A CASE STUDY OF A MAINTENANCE MANAGEMENT INFORMATION SYSTEM IN A SMALL SCALE BOARD MANUFACTURING UNIT

Abstract

The machine performance will be subjected to continuous deterioration over the time mainly due to wear and tear. The machine and its components are to be protected from downtime by means of lubrication/greasing, regular inspection and systematic maintenance. A major part of the expenditure is generally on the men, material and maintenance in an industry. Maintenance activities involve costs associated with them and thus they affect the return on investments and production costs throughout the lifespan of the industry. A significant savings in money, material and manpower can be achieved through a systematic maintenance as its main purpose is to immediately and easily detect any existing defects without causing extensive damage to the plant.

To make the maintenance system effective, it is essential to keep track of all the information related to maintenance and use them for better decision making. Maintenance management can be considered as the direction and organization of resources in order to control the availability and performance of industrial plant to some specified level. . A good maintenance management system makes equipment and facilities available.

The Maintenance Management Information System provides timely and accurate information to assist the management in key functions such as planning, organizing, budgeting, directing and controlling the maintenance activities. The current business activities involve very complex mechanisms which are to be

Author

C.G. Ramachandra
Department of Mechanical Engineering
School of Engineering, Presidency University
Bengaluru, Karnataka, India.
ramachandra.cg@gmail.com

effectively handled by the organizations for their survival and growth. It is vital for every organization to have a competent and effective Management Information System to improve its productivity. It empowers the maintenance manager to achieve his tasks productively. The Maintenance Management Information System is a fragment of the total Management Information System.

Keywords: Maintenance; Management Information System, availability, key functions.

I. INTRODUCTION

1. **Management:** It is an act of directing a process to achieve a definite task. Computerized Maintenance Management System (CMMS) is an application where the computer is used as a tool, but not as a solution. To have an effective analytical tool in the organization, a clear management focus is essential. Decent management acts as a control mechanism, and CMMS acts as a tool.

2. **Information:** It is a data that can be processed in a particular form which helps the management in decision making. The Maintenance Management Information System provides timely and accurate information to assist the management in key functions such as planning, organizing, budgeting, directing and controlling the maintenance activities.

3. **Systems:** They are the group of parts that work together or are connected in a particular manner so as to form a whole. These parts must work in harmony for the effective functioning of the system. In a highly competitive industrial environment, it is required to ensure failure free operation of the plant equipments and maintain the plant in a state of maximum operating efficiency. Therefore, the maintenance activities must upkeep all the plant equipments and service them to the required performance conditions.

4. **Maintenance:** "It involves a set of actions carried out to replace, repair and service an identifiable set of manufacturing components, so that the plant continues to run at a specified level of availability for a specified duration". It also involves the efforts directed towards the upkeep and the repair of that machine. The objectives of maintenance include the following

    - Ensure maximum availability of machines and equipments for production.
    - Preserve the plant value by minimizing deterioration and wear.
    - Avoid disastrous failures and ensures significant financial, material and manpower savings.
    - Realize the above objectives most economically in the long run.

    Every machine in operation will be exposed to continuous wear and tear. The machine and its components are to be protected from downtime by means of lubrication/greasing, regular inspection and systematic maintenance. A major part of the expenditure is generally on the men, material and maintenance in an industry. Even a best designed machine also calls for a repair. The machine may be repaired when it is not in use or its use may be postponed without disturbing the production of the whole organization. The main purpose is to immediately and easily detect any existing defects without causing extensive damage to the plant.

5. **Maintenance Management:** Maintenance management involves managing the maintenance activities and it can be regarded as the direction and organization of resources in order to control the availability and performance of the plant to some specified level. The fundamental steps in maintenance management program are shown in figure 1.

6. **Need for computerization:** Effective maintenance management system can be materialized by keeping track on the maintenance related information. A computer system can be used to process, store/retrieve the data and provide the necessary information as output at the right time to the maintenance planners and the management. Computer usage enhances the efficiency of an organization. Management Information System an integrated man-machine system that offers data to support the planning and control functions of managers in an organization. It is a means of communication in which collection, processing, storage and retrieval of data can be done to help in the process of decision making for operation planning and organizational control. Every organization involve in the process of decision making, in which different types of information is obtained from different functional areas of management. The Maintenance Manager in order to manage his resources more effectively and efficiently in a complex environment, must relate all his resources together as a system. The development and operation of a Maintenance System requires related maintenance Management Information System.

