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The effectiveness of detection of splashed particles using a system of three integrated high-speed cameras

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The phenomenon of splash, which is one of the factors causing erosion of the soil surface, is the subject of research of various scientific teams. One of efficient methods of observation and analysis of this phenomenon are high-speed cameras to measure particles at 2000 frames per second or higher.
Analysis of the phenomenon of splash with the use of high-speed cameras and specialized software can reveal, among other things, the number of broken particles, their speeds, trajectories, and the distances over which they were transferred. The paper presents an attempt at evaluation of the efficiency of detection of splashed particles with the use of a set of 3 cameras (Vision Research MIRO 310) and software Dantec Dynamics Studio, using a 3D module (Volumetric PTV). In order to assess the effectiveness of estimating the number of particles, the experiment was performed on glass beads with a diameter of 0.5 mm (corresponding to the sand fraction). Water droplets with a diameter of 4.2 mm fell on a sample from a height of 1.5 m. Two types of splashed particles were observed: particle having a low range (up to 18 mm) splashed at larger angles and particles of a high range (up to 118 mm) splashed at smaller angles. The detection efficiency the number of splashed particles estimated by the software was 45 - 65% for particles with a large range. The effectiveness of the detection of particles by the software has been calculated on the basis of comparison with the number of beads that fell on the adhesive surface around the sample.

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