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## Photogrammetrically measured sheet and rill erosion on steep slopes

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Soil erosion is a long-term problem that causes the degradation of the earth's surface depending on geomorphological and climatic conditions. Adverse combinations of these conditions can create situations where not only sheet erosion occurs, but also rill processes begin to occur due to the concentration of surface runoff. Erosion processes become undesirable and dangerous when they occur on construction sites. The presented project is basically focused on the effectiveness of protective geotextiles against soil erosion, but processes related to shear and rill erosion were also investigated. The research was carried out on experimental plots of 4x1 meters, which were placed in the outdoor laboratory in Jirkov. These three plots were set at slopes from 22° to 34° and artificial rain was simulated on them using a rainfall simulator. A second experimental area of the same size was available at the laboratory rainfall simulator at the CTU in Prague, where a modern facility was created for the purpose of soil erosion testing on steep slopes. This device can create slopes up to 40°.

The photogrammetric method „Structure from Motion“ was used for monitoring soil surface before and after each simulation. Orthophotos and digital elevation models were compared with each other to get digital elevation models of difference. Calculation of the ratio between sheet and rill erosion was done by manually creating rill polygons and by calculating the volume changes above the polygons of these rills and over the whole surface. According to preliminary results on these 4 m long slopes, the rill volume represented approximately 30 % compared to the overall volume change.

Shifts of stabilizing natural geotextiles by surface runoff and eroded material were also monitored using photogrammetric methods. Deformations and displacements were measured from differences in the detailed images before and after the simulation. Transversal veins and their shift along the slope were evaluated.

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