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Development of fragility curves for bridge
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Abstract
This study presents the development of fragility curves for a three-span reinforced concrete box girder bridge. The model was designed based on ASSTHO LRFD 2017 standard. CSiBridge software was used as the main tool for nonlinear time history analysis (NTHA) which is also referred to as incremental dynamic analysis (IDA). Seven ground motions from the real earthquake were used to generate IDA curves. All the ground motions were converted to acceleration response spectrum and scaled up or down depending on the fundamental period, T1 of the bridge according to the Eurocode 8 (EC8) elastic respond spectrum to suit the characteristic of the ground motion to the soil type. The performance level was identified based on IDA curves. These performance levels include operational phase (OP), immediate occupancy (IO), damage control (DC), live safety (LS) and collapse prevention (CP). These levels will be used to observe the structural performance of the bridge. Results show that piers with 5 m height have better performance than those with 7 m height. The fragility curves were then developed for 5 m and 7 m pier height. Fragility curves show the probability of exceeding the performance levels is higher for 7 m pier height. © 2023 AIP Publishing LLC.

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