An Initiative for Traceability of Concrete Using IC Tags

Housing Production Division, Housing Department
SUMIKURA Hideaki, Research Officer, Dr.Eng.
ARIKAWA Satoshi, Director, Dr.Eng.

(Keywords) Concrete, traceability, IC tags, application

1. Introduction

In 2008, a problem of inferior concrete members arose in some buildings because ready-mixed concrete (RMC) products made from prohibited materials had been shipped and used.

In response to this, a group consisting of NILIM, the Building Research Institute, Hiroshima University, and RMC industry cooperatives of five prefectures in the Kanto region started joint research on developing a prototype system of RMC traceability using IC tags, having investigated the feasibility and problems of the technology concerned. As one aspect of this, we developed basic applications using UHF- and HF-band IC tags on a trial basis, with the aim of a correctly relaying information between concrete manufacturers and users.

2. Posited traceability system

In view of the current level of commercially available IC tags, etc., we designed the proposed traceability system as shown in Fig. 1. The principal characteristics are that (1) the system adopts an ID method whereby data are logged in a database (DB) and linked to IC tags, (2) the data logged are the RMC mixture plan, weights and various test results, and (3) IC tags are introduced to RMC when unloading. We developed a basic application for reading and writing IC tags in line with this proposed system.

3. Outline of basic application

The hardware configuration of the basic application, as shown in Photo 1, consists of (1) IC tags, (2) a reader/writer, (3) a server (DB), (4) a wireless router, and (5) a PC.

Data records logged in the DB are displayed on the reader/writer or PC screen via the IC tags. Taking non-wireless communication environments into consideration, we also made it possible to directly write data such as the results of various tests in the user domain of the IC tags. In a demonstration experiment using a concrete factory as a field, we confirmed that the basic application works without problem.

4. Future plans

To accelerate the creation of a concrete traceability system using IC tags, we plan to continue studying the necessary technology, etc., in future.

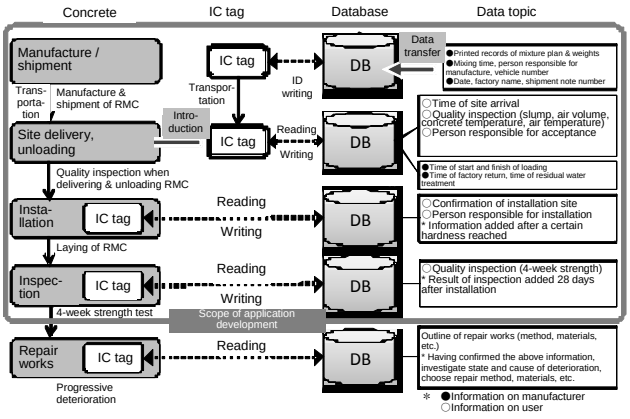

Fig. 1. Proposed traceability system

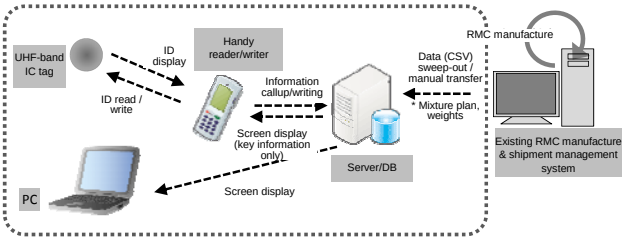

Fig. 2. Development image of the basic application

Photo 1. Hardware configuration of the basic application