

# AUTOMATIC ROTARY MATERIAL STORAGE SYSTEM USING RFID

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## ABSTRACT

Now days in industry, materials (which are available in raw material, finished parts, assembly parts etc.) are kept in a storeroom with stock and mix-up parts to each other which may be damage. So, secure tools, raw material, manufactured parts, and assembly parts of industry have stored in rotary storage system. This system is very useful for material storage in industrial application. Storage compartments rotate by using chain and sprocket mechanism. It is simple to operate with the employee to store the material in the system at the ground level. Each employee has a unique ID for store material in compartments and retrieved material from compartments. Traditional systems have a major disadvantage of large space consumption and damaging material which is successfully eliminated with the use of a rotary storage system. Moreover, the latter provides the added benefits of flexible operation without the need of an attendant and added security and least chances of material damage. Since the model makes use of composite parts, it is easy to assemble and dismantle and is thus more convenient than the traditional storage systems. The idea is to storage and move material with no disturbance to the already stored material in rotary storage system. Once the employee leaves the incorporated safety zone the system rotating to lift the stored material compartment away from the bottom to central position. This leaves an empty compartment available at the ground level for the next material to be stored in. The stored material is easily retrieved by pushing the button for the relevant position number in which material is stored. This causes the required material compartment to rotate down to ground level ready for the employee of industry to enter the safety zone.

**Keyword :** - RFID ,Compartment, Chain & Sprocket, and Motor

## 1.1 INTRODUCTION

It is simple to operate with the employee storing material in the system at the ground level. Once the employee leaves the incorporated safety zone the compartment is automatically stored material by the system rotating to lift the stored material compartment away from the bottom central position. This leaves an empty compartment available at the ground level for the next material to be stored in. The stored materials are easily retrieved by pushing the button for the relevant position number of the compartments material stored in. This causes the required compartment to rotate down to ground level ready for the employee to enter the safety zone and receive material out of the system. Except all other systems use a large ground area, Rotary storage System is developed to utilize maximum vertical area in the available minimum ground area. It is quite successful when installed in minimum

areas which are well established and are suffering with shortage of area for storing material in industry. Although the construction of this system seems to be easy, it will be far from understanding without the knowledge of materials, chains, sprockets, bearings, and machining operations, kinematic and dynamic mechanism.

The Rotary Storage System for material such as material stored in storeroom, tools and equipment stored in cupboard etc. have been implemented on a huge scale. But these systems have a major disadvantage of large space consumption and worst management of organisation which is successfully eliminated with the use of a rotary storage system. Moreover, the latter provides the added benefits of flexible operation without the need of an attendant and added security and least chances of materials damage. Since the model makes use of composite parts, it is easy to assemble and dismantle and is thus more convenient than the traditional material storing systems. The rotary model is specifically designed to accommodate material separately with less space. The materials are safely store and retrieve uniformly and unique shaped items.

The structure can accommodate six compartments in the space and can even be customized to hold a greater number depending upon the requirements of the organisation. Storage spaces cannot cope with the growth of the different type of the different type of the materials. The structure of the system is like a building. The basic structure of the rotary storage system can be described with the help of block diagram.



**Fig. Experimental setup (Side view)**



**Fig. Experimental set up (front view)**

### **1.1 PROBLEM STATEMENT:**

In industries, material handling and storing system is very time consuming and sometimes are hazardous to workers and organization. Now days in industry, materials are kept in a storeroom with stock and mix-up parts to each other which may be damage. Material stocks should be always necessary in mechanical industries. Materials are in the form of raw material, finished parts, assembly parts and also tools, equipment. These are stored in one or two storeroom in industry which can damage and corrosive. Also time consume process for separate materials which stores at one place, that material are like different shape and size rods, nut and bolts etc. Space is also matter for store material.

### **1.2 SOLUTION:**

So overcome this problem of material handling and storage in industries, we create new technology is rotary storage system which is applicable for material storage and also better management of organization for inventory. This system have used to store raw material, assembly parts, finished parts, tools and equipment separately in system compartment. This system should be less time consuming, expensive and better management in inventory for organization. Rotary storage System is developed to utilize maximum vertical area in the available minimum ground area.

