Investigating the Applicability of Standard Software Packages for Laser Scanner Based Deformation Analyses

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SUMMARY

For analyzing area-based deformations of objects based on terrestrial laser scans, several methods exist. If there is no information about the object's geometry, the deformations are analyzed in most cases based on point cloud differences revealed by scanning in two epochs. The point clouds are either compared directly or they are previously meshed or they are filtered based on geometric conditions. Standard software packages include these methods. After a theoretical introduction of these point cloud comparisons, they are analyzed in this study based on two examples: the deformation and the rigid body movement of a wooden plate and the deformation of a water dam. It is revealed that the methods are partially suited to analyze deformations; contrary, the analysis of rigid body movements does only succeed with limited validity. In all cases, the interpretation is only based on inspecting the image of point cloud differences; a statistical test judging the differences between two epochs is not performed.