II. ABOUT THE COMPANY

The company manufactures transformer insulation boards for both Indian and international markets. The production process involved in making boards, Wood pulp delivered from the pulp mill is used as the raw material in boards making. Paper is made from natural vegetable fibers, primarily obtained from wood with/without additives. By choosing appropriate fibres and additives and processing them, variety of products can be produced, generally classified under the heading ‘paper’ or ‘board’. The board making process differs considerable according to the types of boards to be produced, but certain basic elements are common to all types of paper. The process includes stock preparation, forming, pressing, drying, finishing and inspection.

The machines which comes under this department are Beater, Beater Pump, Hydra Pulper, Chest Pumps, Agitators, Refiners, Dilution Tank Pumps, Shower Pumps, Water Pumps, Air Compressor, Wet Machine, Conveyors, Vibrating Screen, Dryers, Blowers, Cold Press, Calendar Mill, Hot Press, Vacuum Pumps etc. presently the department is following the planned maintenance, because of the type of production in the industry. Other than the daily maintenance activities, the department has fixed up a schedule day in a week as a maintenance day for performing the planned schedule maintenance works. The maintenance department has prepared and following the checks lists for all machines. The checklists have got daily checks, weekly checks and monthly checks.

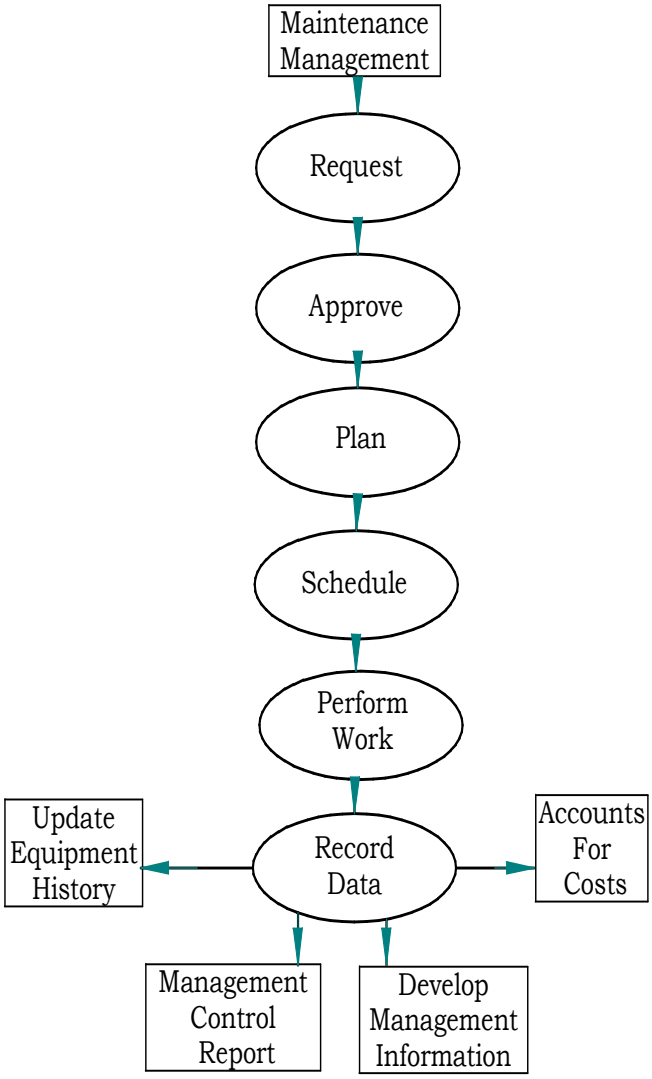


Figure 1: Maintenance Management

Book Keeping or Maintenance Record: To maintain proper history, maintenance activity carried out and breakdown details of various machines in the plant, the department is maintain some books.

The company has a good and active maintenance department, but is having difficulties in handling the records manually. The details on cost of maintenance or labour are not available in the records. Currently, the maintenance department is recording the preventive and breakdown maintenance activities. The key requirement of the department in the plant is to record/generate report on the cost of maintenance and labour, periodic breakdown and preventive maintenance on a routine basis. The reports are useful in the analysis of annual maintenance budget and recurring problems, identification of Mean Time between Failures, costs of material and labour, equipment's downtime and availability. The Management Information System for maintenance can be used in maintenance, production, accounts and planning departments.

