Retrival System with Automatic Storage Using SCADA

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Abstract- *The ASRS developed consists of control hardware and software communicating over a Fieldbus network. A simulation model of the WIT ASR and an order generator were also developed and these are linked to a database and a results spreadsheet. This ASRS allows for a range of control strategies and order types to be investigated utilizing the order generator and the database. There was also a facility developed which allows this mathematical model to run the actual requirements that the ASRS physical model works with, this allows for complete correlation between both models. The development of a mathematical model plus a physical model ensures better understanding of ASRS making the sequence of operations obvious and helping to clarify the broad range of strategies to interested parties. The best recorded performance was with current dwell point, simultaneous travel, dual control, free-nearest storage and nearest retrieval strategies selected in combination. In general, dual control improved performance and throughput simultaneous travel was found to be better than rectilinear travel, dwell point at origin gave very poor results, and a dwell point at current, pick point or deposit point appears best.*

Keywords- ASRS, SCADA, Security, Rac

I. INTRODUCTION

Today, AS/RS systems are designed for automated storage and retrieval of various parts and items in an industry. The system operates under computerized control, maintaining an inventory of stored items. Retrieval of items is accomplished by specifying the item type and quantity to be retrieved. The computer determines where in the storage area the item can be retrieved from and schedules the retrieval. It directs the proper automated storage and retrieval machine to the location where the item is stored and directs the machine to deposit the item at a location where it is to be picked up.

SCADA (Supervisory Control and Data Acquisition) is a type of industrial control system (ICS). Industrial control systems are computer controlled systems that monitor and control industrial processes that exist in the physical world. SCADA systems historically distinguish themselves from other ICS systems by being large scale processes that can include multiple sites, and large distances.

II. LITTERATURE SURVEY

Automated Storage and Retrieval Systems (AS/RSs) are warehousing systems that are used for the storage and retrieval of products in both distribution and production environments. This paper provides an overview of literature from the past 30 years. A comprehensive explanation of the current state of the art in AS/RS design is provided for a range of issues such as system configuration, travel time estimation, storage assignment, dwell-point location, and request sequencing. The majority of the reviewed models and solution methods are applicable to static scheduling and design problems only. Requirements for AS/RSs are, however, increasingly of a more dynamic nature for which new models will need to be developed to overcome large computation times and finite planning horizons, and to improve system performance. Several other avenues for future research in the design and control of AS/RSs are also specified

We present a literature survey on methods and techniques for the planning and control of warehousing systems. Planning refers to management decisions that affect the intermediate term (one or multiple months), such as inventory management and storage location assignment. Control refers to the operational decisions that affect the short term (hours, day), such as routing, sequencing, scheduling and order-batching. Prior to the literature survey, we give an introduction into warehousing systems and a classification of warehouse management problems.

Gudehus[1] and Graves[2], Hausman[3] and Schwarz[4] introduced the design, planning and control of warehousing systems as new research toics. The operation of warehousing systems has received considerable interest in the literature ever since.It is not surprising that the research on warehousing systems gained interest in the 1970s, since this was the era that management interest shifted from productivity improvement to inventory reduction . The introduction of information systems made this strategy possible, with Manufacturing Resources planning (MRP-11) as a notable example . From Japan a new management philosophy emerged: Just-In-Time(JIT) production JIT attempts to achieve high-volume production using minimal inventories of parts that arrive just in time. These new development demanded from frequently with shorter responce times from a significantly wider variety of stock keeping Units (SKU'S).

AS/RS is moving towards greater centralization of distribution warehouses as layers of distribution will be eliminated and the pull for the goods will be directly from the central warehouse to the consumer of the finished goods. This trend will require centralized warehouses to perform more small picks, Eg. more single case and individual part picks.

The second greatest area of growth in warehouses automation over the next decade will be in order picking. The automated order picking systems of the future will not be labor intensive but will have greater responsiveness, will be more flexible and will be more modular than systems today. In support of this higher throughput order picking environment, conveyor systems will play an even more significant role in warehousing than in the past. The greatest area of growth will be in Real Time Warehouse Control Systems RTWCS. The reduced costs of warehouse control systems will place these systems well within reach of warehouses who in the past could not afford warehouse automation.

III. Block Diagram

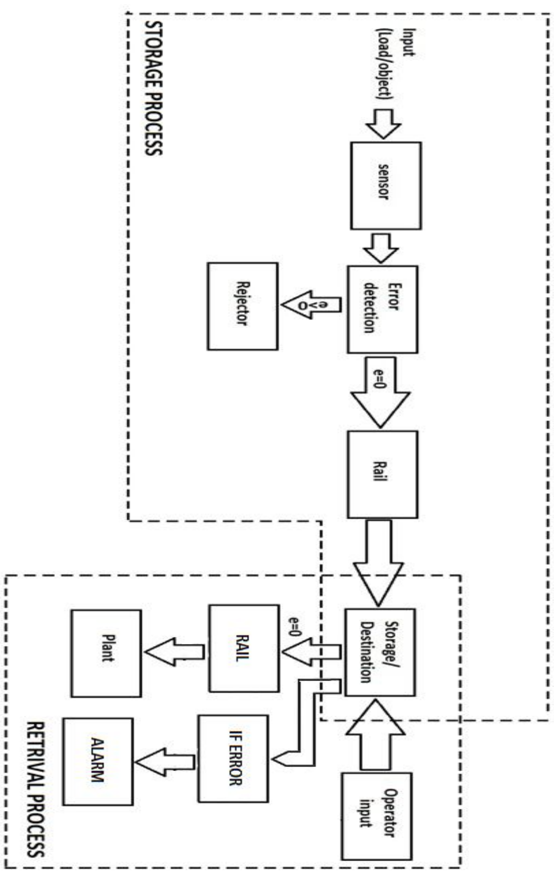

Fig1 Block diagram of automatic storage and retrieval system

INPUT:

