

RFID Materials for the logistic Information

Sang Young Lee

*Department of Health Administration Namseoul University,
21 Maeju-ri, Seongwan-eup, Cheonan, South Korea.*

Abstract

In domestic steel industrial enterprise, there is many logistic information which is still collected manually. It brings out many disadvantages such as inaccurate logistics information, irregular logistics, belated feedback and so on. this paper, presents the feasibility of deploying RFID for the steel industry as a tool to reduce the production costs. Steel industry that is applicable to RFID-based tracking management system is proposed. The results of this paper proved that the recognition of 100 per cent came from the material input and output and the location, the location indicated 99 per cent detection rate. Therefore, the proposed RFID-based tracking management system was found superior to the existing system in terms of productivity.

Keywords: Ubiquitous, Logistics, Industry

INTRODUCTION

Modern identification technologies such as radio-frequency identification, or RFID, have become increasingly important for streamlining production and logistics operations in almost every industry. Radio-frequency identification enables process automation reducing the need for manual labor, speeding up execution of critical business processes while improving information security and worker safety[1, 2]. The power of RFID in supporting the needs of the steel industry is increasingly apparent in the marketplace. ThyssenKrupp Steel and Accenture are leading an initiative to align steel industry players around a common effort to harness benefits highlighted by the Data monitor article such as RFID's ability to assist steel makers and customers with streamlining business processes, harnessing automation more extensively and reducing costs while maximizing revenue opportunities [3, 4].

A typical RFID tag consists of a microchip attached to a radio antenna mounted on a substrate, and contains the identification data of the object to which are attached. The RFID tags may generate a radio frequency signal related to the data, so it can be received by an RFID reader, which

retrieves the data stored on the tag and converts it to a digital format according to the specific application

Steel industry, particularly the weakness of RFID exist simultaneously, steel columns and metal products caused technical problems in the practical application. In addition, the costs of tags, tag attachment and damage costs are one of the challenges to be solved[5, 6]. In general, metal RF (Radio Frequency) energy, and that reflect characteristics of the RF energy has the property to absorb the liquid. Thus, the received RF energy from the reader communicates using UHF band passive tag, the RF energy, adhesive molecules, depending on the actual tag reading rate of change factors will affect a lot. In particular, the spread of RFID application in various industrial environments, according to the order of attachment on the properties to overcome the special Tag antenna, material development, and packaging technologies are essentially required to be developed[7].

FUNCTION OF THE SYSTEM

RFID technology is one of the most innovative technologies in object location and identification, as it provides a good solution for the traceability and tracking of any kind of products in a simple and economic way. On one hand, the application of RFID technology can benefit consumers through improved product availability, speed of service, and quality assurance. RFID tagging of products by manufacturers, wholesalers, and retailers appears to be the most promising approach to reliable product tracking and tracing, instead of bar codes.

On the other hand, RFID helps companies to improve the supply chain efficiency, and provides a high added value by optimizing the distribution process and the available resources. Besides, tags can be used for identification, inventory, and product traceability. The Electronic Product Code (EPC)[8, 9] is designed as a universal identifier that provides a unique identity for physical objects. EPC is generally thought of as the next generation of the standard bar code. It is used in information systems that need to track or otherwise refer to physical objects. A very large subset of applications that use

the Electronic Product Code also rely upon RFID Tags as a data carrier, and enables the assignation of a unique global number to any product, so that it can be associated with specific product information, such as date of manufacturing, origin and destination of the shipment.

The function of each part to the RFID tag reader that can read from and write to the device and antenna frequencies and protocols defined by the tag is configured to exchange data stored on devices, and RFID tags to store the data of the key features plays. The technology used in RFID is one of the automatic identification technology. Incorporating a microchip tags, cards, labels, data stored in the radio frequency are the non-contact reading.

And RFID integration module works with the default function module reads the RFID reader and tag, the tag information stored in the DB which has a function of the location tracking. Support module to track the relevant sector information on the network, the instructions and information, and factory information, directions, check real-time information, and make the factory. The module configurations for the system are shown in Fig. 1.

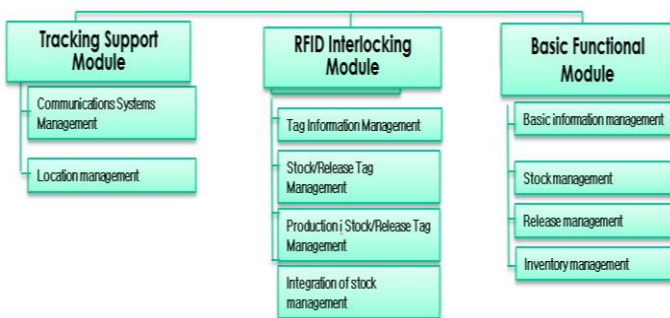


Figure 1 : RFID System Structure

In this paper, how to attach to metal surfaces and solid reliability by developing a tag that can be obtained are presented in Table 1 below, the tag attached to the metal surface are shown the basic specification.

Table 1: Steel-attached Tag Specifications

Item	Unit	Specification	Notes
frequency	MHz	908-914	bandwidth
memory	bit	512bit	
recognition of Distance	m	In air(15m), Metal Surface(10m)	
percentage of recognition	%	Over 99%	

IMPLEMENTATION OF THE SYSTEM

The basic dipole antenna in terms of the metal cannot be used. The reason for the metal in the traditional dipole antenna is attached to the metal loses the original nature of tag.

