

Construction Material Tracking System

Bringing Complex Tasks to Simple Routine

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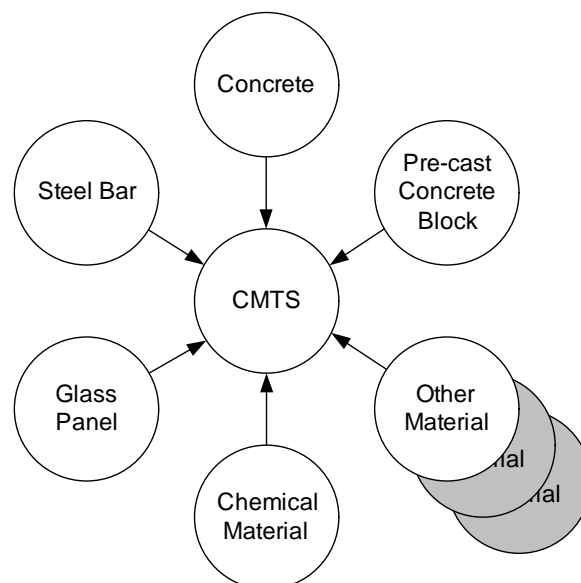
Overview

Construction industry is one complex industry that directly affects our daily life. Houses, commercial buildings, skyscrapers, bridges, roads and shipyards are examples of products of construction industry. The construction industry is a multi-faceted industry ranging from sales and marketing aspect to the more technical aspect of construction engineering.

Construction material is the building block of all structures. Construction material includes steel bars, metal sheets, glass panels, fiber-glass, wooden planks, concrete, pre-cast concrete block, composite material, chemical material and many others. All these construction material require proper tracking not just for accountability but more importantly to ensure the quality and reliability of each construction material.

Each construction material has its own qualifying tests to ensure quality and reliability. For example, a steel bar requires tensile test to determine its tensile strength; whereas concrete requires compression test to determine its strength. Some construction material such as pre-cast concrete block may require more elaborate and complex testing procedures. Test results collected from all construction material need to be properly managed and certified to ensure traceability of construction material. Many times, these test results are managed by various parties, thus causing insecure and ineffective data reporting during the certification of the tested construction material.

Imagine a common platform where all construction material can be tracked right from the material production stage, through the material testing and certification stage, and finally the material commissioning stage. The availability of such common platform shall surely improve the traceability and accountability of construction material, thus ensuring the reliability of test results leading to a more secured certification process. This is common platform is the Construction Material Tracking System (CMTS). The CMTS shall provide a much needed simplicity to manage construction material, thus bringing complex tasks to simple routine.

