

Interactive comment on “Real-scale investigation of the kinematic response of a rockfall protection embankment” by S. Lambert et al.

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Received and published: 4 February 2014

In my review I focused mostly on the analysis of the deceleration of the projectile.

The article describes the impact of a concrete sphere on an embankment. Four tests were carried out in the field and various reactions in the embankment were measured. The basis of the measurements in the embankment is the impact of the projectile into the collecting body and its deceleration. The deceleration is characterized by the following parameters: mass of the sphere, diameter, impact velocity, inclination of the trajectory, stopping distance and braking time. The braking time is a very important factor to describe the deceleration process. Unfortunately the braking time is not described for all experiments. In Table 3 different experiments are compared with each other. The

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braking times from tests of other authors are not specified, which is understandable if the values are not described in the other papers. However in the experiments reported on herein the data are obviously available (e.g. for one experiment it can be determined using the data plotted in Fig. 6), and these data are necessary to properly evaluate the deceleration process. If possible, please also include braking time values if they are reported by the other authors cited in Table 3. I digitized the data from Fig. 8 to attempt to check the consistency of the results. In Table 3, during the 210 kJ test, a penetration depth of 335 mm is reported. This is exactly consistent with the results of the double integration of the measured acceleration (Fig. 8a) using a braking time of 100 ms. But this contradicts the results given in Figure 8b which indicates a braking time of 150 ms. This braking time (150 ms) is also shown in Figure 6 in which, however a penetration of 0.55 m is reported. This discrepancy suggests that either the values plotted in Figure 6 or reported on Table 3 are incorrect. This internal inconsistency should be clarified before publication

The authors have an excellent opportunity to support their acceleration data with deceleration values calculated from an analysis of the video images. This would add a lot to the quality of the paper and might help clarify e.g. the discrepancies between the results in Figure 6 and on Table 3

An integration of the acceleration values should have the same velocity-profile as the result of the differentiation of the observed trajectory. Thus, the quality of the basic data could be confirmed.

In summary I think that this is an interesting and useful manuscript and my recommendation is that it be accepted pending some revisions. In particular, I suggest that at least the braking times in Table 3 for all own tests should be completed before this manuscript is published. If possible (perhaps the authors have already done this) the quality of the accelerometer data should be verified by analysing the video images.