



# COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEMS

By

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## Outline

- I. Maintenance Management Systems
- II. Computerized Maintenance Management System.



## I. Maintenance Management Systems 1/19

1. Primary Functions
2. Concepts of Maintenance Management
  - a. Objectives of the maintenance department
  - b. Policies and procedures necessary to achieve the above objectives.
3. Maintenance work and cost reporting
  - a. Types of work
  - b. Equipment reports
  - c. Backlog reports
  - d. Preventive maintenance (PM)
  - e. Additional controls
  - f. Maintenance stores controls
  - g. Budgets



## I. Maintenance Management Systems 2/19

### 1. Primary Functions

The maintenance department primary functions and responsibilities can be group as follows:

- Maintenance of existing facilities and equipment.
- Facilities and equipment inspections and services.
- Facilities modifications and equipment installation.
- Maintenance store keeping.
- Manpower administration.



**I. Maintenance Management Systems 3/19**

**2. Concepts of Maintenance Management**

- A. Objectives of the maintenance department**
  
- B. Policies and procedures necessary to achieve the above objectives.**



**I. Maintenance Management Systems 4/19**

**2. Concepts of Maintenance Management**

- A. Objectives of the maintenance department**
  - 1. To keep the maintenance cost per production item produced as low as possible.**
  - 2. To keep the quality of the product very high.**
  - 3. To keep the downtime for critical equipment as low as possible.**
  - 4. To keep the maintenance costs as low as possible for non critical equipment.**
  - 5. To provide and maintain adequate facilities.**
  - 6. To provide effective and trained supervision.**



**I. Maintenance Management Systems 5/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

1. Maintenance scheduling
2. Work requests
3. Work force controls
4. Maintenance controls.



**I. Maintenance Management Systems 6/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

**1. Maintenance Scheduling**

- **No maintenance scheduling can be 100% effective**
  - Unforeseen equipment breakdowns and work requests will reduce the efficiency of the schedule.
  - Good maintenance may achieve 70-90% efficiency.



**I. Maintenance Management Systems 7/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

**1. Maintenance Scheduling ( Continue)**

- Most effective scheduling programs schedule maintenance work with a lead time of 16-72 hours
  - Less time will be inefficient
  - More time will usually be changed due to emergency work requests.



**I. Maintenance Management Systems 8/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

**2. Work requests**

- Steps to initiate work requests
- To have assigned priority ratings
  - Preventive maintenance work requests
  - Emergency (unplanned) maintenance work requests.



**I. Maintenance Management Systems 9/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

**3. Work Force**

- Use direct labors
- Use outside contractors



**I. Maintenance Management Systems 10/19**

**2. Concepts of Maintenance Management**

**B. Policies and procedures necessary to achieve the above objectives.**

**4. Maintenance Controls**

- In paper work (sufficient and not excessive)
- Need to standardized communication forms for reporting process for management personnel.
- Need to have cost control.



**I. Maintenance Management Systems 11/19**

**3. Maintenance work and cost reporting**

- **Control maintenance expenditures by:**
  - Control the labor costs
  - Control the material costs

**It maybe divided to the followings:**

- a) Types of work
- b) Equipment reports
- c) Backlog reports
- d) Preventive maintenance (PM)
- e) Additional controls
- f) Maintenance stores controls
- g) Budgets



**I. Maintenance Management Systems 12/19**

**3. Maintenance work and cost reporting**

- a) Types of work  
**Analysis of the actual hours spend on each type of work.**

- Repair work
- Service work
- Preventive maintenance
- Emergency or breakdown work



**I. Maintenance Management Systems 13/19**

**3. Maintenance work and cost reporting**

**b) Equipment reports**

These reports needed for

- Maintenance repair costs - > labor + material
- History repair records - > record the historical data



**I. Maintenance Management Systems 14/19**

**3. Maintenance work and cost reporting**

**c) Backlog reports**

- Keeping an active file of all work orders
- Assign priorities
- Can be used to establish manpower requirements and over staffing.





**I. Maintenance Management Systems 15/19**

**3. Maintenance work and cost reporting**

**d) Preventive maintenance (PM)**

- o Definition of which facilities and equipment need PM.
- o Setting up a PM program needs
  - What to inspect
    - For expensive equipment
    - For critical to plant operation
  - What to inspect for
    - How detailed are the inspections
    - How sophisticated will the testing equipment be
    - How much training will the inspector require



**I. Maintenance Management Systems 16/19**

**3. Maintenance work and cost reporting**

**d) Preventive maintenance (PM)**

- o Definition of which facilities and equipment need PM.
- o Setting up a PM program needs ( continue )
  - When to inspect
    - Calendar basis, or
    - Operational meter reading
  - How much paper work will be required
    - Detailed records, or
    - Necessary information



**I. Maintenance Management Systems 17/19**

**3. Maintenance work and cost reporting**

**e) Additional controls**

**Additional controls for work request initiations**

- **Authorization – important to prevent issuing of work orders**
- **Priority**
- **Time and cost estimates – to perform the work order for budgeting**



**I. Maintenance Management Systems 18/19**

**3. Maintenance work and cost reporting**

**f) Maintenance stores controls**

**To control stores inventory properly, the following must be considered.**

- **Are the part listed by stock numbers?**
- **Is the quantity-on-hand information readily available ?**
- **When an item is ordered, is the promised date noted so that the work can be tentatively scheduled ?**
- **Are the item prices available for stock items ?**
- **Can items be entered and removed from the stores as needed ?**



## I. Maintenance Management Systems 19/19

### 3. Maintenance work and cost reporting

#### f) Budgets

- To provide accounting
- To evaluate maintenance performance.



