TRACK: APPLICATION SYSTEMS – REALITIES Presentation: Reverse modeling for quality assessment

M.N. LEE, S.W. KWON, J.H. SHIN. A reverse modelling method for quality assessment of the as-built condition using 3D-shape information. Gerontechnology 2012;11(2):78; doi:10.4017/gt.2012.11.02.436.00 **Purpose** With modern computerized building information, construction projects are expected to reduce costly construction errors and communication problems due to a mismatch of as-built condition and as-modeled data^{1,2}. The authors propose a smart method for sensor fusion technique for as-built 3D-shape information. The objectives of this study are: (i) to find out the current state-of-the-art usage of 3D-shape information by analyzing rework processes during the construction and maintenance stage; (ii) to propose an innovative computational reverse engineering process with an LBS (location-based system) and an auto-identification system; (iii) to develop a smart sensor fusion technique for as-built 3D-shape information; and (iv) to propose and develop a conceptual demonstration model of a CRE (Construction Reverse Engineering) system for quality checking of building. Method First, a proper sensing method for the construction environment was developed. On this basis, a fitting method for 3D-shape information (points-cloud data) was then developed for analyzing as-built information with BIM-data. Then, we developed an optimizing fitting algorithm for saving computational time based on reverse engineering methods, and verified the method by using a real construction BIM-model and scanned data. **Results & Discussion** In this study, a reverse modeling method is developed that can analyze the difference between as-built model (scanned data) and as-is model (BIMmodel). Consequently, we expect that the developed method can be used at construction sites for site analysis to check as-built quality during the construction stage and analyze space alloca-

tion before installing equipment at an EPC (Engineering Procurement Construction) site. By using this technology, we can facilitate quality checking of as-built information and asmodeled information. This will contribute to a reduction of rework and an increase in constructability.

References

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Keywords: reverse engineering, 3D shape information, object model, laser scan, points cloud Affiliation: Sungkyunkwan University, Suwon, South Korea; E: swkwon@skku.edu Full paper: No



Figure 1. Fitting and matching process