

## ***Interactive comment on “Experimental study of embankment breach based on its construction parameters” by Sachin Dhiman and Kanhu Charan Patra***

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**General comments** The present work studies the effect of construction parameters including compaction effort, compaction moisture content, and the moisture content at the time of failure on the embankment breaching due to overtopping. The contribution of this study is useful and interesting. My studies in this field shows that the some of the parameters such as effect of compaction have been studied in the previous researches (e.g. Ali Asghari Tabrizi, Ezzat Elalfy, Mohamed Elkholy, M. Hanif Chaudhry & Jasim Imran (2016): Effects of compaction on embankment breach due to overtopping, Journal of Hydraulic Research, DOI: 10.1080/00221686.2016.1238014.). But the

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effect of crack in the hydraulics of embankment breaching is novel. The reported data have good agreements with physics of this phenomenon. According to my viewpoint, the measured data were not reported in scale of a research paper. For example, the embankment surface profiles at various times were not shown in the results. The main strong section of the present study which is about the effect of cracks in the breaching process was not discussed well. Also, to ensure the reliability of the measurements, the repeatability of the tests must be checked by considering the various parameters for all cases prior to analysis the results. In this work, the test repeatability was not discussed.

**Response** We are thankful to Reviewer for the valuable comments. As suggested, the embankment surface profiles at various times are added for Phase 1 experiments (P1.2, P1.3, and P1.4). The experiments performed in Phase 2 are new to this field and are basically trial runs to investigate whether the cracks developed in embankments affect the breach parameters. The trial runs itself present sufficient difference in final outputs and we wish to take up more rigorous study on the aspect of the influence of cracks on actual mechanisms of erosion and the repeatability in the next spiral of our experiments.

**Specific comments** The present study is about the embankment breaching which is made by the cohesive soils. However, the effect of the cohesion on the hydraulic of breaching was not studied.

**Response** All the embankments are constructed for same lean clay - CL type soil (cohesive in nature). Our main focus was to vary the compaction moisture content and compaction energy and their influence on the breach parameters. A new factor is introduced in the revised manuscript, which is dependent on the relative dry density and relative moisture content of the embankment. The effect of cohesion of soil on breaching was not focused in the current work.

**Technical corrections** The literature review of the present paper could be rewritten.

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Some major studies must be reviewed, and the novelty of present is expressed clearly. The temporal embankment profiles for each case were not presented, while it is very important for such studies. Finally, a precise indication must be provided for the impact of the mentioned parameters on the embankment breaching.

Response The literature review is improved and focused by considering more studies on this field including the work of Tabrizi et al. (2016) in the revised manuscript. Temporal embankment profiles for Phase-1 experiments are now presented. The conclusions are rewritten with more clarity describing the impact of compaction moisture content, compaction energy and embankment cracks on breach parameters in the revised manuscript.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-383/nhess-2017-383-AC2-supplement.pdf>

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2017-383>, 2017.