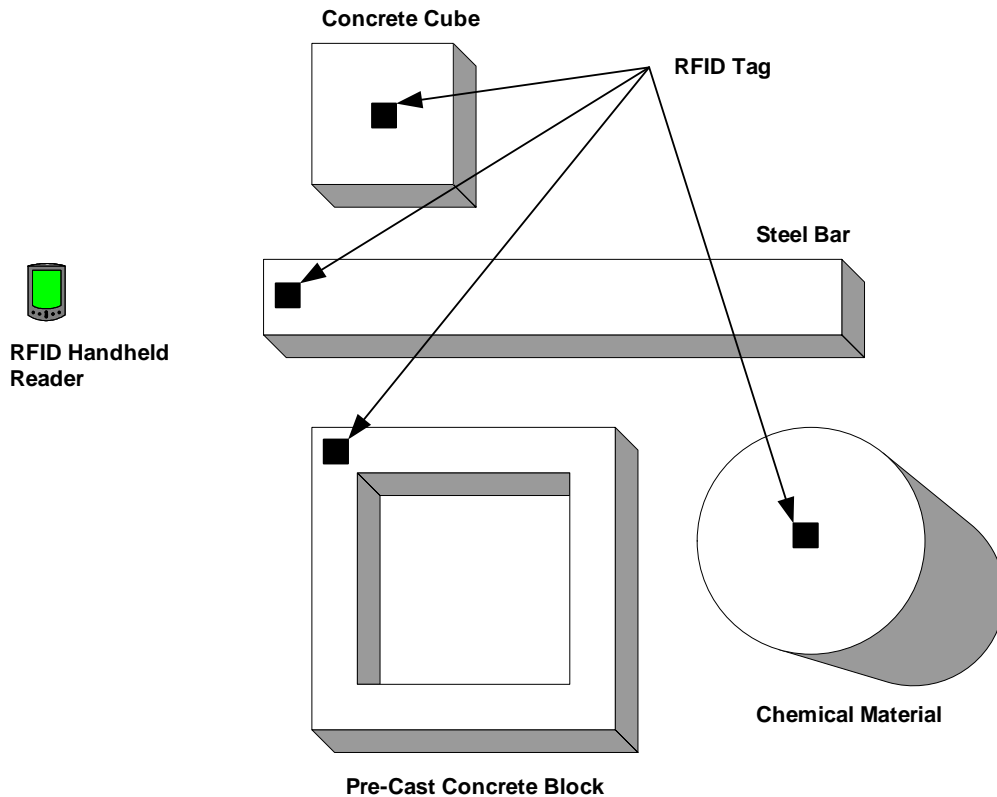


RFID

One of the challenges of designing an effective construction material tracking system is designing an effective construction material tagging system. Legacy tagging systems using simple labels or barcode labels no longer provide sufficient security and information storage for an effective construction material tagging system.

RFID (Radio Frequency Identification) tagging system, capable of contact-less detection and based on simple solid-state memory storage can provide the required security and information storage required for an effective construction material tagging system. Important information such as material ID, production date, manufacturer's details, material characteristics, installation location, certification details and many others can be stored into the RFID tag. Storing information onto the RFID tag provides means for reliable on-site information retrieval and effective on-site material accountability for construction material. RFID tag is also capable of write protection and encryption, thus providing an ultimate security solution against unauthorized information access and manipulation.

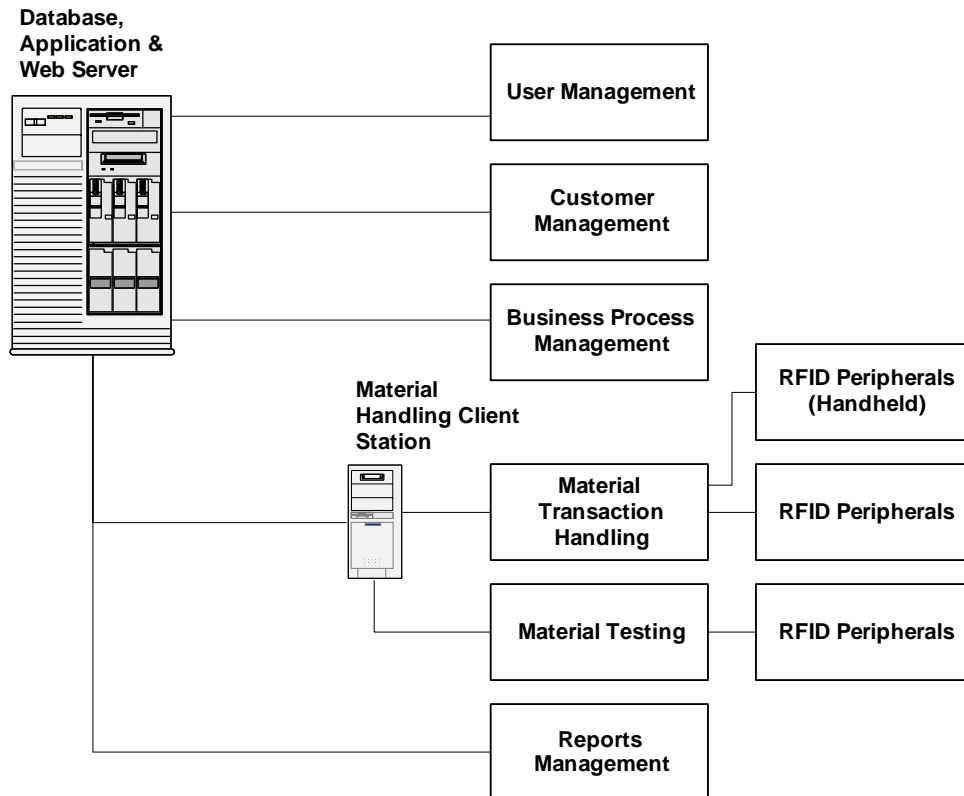
Integrating RFID tagging system into the CMTS provides the much needed tagging system for an effective construction material tracking system.



Effective

CMTS is a total Internet/Intranet solution in construction material tracking. The basic setup of a CMTS shall consists of: a single server acting as the database, application and web server; a testing client station for all material testing interfaces; a set of RFID peripherals (the combination of RFID peripherals differs with the type of construction material).

