

S. SAKAMOTO, N. KANO, T. IGARASHI, H. TOMITA. **Laser positioning system using RFID-tags.** *Gerontechnology* 2012;11(2):304; doi:10.4017/gt.2012.11.02.350.00 **Purpose** We developed a production system for performing renovation work with increased use of pre-cut and pre-fabrication elements. To develop this system, a faithful 3D-CAD model of an existing building was made using a 3D-laser scanner. The purpose of this research is to develop a method for positioning the pre-cut and pre-fabrication elements precisely and at short notice. **Method** First, a 3D-CAD model for renovation was made using the point cloud data of an existing building measured by a 3D-laser scanner¹. Next, the ID-number and the attribute data of the elements of the 3D-CAD model were stored in a database. The database was then sent to the factory along with the fabrication design drawings. The RFID-tags were put on the corresponding elements in the factory. This system automatically identified the delivered elements by reading the RFID-tags, highlighting the appropriate elements of the 3D-CAD models, and it extracting the positions coordinates automatically. The coordinate data were sent to the automatic positioning system using the motor-driven total station developed by us²; the workers were shown the positions by employing laser radiation. The coordinates of the positions were defined on each element and registered as individual information of the element objects. Thus, it is possible to obtain the position information of the elements by simply locating the element objects on the 3D-CAD. **Results & Discussion** In our experiment we installed a dry wall in a room in an existing building (Figure 1). Our system helped in eliminating the marking process, and the wall could be installed using only pre-cut elements. However, some issues that need to be tackled in the future were revealed: (i) it might be impossible to point the laser to the position for an element if this position is in mid-air; (ii) since assembling is performed in a particular sequential manner, a method for searching and identifying a required element is needed.

References

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Affiliation: Shinryo Corporation, Ibaraki, Japan; E: sakamoto.sh@shinryo.com

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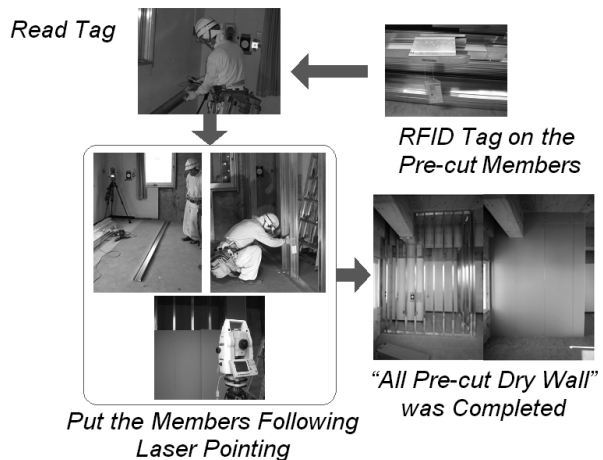


Figure 1. Experiment of installing a dry wall with the system