

March 8, 2022

SUMITOMO MITSUI CONSTRUCTION CO. (SMCC) DEMONSTRATES AUTONOMOUS TOWER CRANE OPERATION

- Safety and productivity are further improved
by the application of Roborigger (load rotation control system) -

SMCC's Technical and Engineering Service Division and IHI's Tower Crane Division in Tokyo, Japan, have developed the autonomous tower crane operation support system. Also, SMCC and Roborigger International PTY. LTD. (RIPL) in Perth, Australia, have worked for further improvement of the safety and productivity of the Load Rotation Control System with Roborigger. This was implemented at the actual construction site in Tokyo.

This system combines SMCC's Construction Information System created in the cloud and integrates construction data such as the current load position, BIM construction data, precast (PCa) element data, and work process data through the crane and Roborigger.



[Tower crane operation support system and Roborigger]

■ Overview of two systems

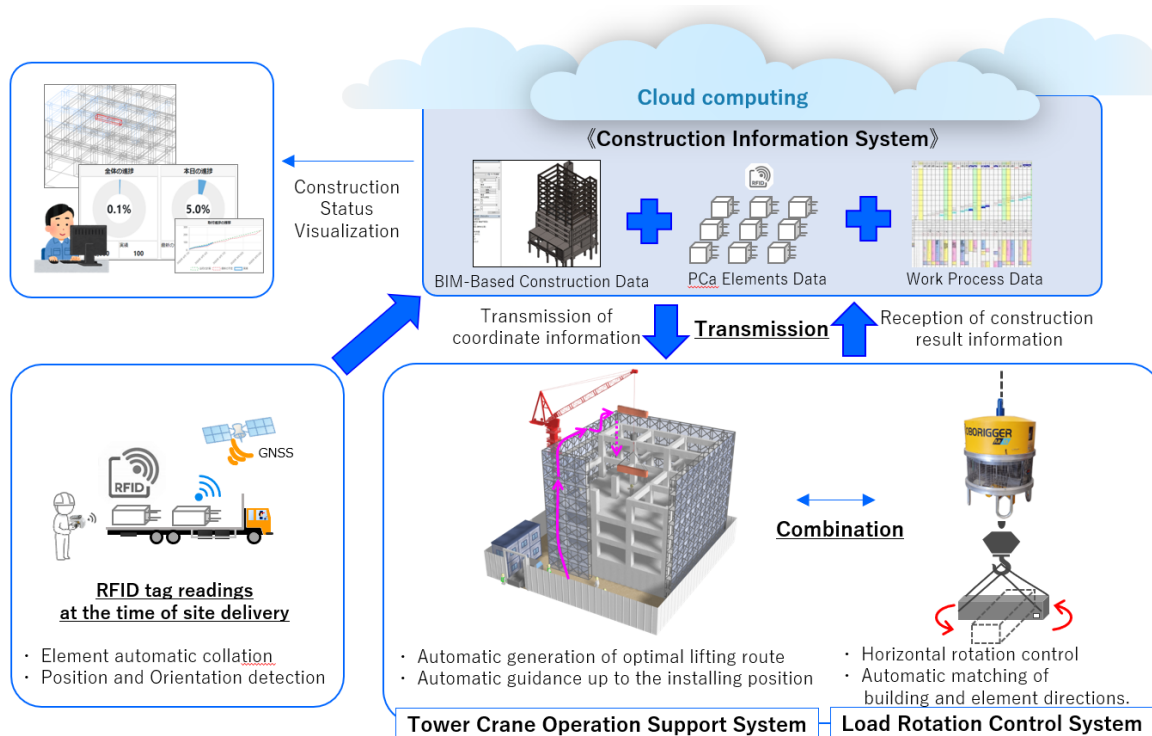
A construction plan information (PCa elements, installation positions, sequence, etc.) based on BIM data is registered in the Construction Information System in the cloud. RFID tags attached to each PCa element are read at the time of delivery to the site, and the unique numbers of the elements are automatically collated. In addition, GNSS (Global Navigation Satellite System) is used to obtain information on the position and orientation of PCa elements when they are delivered to the site and that information is linked with the following systems for safe, smoother, and quicker installation.

《Tower crane operation support system》

The optimum lifting route for the PCa elements is automatically generated based on the construction plan information. Once the operator confirms it on the monitor, each PCa element is automatically directed from the lifting point to the nearby installation point. The operation of tower cranes requires well-experienced operators. Consequently, this system brings the solution to worker shortage issues, which is a concern in the future. Moreover, it is safer and easier to operate tower cranes when it is automatic.

《Load rotation control system of Roborigger》

PCa members are automatically controlled to rotate horizontally and hold positions in conjunction with the lifting work of the tower crane. It enables smooth descent installation work by automatically rotating and holding at the respective (azimuth) angle of the PCa elements based on the construction plan information. This system eliminates the need for workers to manually rotate the lifted load with the ropes and reduces the risk of disasters such as collision with suspended loads and falling of workers.



■ Outline of the construction project

- Project name: Seiseki Sakuragaoka PJ, A-Site New Construction (tentative)
- Location: Tama City, Tokyo
- Total floor area: Approx. 47,613m²
- Structural scale: RC structure, 33 floors above ground, 2 floors on rooftop, 520 units in total
- Structural construction method: SMCC's SQRIM-Full Precast Concrete Method

- Design: SMCC First-Class Architect Office
- Construction: SMCC
- Completion: October 2022

■ Next deployment

From now on, these systems will focus on construction simulation and automation while accumulating digital data and linking it with planning data. By doing so, operational feedback will be provided to further improve safety and productivity at SMCC's construction sites.

■ Contact

For inquiries regarding this matter, please contact the following.

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