

***Interactive comment on* “Stability assessment of roadbed affected by ground subsidence adjacent to urban railways” by Ki-Young Eum et al.**

Anonymous Referee #1

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This study uses FLAC3D to assess the stability and risk level for the roadbed adjacent to urban railways with respect to various groundwater levels and the geometric characteristics of cavities. The topic is interesting and valuable. The manuscript may be potentially a good contribution for publication in Natural Hazards and Earth System Sciences after major revisions are addressed. Some questions are listed as follows:

(1) Abstract. Too many background descriptions are presented and too few results are found in the abstract. Four sentences from lines 13 to 17 in page 1 may be merged in a sentence. However some valuable results and conclusions, e.g., the road settlement and the effects of groundwater level, may be added.

(2) 1 Introduction.

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- Discussion in the segment is not clear, and I think the segment is needed to be rewritten.

- A brief review is anticipated for the development of the software assessing the road risks. Discussions in the 2nd and 3rd paragraphs are chaotic.

- Figure 1 may be erased.

(3) 2 Case studies of ground subsidence. I think this is only an introduction of ground subsidence instead of the case studies of risk assessments. Hence the segment may be simplified and merged into the first segment Introduction. Moreover. Figures 2 and 3 may be merged.

(4) 3 Numerical analysis

- The principle of FLAC3D should be briefly and clearly described, or I can not believe what you calculated are reliable.

- Figure 4 is not clear especially as it is printed. Figure 5 may be erased for a similar description has been given in Figure 7.

- Might you try to simply tables 1-4 and merge them as a table? We might pay more attentions on results and discussion.

(5) 4 Roadbed Settlement and Stability

- Texts in Figure 7 are too small and blur.

- It's better that the number values of the vertical coordinates in Figures 8, 9, and 11 grow from the bottom up. The unit of the horizontal ordinate may be added Figures 7-8.

- Line width of Figure 9 is different to others. What's the meaning of the horizontal ordinate caption in Figure 9?

- Lines 225-227 in page 9: Why could you define the risk level mentioned here?

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- Tables 8-10: Color blocks in the tables are not clear as they are printed in black and white.

- In page 7, the heading of 4.1.1 should be erased.

- From segments 4.1 to 4.2, essential discussion on the problems related to the observed data may be added, and comparison of the results calculated in this study to other references may be replenished.

(6) 5 Conclusions. I could not find any quantitative conclusion here.

(7) The manuscript is readable, but still many minor language errors exist. For examples:

- In line 180, page 7, the original sentences are: "Diameter = 4m (a). Diameter = 6 m (b). Diameter = 8 m (c). Diameter = 10 m (d)". I think to merge the sentences as follows is better: "(a) Diameter = 4m, (b) Diameter = 6 m , (c) Diameter = 8 m, and (d) Diameter = 10 m"

- In line 207, page 8, "4-m and 6-m" may be revised as "4 and 6 m". The sentence in the lines 253-255, page 10, is too complicated to understand.

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