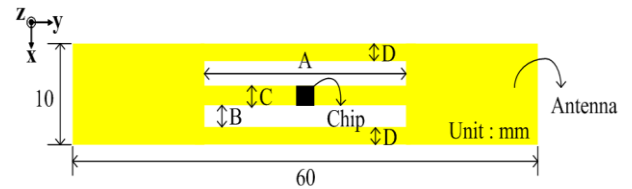


Figure 2 : PIFA-type Microstrip Antenna

As shown in the picture of PIFA-type micro-strip antenna radiator to the presence of the dielectric substrate and the size of the antenna in the direction of the length $\lambda / 4$ and width using the width of the antenna impedance is adjusted for to be accounted. In particular, the emitter side of the ground plane conductor grounded by grounding planes because they used when attached to a conductive object is less affected on the characteristics of the antenna. Major features of the PIFA antenna using a short circuit can reduce the size of the antenna, thus the miniaturization of antennas is one of many methods being used. But the biggest problem of PIFA ground plane and have less than 1 if the ground plane, depending on the size and shape change represents a serious performance. Ground for the characteristic frequency of the radiation pattern changes with the change brings.

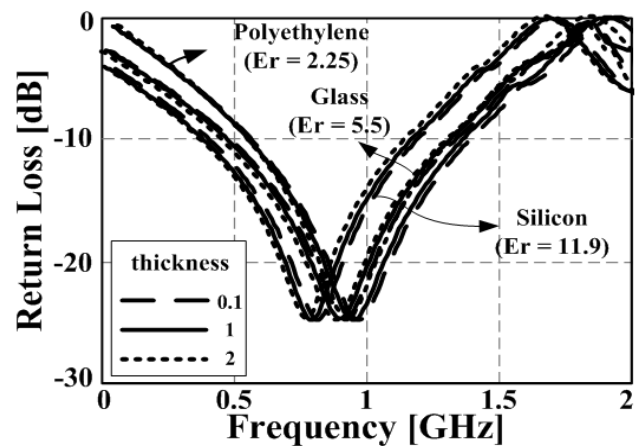


Figure 3: Size of Metal & Return Loss of Antenna

The following figure indicate that according to the size of the ground plane, shows the change in reflected return loss. As shown in the figure, return loss characteristics depending on

the size of the ground plane the frequency shift can be found as a sudden phenomenon. The figure below is shown on the change of ground plane and the radiation pattern. The ground plane 600 mm x 600mm at size 0 at zero level(when you have a (null) is formed.). In addition, since the tag must be attached to the vertical chip production some difficulties arise because the tag chip impedance matching has difficult nature of structure.

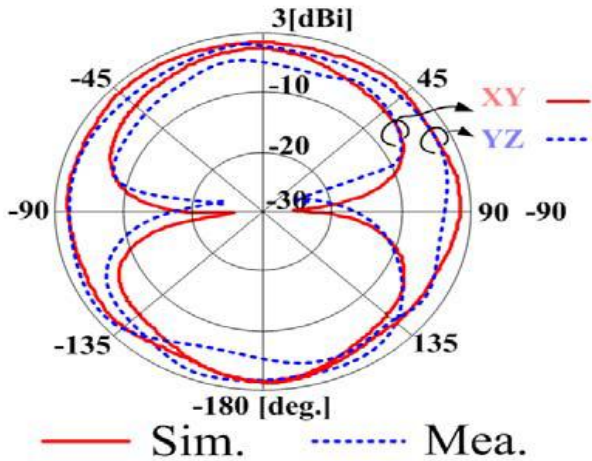


Figure 4: Size of Metal & Radiation Patterns of Antenna

In this paper, we apply the tag structure of the ground plane layer of the dielectric layer and of the emitter configuration. And the floors of the radiator loop type of antenna structures were selected. The fabricated antenna applied has a reliable effect in considering the development of antennas and tags at the bottom of the package by placing two magnets. With the post-production on-site recognition and awareness of the tag antenna distance were measured. Produced were made from two kinds of tags. One kind of size 80mm x 30mm x 4mm and the other the size of the tag (A10010006) is a 100mm x 100mm x 6mm.

teller machines were tested with the same tag testing performed on the mouth. Location on the product coming out process when loading a package of products loaded at the factory in the form of recognition from the state for the package was measured. Measurement conditions were used 100 metal tag attached, portable reader, the maximum output power (30dBm), while the behavior was measured recognition of the tag. The table below shows the measured results from such a system. Measurement results, the pass was secured when the recognition rate of 100%, when the product load ratio of 99% was recognized.

CONCLUSIONS

Modern identification technologies such as radio-frequency identification have become increasingly important for streamlining production and logistics operations in almost every industry. Radio-frequency identification enables process automation reducing the need for manual labor, speeding up execution of critical business processes while improving information security and worker safety

Ubiquitous technology in the field of logistics has been introduced with some minor degree of advantage. In steel industry, especially the nature of RFID, there is weakness at the same time, steel columns and metal products caused some technical problems in the cause of the application. In this study, basically small and medium-sized steel industries, reflecting the characteristics of the building systems and by allowing for faster application time, while minimizing the capital investment.

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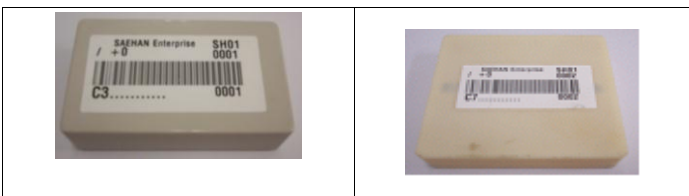


Figure 5 : RFID Tag

Finally, for those tracking the performance of RFID systems we tested fixed reader installed in the 10m distance is based on recognition, PDA mobile readers use expression when measured by 2m interval. First, in order to measure the recognition rate - exit - exit the gate of an installation and

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