## 2. OBJECTIVE:

1. To achieve Safety and security - No material damage.
2. To achieve save time for material handling in industry.
3. To achieve systematic storing material in separate compartments.
4. To achieve better management for production planning.
5. Improved inventory record accuracy in organization.

## 3. METHODOLOGY

1. Identification of problem
2. Idea of project
3. Collection of data
4. Literature of survey
5. Material of selection
6. Design of CAD model
7. Fabrication work
8. Testing

## 4. LITERATURE REVIEW

### 1. Automatic Rotary Storage System Using Rfid

Vipul More, KiranRavariya, Sohil Shah, AzharuddinSolkar, *Electronics and Telecommunication, Rajiv Gandhi Institute Of Technology, Maharashtra India*

This paper is devoted to make use of control systems in rotary storage systems. The control system is going to play a major role in organizing the entry and the exit for the storage lot. It also presents the design of multi-level storage lots which occupies less need on the ground and contains the large number of components. Therefore, the need of using technologies became inevitable.

An automated component Storage has mechanized lifts which transport the component to the different levels at a certain position. Therefore, these component stores require less building volume and less ground space and thus being cost effective. This system saves a lot of space where more than 100 components need to be stored as compared to other systems. This system enables the Storage of material, floor after floor and thus will reduce the space used. Here any number of components can be stored according to the requirement. This makes the systems modern and even a space-saving one. Multi-level component Storage system is essential especially in regions facing space shortages, also in areas which cater huge crowds. Failing to accommodate the growing number of components, it has become important to come up with more efficient and effective Storage solutions.

In 20th century the automated storage can be used for multi purposes even though in short term it will come to life again to be implemented and managed by many other methods. It will be spread to solve many problems of storage issue and preserve the environments

### 2. International Journal of Emerging Technology and Advanced Engineering Website: [www.ijetae.com](http://www.ijetae.com) (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 4, April 2015)

This paper consists of more details related to rotary storage system it is simple to operate with the driver storage and leaving the material in the system at the ground level. Once the driver leaves the incorporated safety zone the material is automatically stored by the system rotating to lift the stored away from the bottom central position. This leaves an empty storage space available at the ground level for the next to be stored on.

The stored is easily retrieved by pushing the button for the relevant position number is stored on. This causes the required to rotate down to ground level ready for the driver to enter the safety zone and reverse the out of the system. Except vertical storage system all other systems use a large ground area, vertical storage system is developed to utilize maximum vertical area in the available minimum ground area. It is quite successful when installed in busy areas which are well established and are suffering with shortage of area for storage. Although the construction of this system seems to be easy, it will be par from understanding without the knowledge of materials, chains, sprockets, bearings, and machining operations, kinematic and dynamic mechanisms imagine the time that automatic smart storage systems would save you.

The earliest known multistage component Storage system was built in 1918. It was built for the Hotel La Salle in Chicago. IL at 215 West Washington Street in the West Loop area of downtown. It was designed by Holabird and



Roche. The Hotel La Salle was demolished in 1976, but the Storage structure remained because it had been designated as preliminary landmark status and the structure was located several blocks from the hotel it was built to service. The Hotel LaSalle multilevel was demolished in 2005 after failing to receive landmark status from the city of Chicago. Jupiter Realty Corp. of Chicago is constructing a 49-level apartment tower in its place with construction underway as of March 2008. During the 1920's and 1930's a series of other patents were granted but it was not until the late 1940's that the Bowser, Pigeon Hole and Roto Store systems became operational and installed in numerous locations. Some of these early systems were vertical elevator lift modules that placed components on upper levels of a structure to be moved by attendant and others mechanical devices that could move material into "slots" in a framework built around a central corridor. Capa industries ranged typically from less than 100 spaces to more than 600. Automated component stores rely on similar technology that is used for mechanical handling and document retrieval. The driver leaves the component in an entrance module. It is then transported to a Storage slot by a robot trolley.

For the driver, the process of Storage is reduced to leaving the component inside an entrance module. At peak periods a wait may be involved before entering or leaving. The wait is due to the fact that loading passengers and luggage occurs at the entrance and exit location rather than at the stored stall. This loading blocks the entrance or exit from being available to others. Whether the retrieval of material is faster in an automatic component store or a self-store component store depends on the layout and number.

