

EGU22-1137

<https://doi.org/10.5194/egusphere-egu22-1137>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Investigation of Air-Bubble Screen on Reducing Scour in River Facility

Kuo-Wei Liao and Zhen-Zhi Wang

National Taiwan University, Taiwan (kliao@ntu.edu.tw)

This study proposes an innovative idea to reduce scour in river structures via air-bubble screens, which does not provoke a significant impact on the ecological environment. Check dam is one of the most popular river facilities and is selected as the research target of this study. The scouring problem on the downstream side of check dam may damage its own safety and therefore, preventing the check dam from scouring has been a challenge task for years. To lessen the safety impact from scouring, the existing methods often rely on using reinforced concrete structures that often, does not solve the problem but induces a series of scouring problem. Further, reinforced concrete structure may damage the river ecological environment during and after the construction. On the other hand, air-bubble screen may provide an alternative solution in solving the scouring problem without interrupting the environment. A scaled-check dam model using flume channel at Hydrotech Research Institute in NTU is conducted, and then the FLOW-3D is used to carry out numerical simulation to evaluate the effectiveness of the air-bubble screen in reducing the depth and range (or volume) of the scours. Results shown that air-bubble screen is able to effectively reduce the check dam scours. Based on results from experiments and simulations, the design principles for air-bubble screen are provided as a reference for future practice.