



Using 3D Laser Scanning Technology for monitoring the safety of silt dam: a case study in the Loess Plateau of China

Bo Zhou (1), Feng Zhang (1), Tao Ma (1), Yanwu Wang (1), Jinhua Tian (1), and Yang Yu (2)

(1) Institute of Soil and Water Conservation of Gansu Province, Lanzhou, China, (2) Department of Sediment Research, China Institute of Water Resources and Hydropower Research, Peking, China

Soil erosion is the most critical environmental issue in the world. Silt dam was an important measure for conserving soil and water in the semi-arid Loess Plateau. Using 3D laser scanning technology to monitor the slight changes of silt dam was an effective way for safety evaluating during its operation. In the current study, the settlement, horizontal displacement and surface erosion of Nanwan and Bieduchuan backbone dam of the Loess Plateau were termly scanned by Nove MS 50 comprehensively. The irregular shape of the dam and river were recorded by equally spaced point cloud and the deformation of silt dam body was analyzed accordingly. The comparison of two-stage monitoring results showed that there were 1 cm around changes near the road surface in Nanwan backbone dam map, and an obvious change was detected on the left reservoir bank. The change was about 0.8 cm, which might potentially resulted to small-scale collapses. During the half year monitoring, Beiduchuan backbone dam had an nearly 1-2 cm decline in the right part. The results of our monitoring were consistent with the routine monitoring results from the management department. Our results demonstrated that 3D Laser Scanning technology can be used for monitoring the deformation of silt dam conveniently, thus it can be applied for detecting the safety of the silt dam after long-term construction.