Basic CMTS



The CMTS shall consist of facilities to manage the users and customers, thus effectively tracking each construction material to its owner. The CMTS shall also manage the entire business process such as quotation generation, order acceptance, testing task scheduling, billing generation and inventory tracking. Managing the entire business process provides an effective customer-oriented business operation platform.

The CMTS shall provide an effective and yet efficient material transaction handling to ensure that the construction material is tested correctly and the test results are properly documented into the CMTS. An effective material transaction handling also ensures the quality of the material testing conducted and the reliability of the material test results.

The CMTS shall provide a common platform for information sharing by providing access to reports generated from material test results collected. The information is effectively distributed to the rightful channel via email (broadcast) or remote access terminal (on-demand). The certification of construction material after successful material testing and test results analysis shall also be distributed to the rightful channel via email (broadcast) or remote access terminal (on-demand).

Secure

The multi-level access control feature in the CMTS shall provide multitude of access possibilities for various operations in the CMTS. Thus, the access control shall securely restrict users of the CMTS to functionalities pre-assigned by the system administrator.

The write-protection and encryption facilities of RFID tagging system in the CMTS shall provide the next level of security against unauthorized tampering of the information stored in the RFID tag.

All data transactions between the CMTS database server and the client stations are encrypted to prevent information snooping on the communication channel. Thus, preventing unauthorized information access from unknown party.

Important emails with attached reports or certifications shall be digitally signed to ensure that the emails are genuinely sent from the CMTS and not by any other unknown party. Thus, preventing any dispute in the origin of important emails sent from the CMTS.

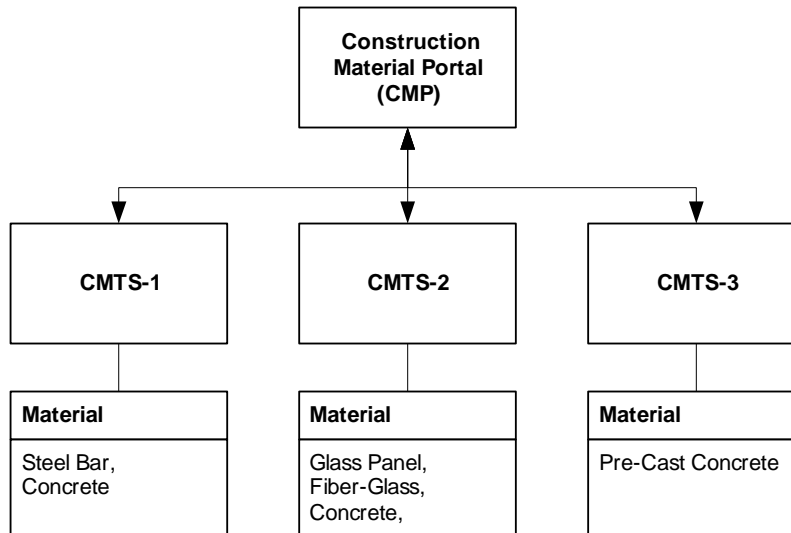
Accessible

The CMTS shall have the capability to be accessed from the Internet, thus allowing authorized user to access the CMTS anywhere, anytime. The CMTS shall also allow the customer to access to the test progress, test results and material certifications online via the Internet, thus allowing real-time monitoring of the material testing. Imagine, the customer receiving an email notification indicating that the material testing requested had been completed and the customer immediately login to the CMTS to retrieve all relevant test reports and certifications, thus cutting waiting time and boosting productivity.

On-site, authorized site staff shall be able to retrieve reliable records stored in the RFID tag via a handheld (PDA) for reference on the material details. This feature is extremely useful for construction material such as pre-cast concrete blocks. With the accessibility to retrieve reliable information on-site, the site staff shall cut down on time spent searching for such information from various sources.

Value Add

With the basic CMTS in place, additional modules can be included to provide value-add functionality on top of the existing operations. One such module is the integration of a Construction Material Portal (CMP). The main functionality of the CMP is the management of construction material with multiple material test laboratories. Each material test laboratory shall be equipped with an independent CMTS. The CMP allows resource allocation and consolidation of test results from multiple CMTS. Hence, the CMP effectively becomes a business to business portal implementation.



Conclusion

The CMTS implementation effectively provides a common platform for construction material tracking, allowing construction material to be tracked from the production facilities to the testing laboratories and finally to the installation site. Powerful management facilities in CMTS allow related business operations to be integrated directly into CMTS. Furthermore, the synergy of CMTS and CMP shall provide a powerful construction material business solution for the construction industry. Bringing complex tasks to simple routine.