

S. CHAE, T. OYAMOTO, T. YOSHIDA. **Development of management system and sensor for improving fresh concrete quality control.** *Gerontechnology* 2012;11(2):400; doi:10.4017/gt.2012.11.02.192.00

**Purpose** The purpose of this paper is the development of a management system and sensor to measure and record distribution processes of fresh concrete including the ready-mixed concrete plant, delivery, and placement. **Method** The management system performs three functions. (i) Monitoring the process. The 3D-model of building is used to display the information that is included: the delivery start time, termination time of placement, and concrete filled time of each member such as a column, beam, and slab. The design of each member of the 3D-model is based on the sequence planning of pouring concrete. The 3D-model can change the color of each member. The color of the member is changed when the data is changed and the member is filled by concrete. (ii) Input the data (manually). The input data is the start time of events i.e. the delivery start, delivery end, pouring start, filling start, and filling end. A smart-phone device and wireless LAN is used to input the data and to connect with the data management sever. Physical observation and operation by the manager are needed to input the data. (iii) Collecting the data (automatically). A sensor to detect the concrete in the formwork and send the data with a wireless device was developed. The sensor has two electric poles that are inserted into the formwork through the holes. The holes are separated from each other by about one centimetre. The value of resistance between two electric poles is measured and the sensor sends the data to the management server when the value is lower than the fresh concrete. ZigBee-technology is used for wireless data communication. **Results & Discussion** The authors made a prototype system and conducted an experiment on a real site to verify the feasibility of data collection and display on the 3D-model. The results of the experiment are as follows: (i) The 3D-model changed the color according to the input data. (ii) The management server was updated by the input of smart-phone. (iii) The sensor sent the data when the concrete filled in the formwork. We conclude that our system is applicable to measure and record fresh distribution process for quality management of fresh concrete.

**Keywords:** quality management, fresh concrete, 3D-model, wireless sensor

**Affiliation:** Kajima corporation, Tobitakyu, Cyohushi, Tokyo, Japan; **E:** chae@kajima.com

**Full paper:** No

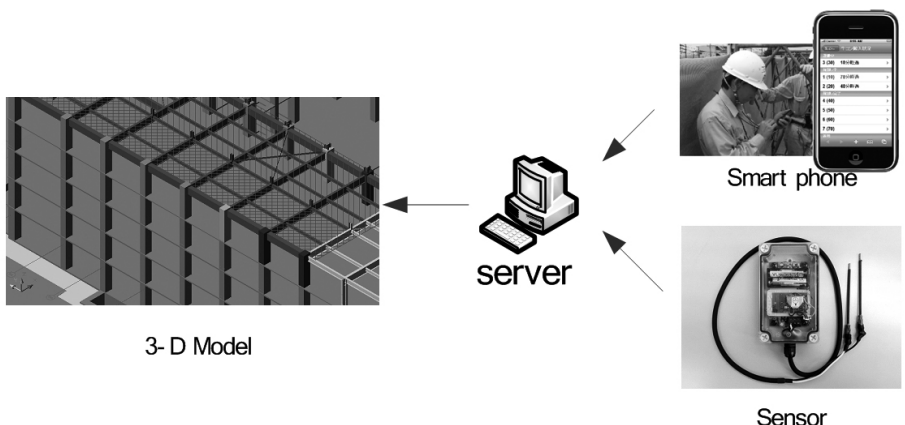


Figure 1. Basic concept of management system