

Interactive comment on “A multi-hazard risk prioritization framework for cultural heritage assets” by Giacomo Sevieri et al.

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The manuscript focuses a very relevant topic and discusses interesting new ideas for prioritizing risk reduction measures in historic buildings. The manuscript is very clear and well written, and I only have the following minor comments/suggestions to make.

We would like to thank this reviewer for the positive overall assessment of our contribution and for the insightful comments on our manuscript. Based on these comments, various revisions have been made to further improve the quality of the paper.

C1

1) Regarding the Introduction, authors should clearly define the typology of cultural heritage assets that are focussed by the risk prioritization approach they propose. Since the referred CH assets are building-like reinforced concrete frame and masonry structures, the applicability of the proposed approach is restricted to this type of assets and this should be mentioned in the Introduction. This way the discussion in Section 2 will be framed more clearly. In the current version of the manuscript, the reader only finds this clearly stated in Section 3.1.

The proposed procedure for multi-hazard risk prioritization of CH assets focuses on reinforced concrete frames and unreinforced masonry buildings. We agree with this reviewer that specifying – from the introduction – the structural typologies considered in the proposed procedure can improve the discussion. In the revised version of the manuscript the following sentence has been added at line 71 (page 3):

“...This paper addresses the above-mentioned issues by proposing a multi-level, multi-hazard risk assessment framework for CH assets, with a special focus on reinforced concrete (RC) frames and unreinforced masonry (URM) buildings...”

2) Still on the typology of the cultural heritage assets, authors refer that Filipino cultural heritage also includes mixed structures. Reference to this type of structure is only mentioned in Section 3.1. Assuming that the proposed risk prioritization approach does not cover this type of structure (the presentation of the proposed approach only focuses structures that are either reinforced concrete or masonry), authors should refer this issue in Section 3.1

We agree with this reviewer. The modification of the sentence at line 71 (previous comment) already provides a clarification concerning the structural typologies considered

C2

in the proposed framework. However, the following sentence has also been added at line 213 (page 8) of the revised manuscript to further clarify this aspect:

“The proposed RVS form has been designed in order to account for the specific features of Filipino CH assets, which mainly consist of RC frames and masonry or mixed structures. It is worth noting, however, that even though the RVS form can be used to collect data related to combined structural typologies, they are not explicitly considered (in terms of scores and weights) in the proposed multi-hazard risk prioritization framework. . .”

3) In line 2015 (page 8), authors discuss the definition of cultural heritage and refer to the criteria set by UNESCO in the Operational Guidelines for the Implementation of the World Heritage Convention. However, the line of reasoning suggested by the authors generalizes the context of the guidelines in a way that is not intended by their scope: the Operational Guidelines do not define cultural heritage, the Operational Guidelines define what is considered World Heritage, which within the UNESCO jargon is made of three types of heritage: natural, cultural and mixed (cultural and natural). As such, given the context that authors are discussing (i.e. different views of what is cultural heritage) perhaps a more suitable reference would be (Vecco, 2010): Vecco, M. (2010). A definition of cultural heritage: From the tangible to the intangible. *Journal of Cultural Heritage*, 11(3), 321-324.

We thank this reviewer for this reference which has been added to revised manuscript replacing the incorrect one.

4) Figure 2 is a bit too small for clear readability. It could be included as a full-page figure (rotated 90) or included as supplemental data.

C3

We agree with this reviewer. While we have left figure 2 in the main text (Section 3.1) to provide the reader with a comprehensive view of the form (when first introduced), we will also add the full form (at its original 3 x A4-size page) as supplemental (online) material.

5) In Section 3.5 authors discuss how to include the intangible nature of cultural heritage value within their approach. Although their proposal is adequate and simple, other approaches have been recently proposed that are able to provide a larger differentiation between the assets while maintaining an adequate level of simplicity (e.g. see the definition of baseline value in (Romão and Paupério, 2019)). Romão, X., Paupério, E. (2019). An Indicator for Post-disaster Economic Loss Valuation of Impacts on Cultural Heritage. *International Journal of Architectural Heritage*, DOI: 10.1080/15583058.2019.1643948 2020-7, 2020.

We thank this reviewer for the reference, which has been added to the literature review (Section 2) at line 176 (page 6).

...Romão and Paupério (2020) presented an approach for the quantification of economic losses related to CH assets damaged by catastrophic natural events. Particularly interesting for the scope of this study, is the definition of the baseline pre-disaster value of the CH asset which namely corresponds to the asset intangible value. The authors consider four categories (i.e., evidential, historical, aesthetic and communal values) reflecting different levels of CH asset significance (Kerr, 2013). This approach requires only few information about the assets under investigation and then it can be used at portfolio level prioritization/assessment. . .

C4

Moreover, the following sentence has been added in Section 3.5 (line 517, page 21), where the proposed index is introduced.

“... It is worth noting that the classification of the CH asset significance proposed by Kerr (2013) has been already successfully used/validated in the scientific literature for the quantification of the intangible value (e.g., Romão and Paupério, 2020; Figueiredo et al. This further strengthens the validity of the proposed procedure...”

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