RFID in Construction: Using Radio Frequency Identification for the Tracking of Assets including Gas Bottles and Percent Build of Ductwork
An Executive Summary
Prepared by Kelli Kopocis & Jane Silveray for the MCERF Committee of MCAA
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Introduction

The objective of this project is to prove the usability and flexibility of RFID technology in the mechanical construction industry. A project website has been built to provide project progress updates and will act as a resource for all parties (http://www.unl.edu/rfscl/MCERF/McerfHome.htm).

Background

RFID technology in a construction setting involves tags or transponders containing a unique serial number scanned and linked to a secure database containing manufacturing and installation information. From these databases gas bottles and percent build of ductwork may be more immediately determined. Equipment used must be able to withstand harsh environments and link to a secure mainframe for use by foremen and managers.
Recently, RFID has been introduced into the construction industry by means of supply chain management, asset tracking and personnel management cost coding, material tracking, and updated installation status. To ease the implementation of RFID on construction sites, tag and reader companies such as Zebra & Symbol have already begun manufacturing tags and readers to endure the harsh environments experienced at construction sites.

Methodology

The proposed methodology has three phases. The first phase is to identify environment and review the current technology, the second is to build scenarios and identify the function of each scenario, and the third includes performance testing and analysis. A site visit was warranted to observe the hazardous construction site environment to determine proper equipment needed. From these observations, equipment choices including handheld readers and cargo-grade tags from Symbol have been identified as ideal. The cargo tags are durable, passive, and may be read from forty feet which is valuable to obtain reads from the ground to an installed duct. The readers are powered by Microsoft's Pocket PC and are compatible with the 802.11b wireless frequency. These equipment choices will be further tested over the coming months for the ability to withstand the environmental conditions in conjunction with economic analysis to determine the most cost effective and managerially beneficial route. Finally, a final product ready for immediate implementation is to be presented to the members of MCAA's MCERF.

Site Visit

On March 27, 2007, Professor Tim Wentz, Dr. Erick Jones, and Kelli Kopocis of the UNL RFID design team toured the UNMC tower project with Dan Zimmerman and Nick Doht of The Waldinger Corporation. The main purposes of the site visit were to build understanding of the environmental conditions of a job site, discover first hand processes that may be improved by implementation of RFID, and discuss the site and possibilities with representatives from Waldinger.

Conclusion

The project has moved from the conceptual stages to the second stage of development. This project demands results and products from these outcomes to be implemented as soon as possible on construction sites of MCAA member companies. On the other hand, the conceptual development of RFID applications in the construction industry is an encouraging stage for both RFID technology and the development of automation of construction sites. The research in this arena will contribute the future of RFID development. Also, the results of these tests will provide a practical reference for future benefits of RFID in the construction industry.