Box in which various types of materials are present is placed on the conveyor belt from the unloading section. On every box there is a barcode that gives detailed information of the material in the box. When this object is placed on the conveyor belt; barcode scanner which is placed near to the conveyor belt scans the barcode and gives information about the object. This information is provided to the system and operator, at the same time the system analyzes the data given by load cell on the conveyor belt. This weight cell measures the weight of the object and gives information to the operator. According to the information provided by the scanner and the load cell system checks whether space is available on the rack or not to place the object. If the rack is overweight then the error is generated and according to that error object gets rejected by the rejecter system. If there is no error storing process is carried out.

The conveyor belt moves the object towards the rail. Then the object is placed on the rail, that moves in up- down and x-y direction according to object destination. When the rail comes to object destination sliders come out from the rack block. Slider takes the object from the rail and stores the object on the rack. Fig.1 represents the block diagram of the input module.

OUTPUT MODULE SYSTEM

The operation of retrieval module system is shown in fig.1

ENTER THE CODE OF THE OBJECT TO BE RETRIVED.

As we know the each object having code and according to that code objects are get placed on the rack. as per the requirement object which we have to retrieve for the further operation Operator gives the code to the system through the computer.

CHECK ITS AVAILABILITY.

Now As per the requirement of object operator gives the object code to the system. System accept the code and checks the rack block whether the object is available on that block or not. For the object checking purpose we introduce the load cell on rack if. If the load cell gives the high output it means object is present on rack if the load cell low output it means object is not available. When no object condition occurs then error is get generated.

GO TO SPECIFIED RACK

When the no error condition is occur that time according to operator in (object code) the output rail goes to specific rack destination.

BRING THE OBJECT TO THE WORKFLOOR.

Then slider kept the object on the rail. And rail moves towards the output conveyor belt. Now object from the rail moves on to the conveyor Belt. From the conveyor belt object are bring get to the workfloor.

IV. RESULT

The simulation result for S-MB1 even is shown below

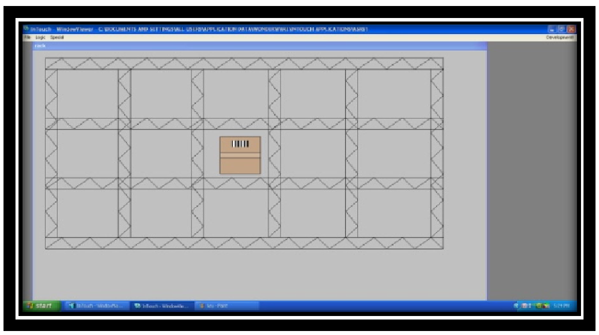

Fig. Rack

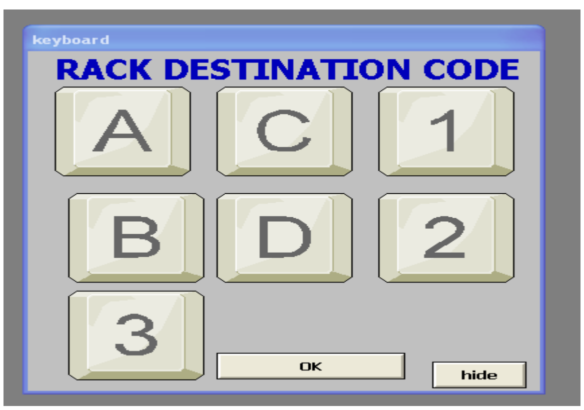

Fig. Keyboard

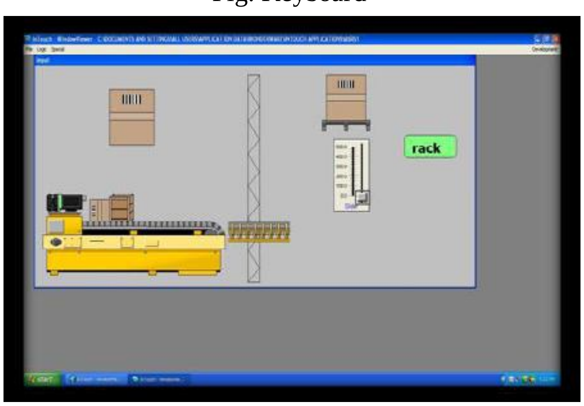

Fig. Conveyor belt with barcode scanner

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V. CONCLUSION

Object in which various types of materials are present are getting placed on the conveyor belt from the unloading section .When that object is placed on the conveyor belt; barcode scanner which is placed near to the conveyor belt scans the barcode and get the all information about the object. That information are provided to the system, Check if there is space in the desired rack. And place the object in its destination.

In the retrieval procedure by entering the code of the object to be retrieved. Then system checks the availability of the object if the object is available then slider goes to specified rack, in this way object should be retrieve.

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