**3. Industrial ousels – A Versatile Technology for Distribution Applications** Böhm et al. (2006) argue that the power relations (including geopolitical factors) are invisible to drivers. Moreover, the cost of auto mobility in terms of human life is largely hidden. (Böhm et al. 2006 p10) credits 1.2 million deaths annually to auto mobility, a side effect largely ignored due to the normalization of auto mobility. I would further argue that the power relations regulating who has access to on- and offstreet Storage spaces is also largely invisible to neighbourhood residents. In addition to power relations, the dual meaning of the term auto mobility is also examined. The "auto" of auto mobility relates to both an autonomous self and as a machine or process with ability to move (Sheller and Urry 2000).

They argue that autonomous people and autonomous machines result in a hybridized "component-driver" composed of people, and "simultaneously, of machines, roads, buildings, signs and entire cultures of mobility" (Sheller and Urry 2000 p739).

These frameworks of auto mobility emphasize its spatial dimensions; however, none explicitly examine the impact of auto mobility on a walk able, mixed-use, pre automobile landscape. At the local scale, the institutions and practices of auto mobility dominate the landscape, even though land uses are not separated, even though public transport options exist that obviate the need for automobiles.

Likewise, this perspective on auto mobility fails to address the fact that although auto mobility is both flexible and coercive, it is also dependent upon not everyone driving an automobile. With its high population density and relatively low per household material ownership, not everyone in the Mission District drives and the system – through physical adjustments to the streetscape – is able to accommodate auto mobility only because not everyone drives. Moreover, these scholars of mobility and auto mobility have largely focused on the movement and circulation of automobiles, not the impact of the (im) mobility of stored automobiles.

Storage Private residential garages essentially privatize street space through the appropriation of public curb space for driveway access. On-street (public) Storage spaces are greatly diminished, as this study demonstrates, by the addition of curb cuts to access off-street private garages. Within the Mission District, garages and garage doors are the most visible manifestation of the impact of auto mobility on the built environment. Yet, there has been little scholarly attention focused on the impacts of retrofitting residential units to accommodate Storage garages.

#### **4. Student Tracking and Attendance Monitoring System Using RFID**

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When student are entered in campus they try to avoid the lectures. Students are not ready to attend lectures and they are bunking lectures and parent assures that their son/daughter will present to lecture. But it is not happen in reality. So to avoid these things this system can be implemented. If student try to bunk the lecture and his/her attendance is below 70% then alert message will send to the parents. System uses RFID technology to track the student. Radio frequency identification (RFID) is a technology that transmits data using radio waves from an RFID tag attached to an object by the reader for tracking and identifying object an automated attendance management system was implemented both in electronic and mobile platform using stationary matrix AR 400 RFID reader with four circulatory polarized antennae and Symbol MC9000-G handheld RFID reader respectively. In the electronic

platform, the attendance management system depicts a simple client (antennae placed at classroom entrance) /server (privileged student database) system. Our proposition emphasizes a simple, reliable and cost effective model for face to face classrooms' attendance management that uses existing student ID card chip as the passive tag with additional short message services to parents as weekly summary.

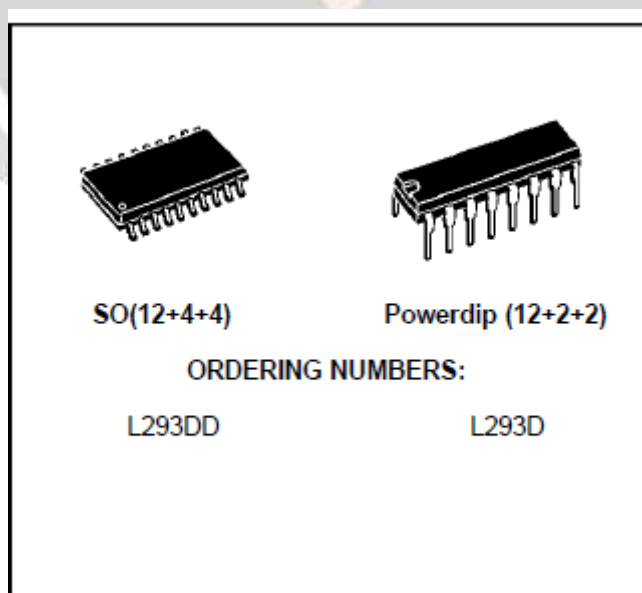
The proposed system i.e student tracking and attendance management system using RFID technology will improve the process of manual attendance, especially in an organization or school environment. In proposed system it is necessary to issuing RFID tag to each and every student in the college. The students have to swap their RFID cards to the RFID reader. By using this system we will track the particular student and check whether he/she is bunking his/her lectures. The purpose of developing this system is to track the student using RFID tag which will be provided to the student system is to track the student using RFID tag which will be provided to the student.

