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Probabilistic-Based Design of Bridges under Multiple Hazards: Floods and Earthquakes

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Abstract : Bridge reliability against natural hazards such as floods or earthquakes is an interdisciplinary problem that involves a wide range of knowledge. Moreover, due to the global climate change, engineers have to design a structure against the multi-hazard threats. Currently, few of the practical design guideline has included such concept. The bridge foundation in Taiwan often does not have a uniform width. However, few of the researches have focused on safety evaluation of a bridge with a complex pier. Investigation of the scouring depth under such situation is very important. Thus, this study first focuses on investigating and improving the scour prediction formula for a bridge with complicated foundation via experiments and artificial intelligence. Secondly, a probabilistic design procedure is proposed using the established prediction formula for practical engineers under the multi-hazard attacks.

Keywords : bridge, reliability, multi-hazards, scour
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