A First Step Towards Automatic Construction Progress Monitoring

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SUMMARY

Monitoring the progress of construction projects is important for early detection of structural defects, just-in-time delivery of construction materials, planning of activities, efficient deployment of workers, etc. Especially for large projects, the need for semi-automated progress monitoring is emerging.

On the one hand, the 3D data acquisition of the as-built environment has become rather simple by means of advanced techniques such as laser scanning. On the other hand, also the design process underwent a revolution as designing moved from CAD to BIM.

Notwithstanding both evolutions, there is still a missing link, because often the as-built point clouds resulting from laser scanning and the as-planned BIM model are created in different reference systems. Hence, the as-built model has to be integrated with the as planned manually, in order to make their comparison possible. This integration involves a process called registration, during which the as-built model is transformed into the same reference system as the BIM, thus making the assessment of the construction progress possible.

In the research at hand, two novel methods were developed to automate the registration process.

The purpose of this paper is not to explain the methodology in detail, but to demonstrate the results for different scenario's and cases.

It can be concluded that both methods have good results, even if the building is only partially finished and clutter (e.g. construction materials and machinery) leading to occlusions in the point clouds is present, provided some boundary conditions are met.