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Interactive comment on "Roadway backfill method to prevent geo-hazards induced by room and pillar mining: a case study in Changxing coal mine, China" *by* J. Zhang et al.

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Thank reviewer for the comments concerning our manuscript entitled "Roadway backfill method to prevent geo-hazards induced by room and pillar mining: a case study in Changxing coal mine, China" (ID: 830587). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and will try our best to revise this paper. The responds to the reviewer's comments are as flowing:

Overall comments: Many geo-hazards associated with room and pillar mining, such as pillar failure and bursts. This paper presented an effective way, i.e. roadway backfill method, to resolve these issues. Overall, this paper was well-written in general and

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flows well. However, a few points have not been well presented or not clear enough, thus need to be improved.

Response: Thank reviewer for your recognition to our work. We will try our best to revise this paper according to the reviewer's comments.

Comment No.1: Page 3, line 70: Why the authors use aeolian sand and loess as the backfill materials? Is there any reference?

Response: The Changxing coal mine is located in western China, where the surface of the earth is covered by aeolian sand and loess, so we used aeolian sand and loess as the principal backfill materials for maximum cost reduction. Some detailed information will be added in the revised paper.

Comment No.2: Table 1: check if "ratio of loess" is right, I think this should be "loess".

Response: Thank reviewer for pointing this place out. We have changed "ratio of loess" to "loess".

Comment No.3: Section 5.1.1. the selection of the modeling dimension was not justified. Need to explain whether or not the model is large enough to cover the whole zone of influence.

Response: After the roadway is excavated, the roadway will be filled by backfill materials immediately. So the influence zone will be smaller and the abutment stress will be lower. As shown in Figure 9(d), when the all roadways were excavated and filled by backfill materials, the advanced abutment pressure on both ends of the model almost equaled to the virgin stress. Thus, the model is large enough to over the whole zone of influence.

Comment No. 4: Section 5.1.2: In scheme 2 (i.e. Scenario 2), the pillar information was not given, please provide.

Response: Thank reviewer for pointing this place out. We will add the pillar information

in the revised paper.

Comment No.5: Figure 5 is hard to understand. Please make sure all parts all clearly explained/given. Replace ‘Open-off Cut’ by ‘cut off’.

Response: Figure 5 shows the essential information of numerical model and the schematic diagram of roadway driving and backfill. We will replace ‘Open-off Cut’ by ‘cut off’ and add the detailed explanation in the revised paper.

Comment No.6: Page 6, line 161: Eq. (1). How was the ‘Average compressive stress calculated? Average all principal stresses? Average the first principal stress? Or average vertical stress? It’s not clear. Another question is that when the average value is used, it may result in the overestimation of pillar stability. For instance, the pillar along the opening has already been yield, but this cannot be reflected when the average value is used.

Response: Thank reviewer for pointing this place out. The definition of safety coefficient of a pillar provided in lines 159-160 is wrong: the right definition is the inverse of the ratio indicated, since the safety factor is equal to the compressive strength divided by the average compressive stress. We will correct this error in the revised paper. The average compressive stress means the average vertical stress. This method can be used to evaluate the pillar stability and we will add the reference in the revised paper.

Once again, thank reviewer very much for your comments and suggestions.

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