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Concise caption describing the content of the file:

ESM_02.pdf file contains four pictures and brief explanations on the development of release tests.

Contents

In the Fig. 2 in the main text, there is an accelerometer installed in the slope bottom part. Effectively, one geophysical device was used during the tests: a Nanometrics TitanSMA accelerograph (Fig. ESM02-1) was registering the dynamic events in the time domain. This help in the precise dating of the main bounces and impacts and may be related with the energy released in the impact. The full analysis of the seismic signal falls outside the scope of this paper and was presented in Saló et al (2018).

Figure ESM02-1. Nanometrics TitanSMA accelerograph installed directly over a rock outcrop.

In the Fig. 2 in the main text, the use of three High-Speed (H.S.) video cameras is mentioned, which were used in convergent lines-of-sight to register the drops in 3D (Fig. ESM02-2).

Figure ESM02-2. High-Speed video camera, Sony NEX FS700R. a, b) The camera over its tripod. c) Camera close-up. d) During a block release (Test 4 site). Note the drone flying over the esplanade.

These professional cameras (Sony NEX FS700R) give a balanced performance: they are portable, battery powered and with a memory card as internal storage. Among the possible settings, in general we selected: 400 frames per second (convenient for the slow motion viewing); 16 bit color; 2 Mpixel resolution (1980p · 1080p); MTS output format (with H264 video-codec-compression), i.e. 45 Mb/second. In a single H.S. shot, this camera model can record up to 12 seconds, enough to cover the full drop, at least in our test setups. Some breaks (time between releases or breaks for flying the drone) were used for battery change and/or video downloading to a computer and external Hard Disk. To finely synchronize the time pattern between the different shots, we placed a flashlight within the field of view of all the video cameras (Fig. ESM01-1); the flash was shot several times during each drop. Additional details on the videogrammetry processing can be found in Prades et al (2017).

During the drops, apart from the terrestrial pictures and videos (GOPRO Hero4 for instance), the drone (Fig. ESM02-2b, upper left corner) was taking nadiral and oblique footage with a Sony NEX5 camera (24 frames per second and 8.3 Mpixel resolution). Additionally, some factual information was annotated in the notebook as observations about the general performance of each block, if it broke or not, where, etc. In this way, we can have a preliminary figure for the ratio of fragmented blocks, or the percentage of blocks reaching the second bench at Test 2. The inventory of the fragment sizes was also wrote down in the notebook, along with some characteristics of the main pieces (Fig. ESM02-3 and ESM02-4).

The information collected in the field occupies approximately 200 GB per test

Figure ESM02-3: big fragment of block #22 (Test 1) surrounded by small fractions. The pink dots in some fragments around the big one intended to avoid double counting.

Figure ESM02-4. Inventory tasks on the esplanade: counting and measuring the fragments; some pictures were taken as well.