

RFID + CLOUD + BUILDING INFORMATION MODELING HELPS MANAGE PERSONNEL IN VERTICAL CONSTRUCTION

THE OPPORTUNITY

Historically, construction management and building owners had to wait weeks and months to get data on how their projects were staffed. New RFID-based systems provide this information in real-time during each workday.

Construction site management used to deploy several security guards and supervisors for the sole purpose of monitoring the workforce in different sections of the building. Using the new systems, management can monitor the flow of people in and out of zones from the office trailer. If a person enters an unauthorized zone, an instant email alert is sent to the designated supervisor. Most importantly, should there ever be an emergency evacuation event on site, the system provides real-time updates on who remains in the building and where they are located.

ThingMagic has had the opportunity to design, build and run an RFID-based personnel management system on a large construction project in California. Only three months after going-live, the general contractor was blown away by the system benefits and the richness of the collected data.

RFID for Managing Personnel in Vertical Construction

SYSTEM OVERVIEW

ThingMagic deployed a three-tier system with three components: sensors, database, and web applications.

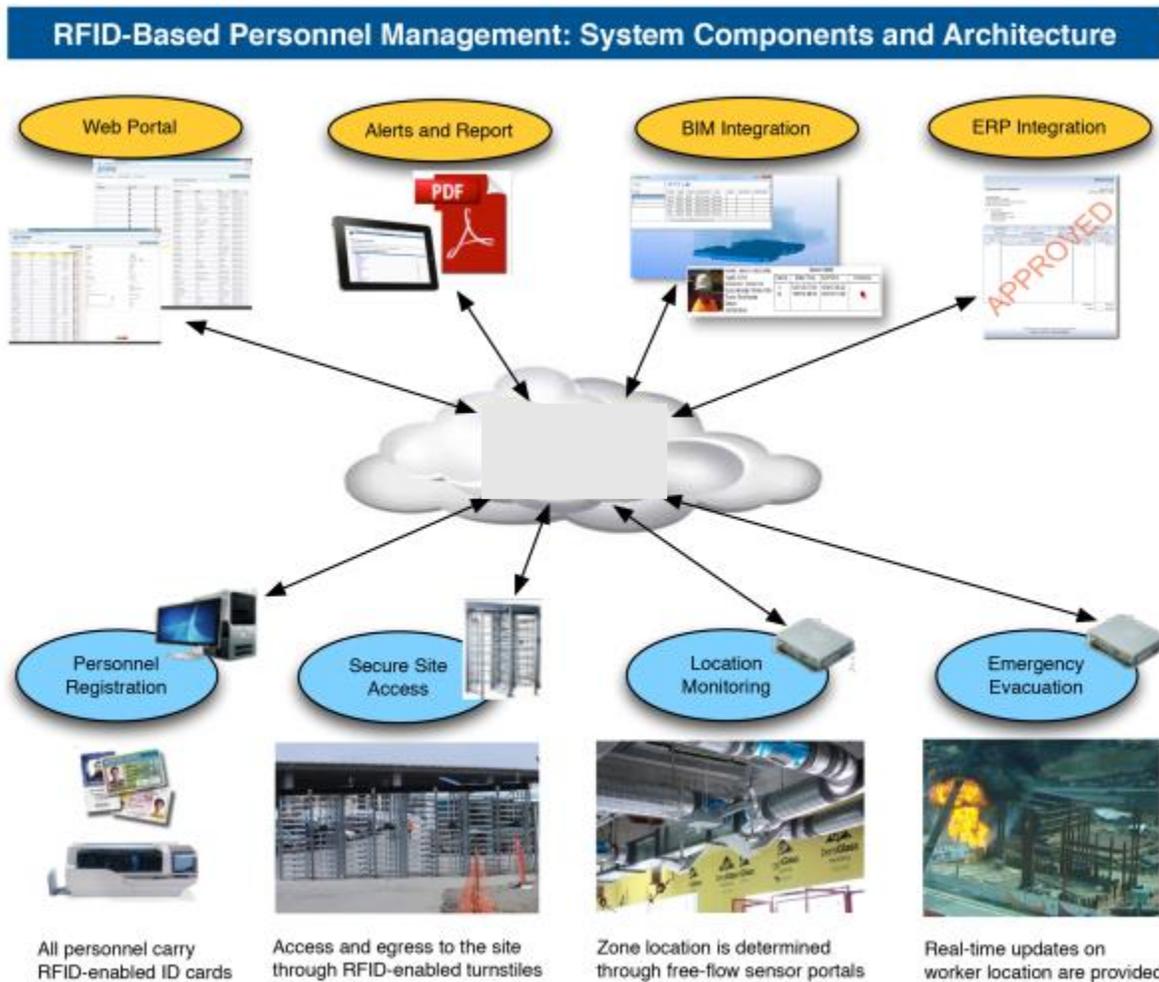


Figure 1: RFID-based Personnel Management in Vertical Construction: Major system components and system architecture.