III. DEVELOPMENT OF MAINTENANCE MANAGEMENT INFORMATION SYSTEM

The computer systems possess unrivaled processing speeds, carry out repetitive works with no errors and allow the human being to concentrate on important and innovative tasks. The key functions of the maintenance department include formulation of maintenance plans, their daily status, monthly or annual analysis, etc. The following requirements are suggested for computerization.

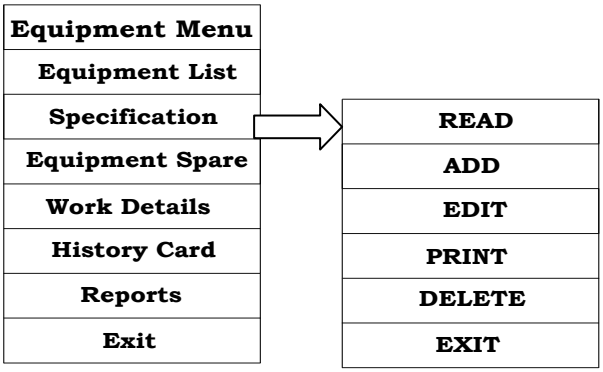
- To help the department in getting the information and existing state of maintenance activities.
- To maintain a database of all equipments that are available in the plant by recording its complete technical details.
- To prepare schedule of Preventive Maintenance program.
- Generation of periodic reports which should establish credibility to maintenance department.
- To help the management in making decisions about investment on maintenance activity.
- To make it user friendly.

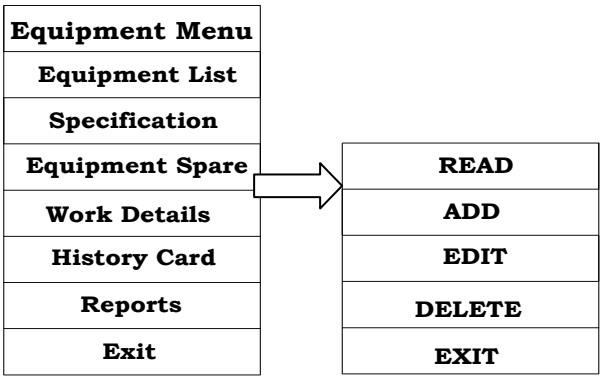
Selection of Platform: The maintenance needs huge quantity of data to be stored or retrieved as well as the generation of extensive system reports. The Oracle Relational Database Management System is a product of Oracle Corporation, which has a major existence in the area of database computing.

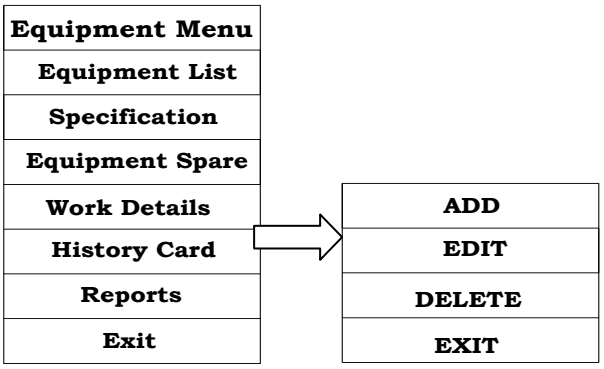
IV. DESIGN AND DEVELOPMENT OF PROPOSED SYSTEM

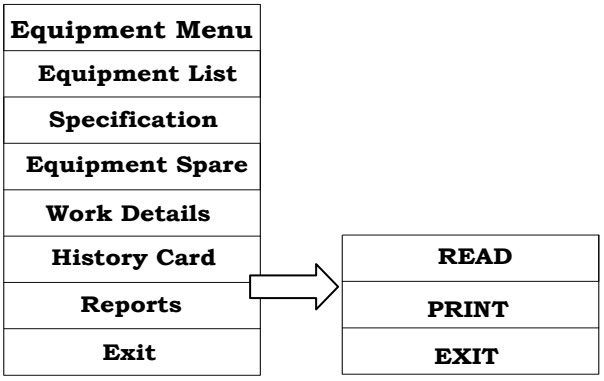
Oracle is used to design and develop this package, which consists of 3 Menus namely, equipment menu, PM schedule menu and reports menu.