### **5. Safety and Security in RFID Based Multilevel Vehicle Parking System – 1R.Jayanthi, 2R.Jeyabharath 1PG Student and 2Professor, 1,2Electrical and Electronics Engineering, KSR Institute for Engineering and Technology, Tamil Nadu, India**

RFID systems based on UHF and higher frequencies use far-field communication and the physical property of backscattering or “reflected” power. Far-field communication is based on electric radio waves where the reader sends a continuous base signal frequency that is reflected back by the tag's antenna. During the process, the tag encodes the signal to be reflected with the information from the tag using a technique called modulation. An active tag has its own battery and does not rely on the reader for any functions. Passive tags rely on the reader for power to perform all functions. To my project using passive RFID tag because the tags had no batteries; they just collected energy from the reader and sent back their information and limiting in this way the distance between the reader and the tags.

The multi-level car parking system had successfully designed and developed. The number of entering and existing car from all the floors was controlled as per the signals from the sensors on each floor at the entry and exit point. The car exist from various floors will depend on time based Dijkstra's shortest path algorithm. The process of accessing the RFID will take time in microseconds. Hence it's less time consuming technique. It can be fully automated by integrating with tag and reader, such that whenever a particular tag is showed from reader, the PIC microcontroller called on the respective platform should appear at the ground level. This system can further be made space efficient by designing slots of different size. Whenever the human movement is present in the system, the rotation of that system should be immediately stopped for avoiding accidents. The platforms can also be equipped with safety sensors guiding the movement of vehicles in the platforms.

### **5. ARDUINO**



## 5.2 EM-18 RFID READERS:



**Fig (6.2.1) EM-18 RFID Readers**

The EM-18 RFID Reader module operating at 125 kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a weight and output.

### Typical Applications:

- e-Payment
- e-Toll Road Pricing
- e-Ticketing for Events
- e-Ticketing for Public Transport
- Access Control
- PC Access
- Authentication
- Printer / Production Equipment

## 6. CONCLUSION:

- ❖ Rotary storage system is utilizing space in industry.
- ❖ Time saved of operations.
- ❖ More efficient than traditional storage system.
- ❖ RFID used in this system used in multiple spaces like malls, bank etc.
- ❖ Fully automated.

**7. REFERENCES:**

- [1]. Vipul More, Kiran Ravariya, Sohil Shah, Azharuddin Solkar, automatic rotary storage system using rfid, IJARIE-ISSN(O)-2395-4395, volume-3 issue-2 2017, (pp 5079-5080).
- [2]. A. A. Kamble & A. Dehankar, International Journal of Emerging Technology and Advanced Engineering Website: (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 4, April 2015)
- [3] Böhm et al., Industrial Ovens – A Versatile Technology for Distribution, document #WMC-WP2883, revised March 4, 2002 (pp 16-17)
- [4]. Rumana Anjumana, Vijaya Kamble, Student Tracking And Attendance Monitoring System Using RFID, international journal for research in science and technology, special issue 1 Jan, 2017, (pp 144-147)
- [5]. 1R. Jayanthi, 2R. Jeyabharath 1PG Student and 2Professor, Safety and Security in RFID Based Multilevel Vehicle Parking System, international journal of trending research and development, volume 3(2) Mar-April 2016, (pp-7),
- [6]. <http://aboutstrangesorld.blogspot.com/2010/07/10-automated-car-parking--systems.html>
- [7]. [http://www.tksmy.com/activities\\_parking\\_system.html](http://www.tksmy.com/activities_parking_system.html)
- [8]. <http://www.gizmology.net/sprockets.htm>
- [9]. <http://www.parkingsystemsolutions.com/rotary/>
- [10]. <http://aboutstrangesorld.blogspot.com/2010/07/10-automated-car-parking--systems.html>