Every worker on the construction site is issued a passive UHF RFID-enabled ID card, which the individual wears on a lanyard around the neck. The **sensor infrastructure** consists of RFID reader-enabled secure turnstiles for access to and egress from the job site. Inside the building under construction Mercury6 RFID readers and antennas are installed to systematically cover the entry areas of the building, staircase landings, man-lift landings, and elevators banks. As a worker moves from one building section to another,

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the portal readers pick up the badge ID of the worker and associate the individual with the correct space or zone.

Raw sensor data is sent in real-time to a **cloud-based database**, where the data is translated into high-level events such as zone entries and exits. The data is then stored.

A multitude of **web-enabled applications** have access to the event data through a web API.

BUILDING INFORMATION MODELING (BIM) INTEGRATION

The General Contractor and other stakeholders are given access to the data via a number of interfaces, including a mobile-device friendly web portal and email reports and notifications. The core filtering and reporting engine was implemented as a plug-in to **Tekla Structures**, the comprehensive Building Information Modeling (BIM) and CAT software developed by Tekla.

The construction manager can visualize the personnel deployment on site within the 3D model. He or she has the ability to specify the time window of interest, the subcontractor, the zone, and other properties. The selected population of workers or a particular individual is presented, along with a work zone selected in the model.

BENEFITS

Why would a general contractor or project owner deploy this system? This RFID-based people management system provides:

- Real-time visibility into worker location during an evacuation event
- Instant alerts on security or safety breaches
- Instantaneous reports on sub-contractor staffing levels
- Real-time updates on personnel-related compliance issues or ordinances

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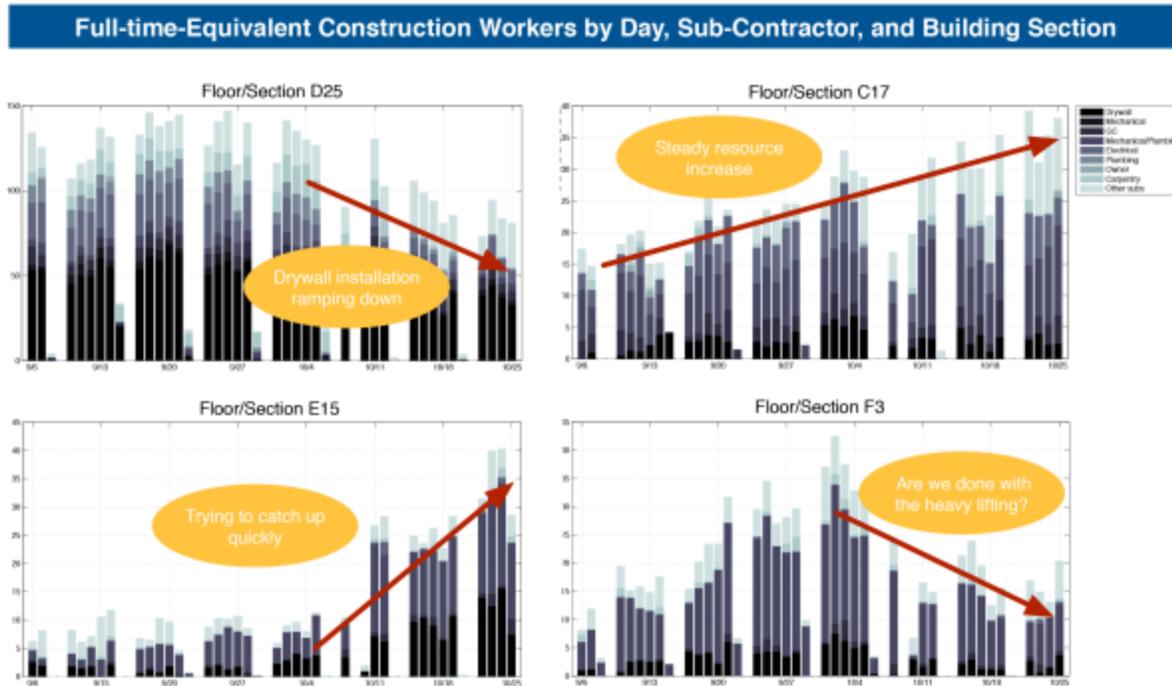


Figure 2: Full-time equivalent construction personnel over a period of ~ seven weeks by day, subcontractor, and zone of the building under construction.

Supported by RFID and cloud-computing, emerging life-cycle management solutions are enabling new levels of innovation, productivity, collaboration, and growth in the construction market. Organizations that harness this “big data” opportunity will hold a distinct competitive advantage.

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A TRUSTED RFID PARTNER

Many suppliers can offer a wide variety of RFID products to choose from but unlike most data collection manufacturers, JADAK has one of the broadest RFID product portfolios in the industry, backed by engineers with the resources and technical expertise to help customers implement solutions to meet their specific needs and requirements.

ABOUT JADAK:

JADAK, a business unit of Novanta, is a market leader in machine vision, RFID, barcode, printing, and color and light measurement products and services for original equipment manufacturers. The company designs and manufactures embedded detection and analysis solutions that help customers solve unique inspection, tracking, scanning and documenting challenges. The company is ISO 9001 and ISO 13485 registered.

Novanta is a trusted technology partner to OEMs in the medical and advanced industrial technology markets, with deep proprietary expertise in photonics, vision and precision motion technologies.

ThingMagic is JADAK's RFID line of products and services.

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