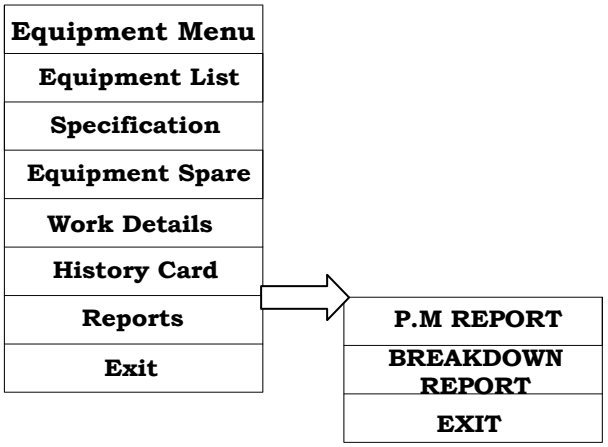
- Each menu can be executed from main menu.
- For critical data input appropriate validation of data is integrated in program. This controls entry of wrong data as well as data duplication.
- Menus and windows are used extensively to ease the utilization of package.
- User has the complete control over the data deletion.
- The messages assist the easy usage of the package.

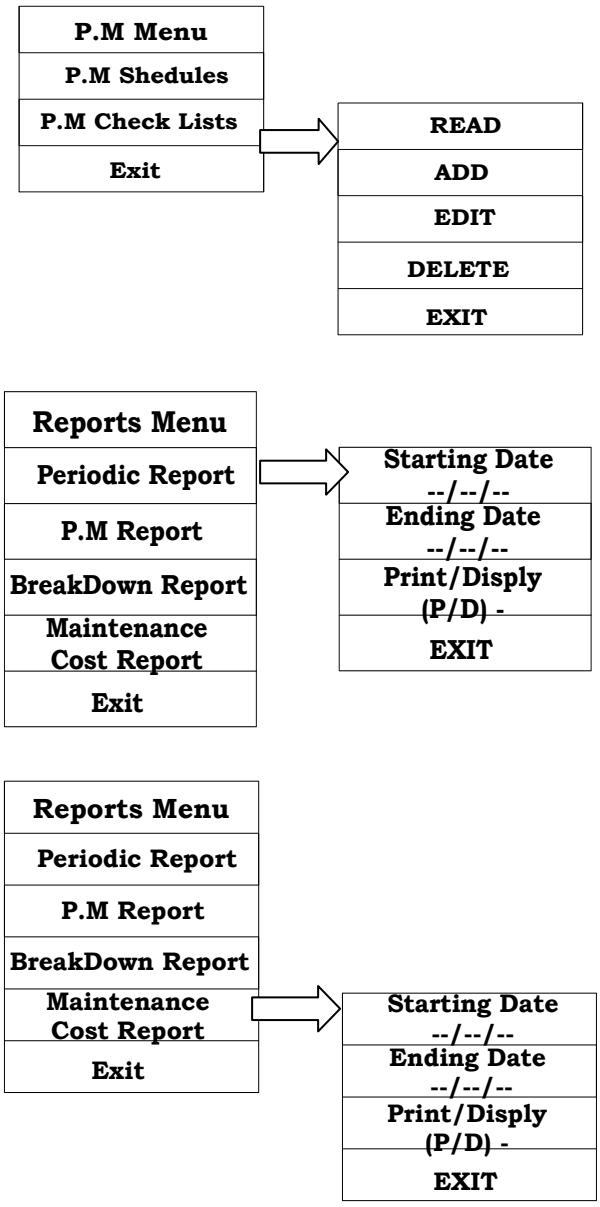












V. CONCLUSION

The Management Information System for Maintenance is developed as per the needs of the plant. The package is proficient in offering screen viewing and specific reports on equipment and their spares data, schedules for preventive maintenance, breakdown history, preventive maintenance check lists, etc., This will helps both maintenance section as well as management in working at maximum effectiveness by providing adequate information with minimum work. This package can be made useful for other process industries with their specific little modifications.

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