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The Effects of Different Parameters of Wood Floating Debris on Scour Rate Around Bridge Piers

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Abstract : A local scour is the most important of the several scours impacting bridge performance and security. Even though scour is widespread in bridges, especially during flood seasons, the experimental tests could not be applied to many standard highway bridges. A computational fluid dynamics numerical model was used to solve the problem of calculating local scouring and deposition for non-cohesive silt and clear water conditions near single and double cylindrical piers with the effect of floating debris. When FLOW-3D software is employed with the Rang turbulence model, the Nilsson bed-load transfer equation and fine mesh size are considered. The numerical findings of single cylindrical piers correspond pretty well with the physical model's results. Furthermore, after parameter effectiveness investigates the range of outcomes based on predicted user inputs such as the bed-load equation, mesh cell size, and turbulence model, the final numerical predictions are compared to experimental data. When the findings are compared, the error rate for the deepest point of the scour is equivalent to 3.8% for the single pier example.

Keywords : local scouring, non-cohesive, clear water, computational fluid dynamics, turbulence model, bed-load equation, debris
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