Assessing flooding impact to riverine bridges: an integrated analysis

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No.	Comment	Answer
Reviewer #3 (minor revision)		
1.1	Several responses to my comments have been quite evasive, for example in response to comment 1.3 instead of addressing the concern regarding the values of the flow velocity and height that seem excessive and are not supported by hydraulic analysis, the authors say that the Highways Agency is "supportive of the overall framework and expressed interest in investigating consequences due to extreme events for the M6 bridge in Carlisle".	The answer to previous Comment 1.3 also included the test below: "The velocity of 3m/s was based on hydrodynamic simulation for the event of 500-year return period. Due to climate change, flood return periods are dramatically decreases, and a 500-year flood in 2021 could become a 271.6-year flood in the 2050s (Orton et al., 2016). Thus, for the design of e.g. bridge piers, return periods up to 500-year will be more and more justified (Rashidi et al., 2021); recent works has used similar return periods too (Alabbad et al., 2021)."
1.2	I agree that climate change will exacerbate the risk of bridge failure due to floods, but other case studies would have been more effective and more realistic. The friction coefficient between concrete and elastomer can be very high (otherwise car tyres would not be made of elastomer and would not function under wet conditions!) and I am not sure AASHTO would prescribe a value of 0.2. In any case, 0.1 is a value typically used as an upper bound for teflon (a material used for guaranteeing sliding).	The authors do not suggest a coefficient of friction of 0.1 is the true coefficient of friction, but it is based on (1) the suggested AASHTO Commentary design coefficient of friction of 0.2 and (2) the expectation that the coefficient of friction may be lower than expected in wet/submerged conditions. Further, the limiting coefficient of friction is defined as the AASHTO commentary suggestion of 0.2 in Figures 7a and 7b. To the authors' knowledge, there are no experimental data available to help overcome the epistemic uncertainty associated with these conditions.
1.3	I pointed out that if the scope of the paper is to present an "holistic framework", others already did, introducing similar levels of simplification. However, I don't think it is worth at this stage to continue to point out such issues when they are considered as minor by the authors, and thus are not addressed. Thus, I leave to the Editor's judgement to decide on the suitability of such a manuscript for publication.	The previous response to Comment 1.1 largely explained the differences from existing works and the novelty of this paper. In summary, we argue that our approach is novel because it models hydrodynamic forces as demand on the bridge structure using CFD. While there are, admittedly, several other frameworks that have been developed for similar cases, this concept is not ubiquitous throughout the literature, and expanded computing power has resulted in more availability of these tools, and our hope is that we are providing an avenue for potential users to explore these approaches.

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