge piers, the highestrates of force (drag and lift) are applied on the bridge piers

کلمات کلیدی:

(Flow Blockage, Accumulation of Floating Debris, k-ε Numerical Model, Drag Force,Normal Forces to The Flow (Lift