## II. Computerized Maintenance Management Systems (CMMS) 1/10

### Outline

Introduction

CMMS Objectives

Computerized vs. Manual Systems

Advantages of CMMS



## II. Computerized Maintenance Management Systems (CMMS) - Introduction 2/10

- **CMMS are computer software programs designed to assist in the planning, management and administrative procedures required for effective maintenance.**
  - **Many of maintenance management and administrative procedures which previously done by hand can be done automatically by a computer using CMMS software.**
  - **Maintenance – related data can be entered directly into the computer rather than written on paper and reports can be generated automatically or on demand by computer rather than manually sorted and typewritten.**

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## II. Computerized Maintenance Management Systems (CMMS) - Objectives 3/10

1. **Maintenance of existing equipment:**
  - **Reducing equipment downtime.**
  - **Maximizing the operating life of the equipment.**
2. **Inspection and service of equipment**
  - **Execution of the preventive maintenance work within the constrains of production schedules**
3. **Installation or major refurbishing of the equipment**
4. **Maintenance store keeping**
  - **Minimizing the spare parts inventory**

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## II. Computerized Maintenance Management Systems (CMMS) – Objectives (continue) 4/10

5. Craft administration
  - Minimizing the productivity of the workforce
    - In order to achieve the above objectives, a maintenance manager require a substantial amount of timely information.
    - In manual systems, many maintenance staff are required to collect and present the need information through excessive paper work.



## II. Computerized Maintenance Management Systems (CMMS) Computerized vs. Manual Systems 6/10

- ❖ In most computerized maintenance management systems, the basic activities performed are
  1. Work order planning and scheduling
  2. Maintenance stores controls
  3. Preventive maintenance
  4. Maintaining maintenance records
- ❖ In manual systems
  - The above activities are usually kept to their simplest forms to minimizing clerical work required and are not as useful or-to-date.
  - Major disadvantage of a manual system is the difficulty of obtaining a history of the maintenance work.



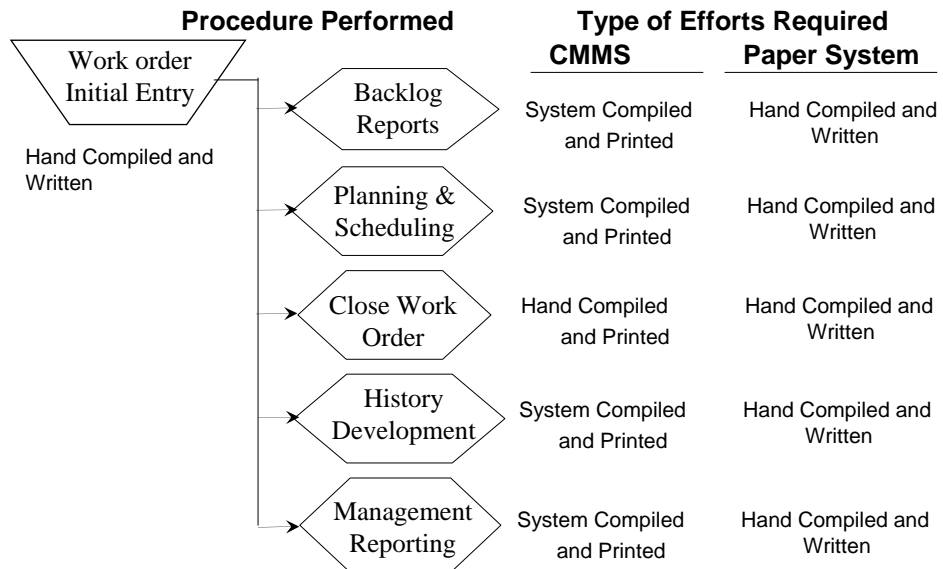
## II. Computerized Maintenance Management Systems (CMMS) Computerized vs. Manual Systems 7/10

(Continue)

- ❖ The computer has the capability to
  - Receive
  - Store, and
  - Retrieve, the data with fast speed
  
- ❖ Figure 1 shows comparisons of the work orders
  
- ❖ Figure 2 shows comparison of preventive maintenance



**Figure 1: System Effort Required for Maintenance Work Orders CMMS vs. Manual Paper System**





**Figure 2: System Effort Required for Preventive Maintenance CMMS vs. Manual Paper System**

Procedure Performed	Type of Efforts Required	
	CMMS	Paper System
Develop Needed PM Procedures and Schedules	Hand Entry	Hand Entry
Procedure Next PM Schedule	System Compiled and Printed	Hand Compiled and Written
Record Results	Hand Entry	Hand Entry
Report Unperformed Work	System Compiled and Printed	Hand Compiled and Written
Produce History Reports	System Compiled and Printed	Hand Compiled and Written



**II. Computerized Maintenance Management Systems (CMMS) - Advantages of CMMS 10/10**

- Lower Equipment Downtime
- Increased Maintenance Labor Efficiency
- Overall Maintenance Cost Reduction
- Improved Supervisor Effectiveness
- Improved Parts & Materials Availability
- Lower Production Cost
- Lower Preventive Maintenance cost
- Lower parts and Materials inventory
- Lower Purchasing Cost for Maintenance Parts & Materials
- Reduced Outside Maintenance Contractor Cost



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*Thank You*