Review of the manuscript ID egusphere-2023-2715 '*Dynamic Response of Pile-Slab Retaining Wall Structure under Rockfall Impact*' submitted to *Natural Hazards and Earth System Sciences*.

Recommendation: ACCEPT

Focus of the paper: numerical modelling in engineering geology.

Relevance: The presented study is the original primary research within scope of the journal.

Title: the title and abstract of this paper clearly reflect its content.

Abstract is well written and clearly describes the undertaken study: In the presented experiment, the impact resistance of the structure is optimized compared to traditional reinforced concrete retaining walls.

Structure: The article is well organized with structured sections. The structure of the manuscript conforms to the journal standards and discipline norm.

Introduction presents a background, defines research goals and provides a clear statement of research problem. It describes the purpose of the research investigation supported by literature. The Introduction well describes the research. Introduction and background show context of the article. Literature is well referenced and relevant.

Research questions and goal are identified. Objectives are relevant to the study aim.

Literature regarding the relevant topics is reviewed, formatted according to the journal rules and appropriately referenced. Major sources include published papers on geotechnical engineering.

Research gaps and weakness in former works are described: the authors evaluated the that the impact position which has a significant effect on the stability of the structure, which has not been investigated earlier.

Motivation is explained: The authors presented numerical experiments to investigate the dynamic response of a pile-slab retaining wall under the impact of rockfall.

Methods: The authors performed a full-scale numerical model of a four-span pile-slab retaining wall satisfying specification requirements.

Results are reported: The authors reported that during the impact process, the stress, strain, and concrete damage of the structure spread from the impact centre to the entire structure and result in permanent deformation. The authors also reported that lateral displacement of pile at ground surface and the number of damage failure units under the pile as the impact centre is greater than those under the slab as impact centre.

Discussion interpreted the major outcomes of this study: The authors discussed a presented series of numerical experiments to investigate the dynamic response of a pile-slab retaining wall under different impact centers and velocities.

Conclusion The authors predicted the maximum impact energy that the structure can resist.

Actuality: the authors found that the impact force, interaction force, lateral displacement of pile at ground surface, and concrete damage is increased with the increase of impact velocity.

Novelty: The authors investigated the relationship between the impact velocity and the maximum lateral displacement of pile at ground surface. The authors also estimated maximum impact energy that the pile-slab retaining wall can withstand.

Academic contribution: Rigorous investigation performed to a high technical and professional standard. The paper deserved to be published in ***Natural Hazards and Earth System Sciences***.

Figures The authors presented 20 figures which are of acceptable quality, easy to read, relevant and suitable. Figures are labelled and appropriately described.

Recommendation: This manuscript can be ACCEPTED based on the detailed report above.

With kind regards,

- Reviewer.

13.12.2023.