

AUTOMATED ROTARY STORAGE SYSTEM

PROJECT GUIDE

PROF. J.S.KULKARNI

Department of MECHANICAL ENGINEERING

PVG's College of Engineering & Technology and G.K. Pate (Wani) IOM Pune, India

jsk_mech@pvgcoet.ac.in

PROJECT MEMBERS

SAURABH SANJAY KSHIRSAGAR

Department of MECHANICAL ENGINEERING

PVG's College of Engineering & Technology and G.K.
Pate (Wani) IOM Pune, India

Saurabhkshirsagar02@gmail.com

AKSHAY NIVRUTTI NIMBOLE

Department of MECHANICAL ENGINEERING

PVG's College of Engineering & Technology and G.K.
Pate (Wani) IOM Pune, India

Akshaynimbole12@gmail.com

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.

I. 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 par 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 organization

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.

II. LITERATURE REVIEW

International Journal of Emerging Technology and Advanced Engineering Website: 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 the 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. Every time you enter your office building you have to find a storage space and spend time walking in and out of the lot as well. Imagine how much time it is costing you. Even if you just spend 5 minutes a day to store that translates to you spending more than a whole day just storage every year. If you calculate the time you spend walking in and out of the storage lot, searching for space and such it will be easily more than the above amount. A fully automated system mimics a futuristic assembly line structure where they are moved to an empty platform. The earliest

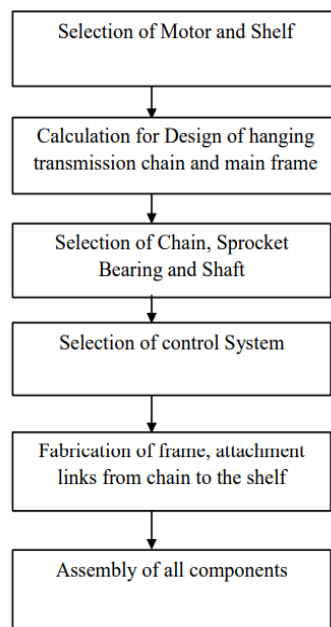
known multistage component Storage system was built in 1918. It was built for the Hotel La Salle in Chicago. IL at 215 West Washington Street in the West Loop area of downtown. It was designed by Holabird and Roche. The Hotel La Salle was demolished in 1976, but the Storage structure remained because it had been designated as PVG's College of Engineering and technology and G.K. pate (wani) IOM Pune, BE (mechanical) 12 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. Imagine the time that automatic multistage Storage systems would save you. Every time you enter your office building you have to find a Storage space and spend time walking in and out of the lot as well. Imagine how much time it is costing you. Even if you just spend 5 minutes a day to store that translates to you spending more than a whole day just Storage every year. If you calculate the time you spend walking in and out of the Storage lot, searching for space and such it will be easily more than the above amount. A fully automated system mimics a futuristic assembly line structure

where the components are moved to an empty platform. The platform under the component moves to a designated spot and all the other platforms are arranged so that no components are stuck.

III. METHODOLOGY

Flow chart shows the Methodology following for automated shelves. The Automated Shelves is an electrically operated vertical conveyor storage system with an integrated control system to accommodate maximum material while optimizing the space and time for operation and also to ease the process of storing and handling the products stored at inaccessible heights. Following methodology can be used for the Automated Racks

The Rotary Storage System has following components: 1) Main Frame 2) Electric Motor 3) Chain drives for motor power transmission 4) Transmission Shaft 5) Main Chain drive for Racks 6) Rack to Chain Attachment 7) Racks (Buckets) 8) Control System.



IV. LIMITATIONS

High initial cost and maintenance is required

V. CONCLUSION AND FUTURE SCOPE

The automated Rotary storage system for the selected application is designed, analyzed and fabricated. The system is tested and is found to work satisfactorily. It takes twenty five seconds for the shelf to complete one full rotation. The automated racks are an efficient system which will transfer the material from higher to lower level. It can be used in wide applications for material handling for domestic, industrial as well as commercial purpose. It can be easily tailored to the applications individual needs. It optimizes the use of vertical space and also reduces the time and effort needed to bring the items kept at elevated height.

VI. ACKNOWLEDGMENT

First and foremost, I would like to thank my guide, Prof. J. S. Kulkarni, for his guidance and support. I will forever remain grateful for the constant support and guidance extended by guide, in making this report. Through our many discussions, he helped us to form and solidify ideas. The penetrating questions he has put to us and the constant motivation, has led to the development of this project. I wish to express my sincere thanks to the Head of department, Dr. Manmohan Bhoomkar, also grateful thanks to our coordinator Prof. J.S. Kulkarni, and the departmental staff members for their support.

References

1. Aji Roy, "Object Sorting Robotic Arm Based on Colour Sensing", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 3, Issue 3, March 2014.
2. GargUttam, BhowadRugved, Rahul Chorghe, Yadav Sachin, "Vertical Material Handling System", International Journal Of Mechanical Engineering And Technology (IJMET), Volume 6, Issue 2, February 2015
3. Manas Lad, PrabhatMahamuni, PrachiMandve, SavioSequeira, Sanjay Rukhande, "Design and Fabrication of Automated Shelves", IJIRT, 143382, April 2016 | IJIRT | Volume 2 Issue 11 | ISSN: 2349-6002, pg 85-89
4. MakatoKanehira, TomofumiOtani, "Complete Guide to Chain", (Handbook), U.S Tsubaki, Inc, 2016
5. ABNT NBR-14672. Dimensionamento de Estruturas de AçoConstituídasporPerfisFormados a Frio.

2017 6. [14]WebLink-
[http://www.dfrobot.com/wiki/index.php/TC_S3200_Color_Sensor_\(SKU:SEN0101\)](http://www.dfrobot.com/wiki/index.php/TC_S3200_Color_Sensor_(SKU:SEN0101)) 7.
Web-Link-
http://www.valinonline.com/images/support_docs/Oriental-MotorElectromagnetic-

Brake-Motors.pdf 8.
VipulMore,Kiranravaria,Sahil Shah
Automatic Rotary Storage Sytem Using
RFID IJARIE-ISSN(O)-2395-
4395,Volume-3 issue-2,2017 (pp 5079-
5080)