

## ***Interactive comment on “Sandbagging versus Sandbag Replacement Systems: Costs, Time, Helpers, Logistics” by L. Lankenau and B. Koppe***

**Anonymous Referee #1**

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The manuscript compares the use of sandbags with alternative flood protection systems, the so-called Sandbag Replacement Systems (SBRS), in terms of costs, helpers and logistics for installation and dismantling. Three different cases are considered: temporary flood dam, load drain in the case of a saturated dyke over an extensive area and ring dike for reinforcement against heavy punctual exit of seepage on the inner embankment of the dyke. The manuscript is well written and structured and addresses, despite a lot of simplifications, an interesting and rarely explored topic in the literature, that is the assessment of alternative protection systems in case of a inundation event, which can be more efficient and convenient than the traditional sandbags. Although this, the paper does not address the topic of the efficiency of these methods and it is limited to cite the other manuscript of the same authors (and, for example, not in

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the introduction, where it is fundamental in order to understand why the authors write about this topic), in which the topic is discussed. It is not clear, in the current version of the manuscript, why it is so important to focus on the SBRS and the reason why a comparison in terms of costs, helpers and logistic is necessary. The authors in this manuscript compared three different type of SBRS, but it is not clear why they take these methods among all the available one (the reason is maybe that they have better performances, but it can only understood by reading the other manuscript). In addition, the SBRS are very shortly described, taking for granted that their characteristics are clear and well known (but it is not always obvious). In my opinion, the manuscript needs to be re-structured considering also a part about the "hydraulic" efficiency of the SBRS, because, in the current version, it is not enough interesting to be published in NHESS, but can be important more for municipal administrations. The manuscript would earn a lot in terms of quality with the consideration of the "hydraulic tests" of the other manuscript. I suggest to the authors to consider the idea of unifying the two manuscripts, which seem to be a bit poor if considered singularly.

In case authors consider to review the manuscript in this direction, I would also suggest to better justify some values, for example the costs of trucks and fuel (it is not clear to me which is the considered distance to cover), the sandbag requirement (Table 1: why Acqua defence and Aquariva need sand?) and the price used for sand (it is written, during the event it rises sharply: which price is considered in the manuscript? during the event? an average value? etc.) I would also better explain what the terms in the tables mean, for example "time materials", "time logistics", etc. (Table 3, e.g.) In Sec. 3.2, it is not clear to me why SBRS don't require additional helpers in case of poor access to the site, as it happens for sandbags. In the conclusions, I couldn't find anything about the higher costs of SBRS, although I think it is a relevant result of the analysis. I think some considerations on the long terms is also needed, in order to say that the higher costs of SBRS are amortized because they can be reused. I was also curious to know if there are studies on the case in which these protection systems turn out to be undersized and are, for example, overtopped: can they be reused? how is

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the amortization reduced?

Finally, I found a couple of other papers which addressed the comparison of the performance of different flood protection systems, and which the authors can consider as additional material: Wibowo & Ward, 2016 "Evaluation of temporary flood-fighting structures" and Rappazzo & Aronica, 2016 "Effectiveness and applicability of flood barriers for risk mitigation in flash-flood prone Mediterranean area".

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