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Discussions

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**Interactive
comment**

Interactive comment on "The effects of cushion's particle size and thickness on coefficient of restitution under the rockfall impacts" *by* Chun Zhu et al.

Anonymous Referee #2

Received and published: 1 March 2018

Main goal of the paper is to evaluate directions for cushion particle size and thickness when used in open-pit mining as energy dissipating and thus safety mechanism. The aim of the work tries to draw conclusions from laboratory tests to a universally applicable rule for cushioning design. As such, the investigated topic is clearly of interest for the general NHESS readership. The test procedure is such that a leading parameter in cushioning design should be evaluated via a so-called orthogonal test design, which is using differing impact conditions, altering rock size, release height, cushion particle size). Main conclusion is that the cushion thickness is the leading parameter.

However, the presented work needs major revisions in several aspects: Primarily, the

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[Discussion paper]

experimental findings need to be printed alongside with their error bars. Without the given uncertainties, it is not obvious whether the drawn conclusions can be labelled as significant or something be called as leading parameter. It is of key importance for the authors as for the reader likewise to be able to judge the results against their experimental uncertainties. From the description of the experimental work, it seems that the only measure to mitigate statistical outliers is, that each series result is the mean of an experimental triplet. It has to be shown that this procedure is sufficient to generate statistically significant data. If error bars should even out all recorded differences, the experimental method has to be improved.

Secondly, the text requires substantial refurbishments with respect to language. The authors should invest in clearer structure when describing the experimental setup as well as the testing procedure. Furthermore, figures should be labelled correctly and descriptive in order to facilitate the reading. Additionally, the measurement units should be consistent within the legends and the text (mm and cm, etc.). The use of proofing tools and the revision by a native speaker is highly advised to make the text more readable.

A few technical comments: The Introduction should be shortened, since the paper clearly focuses on open-pit mining questions and an overview and listing of references for general rockfall mitigation measures is not needed. References for the approximate formula for the total energy of rockfall should be backed up with a better accessible source. The experimental setup needs to be clarified, especially the positioning and use of the cameras (field of view, image processing, etc.). The concept of an orthogonal test theory should be explained and/or backed with a better accessible source. Is it just the altering of the four parameters of interest? The drawn conclusions are not written in a concise manner. Focusing on the main experimental result in a clear way would be favorable.