

## ***Interactive comment on “Re-evaluating safety risks of multifunctional dikes with a probabilistic risk framework” by Richard Marijnissen et al.***

### **Anonymous Referee #1**

Received and published: 17 December 2018

Aspects for the full review: 1. Does the paper address relevant scientific and/or technical questions within the scope of NHESS? (yes) 2. Does the paper present new data and/or novel concepts, ideas, tools, methods or results? (yes) 3. Are these up to international standards? (yes) 4. Are the scientific methods and assumptions valid and outlined clearly? (Generally yes, however only if the basic concept of probability based design of flood protection is well known to the reader. . .) 5. Are the results sufficient to support the interpretations and the conclusions? (yes) 6. Does the author reach substantial conclusions? (Yes, when it comes to defining the knowledge gap for further research and development.) 7. Is the description of the data used, the methods used, the experiments and calculations made, and the results obtained sufficiently complete and accurate to allow their reproduction by fellow scientists (traceability of results)? (In

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the paper it should be explained more clearly what was exactly calculated and from which calculation followed which result. In general, however, this part is OK.) 8. Does the title clearly and unambiguously reflect the contents of the paper? (Yes) 9. Does the abstract provide a concise, complete and unambiguous summary of the work done and the results obtained? (yes) 10. Are the title and the abstract pertinent, and easy to understand to a wide and diversified audience? (yes) 11. Are mathematical formulae, symbols, abbreviations and units correctly defined and used? If the formulae, symbols or abbreviations are numerous, are there tables or appendixes listing them? (n/a) 12. Is the size, quality and readability of each figure adequate to the type and quantity of data presented? (See below) 13. Does the author give proper credit to previous and/or related work, and does he/she indicate clearly his/her own contribution? (yes) 14. Are the number and quality of the references appropriate? (yes) 15. Are the references accessible by fellow scientists? (In general yes, without checking every single reference) 16. Is the overall presentation well structured, clear and easy to understand by a wide and general audience? (Generally yes, however, a wide and general audience would need more detail on the probabilistic design concept and its implications when it comes to multifunctional dikes) 17. Is the length of the paper adequate, too long or too short? (adequate) 18. Is there any part of the paper (title, abstract, main text, formulae, symbols, figures and their captions, tables, list of references, appendixes) that needs to be clarified, reduced, added, combined, or eliminated? (See below) 19. Is the technical language precise and understandable by fellow scientists? (yes) 20. Is the English language of good quality, fluent, simple and easy to read and understand by a wide and diversified audience? (yes) 21. Is the amount and quality of supplementary material (if any) appropriate? (yes)

General comments: The paper is extremely relevant in the context of the design of flood protection under consideration of multifunctionality. In general it is well structured and contains all necessary information to follow the discussion. The paper could be improved by explaining more clearly what was actually calculated to allow a better understanding of results and findings. The word function is used regarding multifunc-

tionality as well as mathematical function. Because this word is used very often in the text, the authors should revise the text if the context for the word function is always clear.

Specific comments: Page 1: L11ff: (While a traditional...) please define more precisely. As for now it does not become clear what the difference really is. Page 3: L18: "...to exclude flood defences with an insignificantly low failure probability..." " If The probability to fail is insignificantly low, this would be a positive result. Why should such flood defences be excluded? Page 5: L11ff: The referral to table 1 gives the impression that either the set of analysed MFFDs or the respective calculations can be found in table 1. Neither is correct. Table 1 only shows (very generally) the differences of the approaches. Table 1: Please rethink: If the probability of occurrence in scenario 1 (additional function present) is  $x\%$ , is then the probability for scenario 2 (additional function absent) really  $100-x\%$ ? This seems to be a mistake. Otherwise this needs explanation in the text. Page 7: L28: is there really a hole presenting the profile or is there an empty space, the outer shape of the area of the additional function or something like this? L31f: Why is the probability of the absent structure chosen to be  $1\%$ ? And why is this a conservative approach? Page 8: L3: ...when the structure remains just outside of the profile (0,1,2)... Please explain: why does this not also apply to profiles 3 and 5?

Technical corrections: Page 1: L22: ..., a better understanding... L26: "This is true..." please reformulate. Page 3: L4ff: please do not use the personal pronoun "we". Page 5: L12: ...and the traditional... Table 1: ...a given failure mechanism ...probability of occurrence Page 7: L10: ...by weighing... L25: please reformulate... L27: ...2 two... ?; ...present in which CASE the load... Page 8: L1: ...berm [] both... L6: for better readability: ...along the full length, the inclusion of uncertainty... L7f: reformulate: TRUE L34: reformulate: "risk of functions" Page 9: L1: personal pronoun "we"... see above L2f: Please revise the sentence for better understanding. Figure 3: Please reformulate the caption: ..."for calculation the probability"...

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