RFID Technology in Construction Life-Cycle Data Management

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Problem Statement
- Not having component-related information readily available results in delays, additional labor costs, and lost pieces in precast supply chains.

Current practice has limitations:
- Status, location and quality control information is not up-to-date.
- Historical info about pieces are stored in different party’s databases.

RFID-Radio Frequency Identification
Enables automatic data collection and data storage on the components in a construction supply chain:
- Provides instant access to data at any time and location.
- Durable in harsh environments.
- Line-of-sight is not required.

Provides an opportunity to fill the information gaps in the construction project life-cycle.

Objective
- Develop a fully automatic data collection system to capture the status and historical information at various milestones.
- Integrate this data in a database automatically to minimize errors and to enable real-time reporting.

Envisioned Data Collection and Storage Through a Precast Supply Chain Using RFID Technology

Manufacturing Plant
- Shipping
- Storage

→ RFID tag is attached

1, 2, 3, 5, 6

Manufacturing

Construction site
- Receiving
- Storage
- Installation

Information Items
1. Manufacturing info
2. Storage & handling manual
3. Inspection info
4. Storage & location info
5. Status info
6. Final location at the structure
7. Maintenance info

Operations & maintenance
- Maintenance
- Info

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Results to Date
- Field test
- On crane: RFID tags are read successfully if the tags and the antenna are on the same side.
- On trailer: RFID tags are read successfully if the tags and the antenna are on the same side and the truck speed < 5-10 mph.

- Information items need to be stored on component
  - Identification info
  - Material certificates
  - Drawings
  - Production records
  - Quality control inspection records
  - Handling information
  - Recommended maintenance.
  - Supplier information