Maintenance Management

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Definition:

A formal definition of maintenance is " that function of manufacturing management that is concerned with day to day problem of keeping the physical plant in good operating condition"

Objectives:

- Minimize loss of productive time
- Minimize repair time & cost
- Keep productive assets in working condition
- Minimize accidents
- Minimize total maintenance cost
- Improve quality of products

Importance

- Dependability of service
- Assured quality
- Prevent equipment failure
- Cost control
- Hung investment in equipment

Area of Maintenance:

1. **Civil maintenance:** Building construction and maintenance, maintaining service facilities
2. **Mechanical Maintenance:** Maintaining machines and equipment, transport vehicles, compressors and furnaces
3. **Electrical Maintenance:** Maintaining electrical equipment such as generators, transformer, motors, telephone systems, lighting, fans, etc.

ORGANISATION MAY USE ANY OR ALL THE FIVE TYPES OF MAINTENANCE

- **Breakdown maintenance or corrective maintenance**
- **Preventive maintenance**
- **Predictive maintenance**
- **Routine maintenance**
- **Planned maintenance**

BREAKDOWN MAINTENANCE

- Occurs when there is a work stoppage due to mechanical breakdown
- Maintenance becomes repair work
- Seeks to get the equipment back into operation as quickly as possible
- To control the investment in replacement spare machine

Preventive Management

It is undertaken before the need arises and aims to minimize the possibility of unanticipated production interruption or major breakdowns

Predictive maintenance:

In this sensitive instruments (eg. Vibration analyzers, amplitude meters, audio gauges optical tooling and resistance gauges) are used to predict trouble. Conditions can be measured on a continuous basis and this enables the maintenance people to plan for an overhaul

Routine maintenance:

This includes activities such as periodic inspection, cleaning, lubrication and repair of production equipments after their service life.

Planned maintenance:

It involves the inspection of all plant and equipments, machinery, buildings according to a predetermined schedule in order to service overhaul, lubricate or repair, before actual break down or deterioration in service occurs.

CONTROL OF MAINTENANCE

1. Authorized by an official
2. Maintenance schedule
3. Issue materials against proper authorization
4. Maintenance budgets
5. Equipment records

Issues:

- How much maintenance is needed?
- What size maintenance crews must be used?
- Can maintenance be sub-contracted?
- Should maintenance staff be covered by wage incentive schemes?
- Can effective uses be made of computers for analyzing and scheduling activities?

Preventive Maintenance:

Preventive maintenance is undertaken before the need arises and aims to minimize the possibility of unanticipated production interruptions or major breakdowns

It consists of:

- Proper design and installation of equipment
- Periodic inspection of plant and other equipments
- Repetitive servicing and overhaul of equipment
- Adequate lubrication, cleaning and painting

Benefits

- Greater Safety
- Decreased Production Down Time
- Fewer large scale & Repetitive Repairs
- Less Cost for Simple Repairs
- Less Standby Equipment Required
- Better Spare parts Control
- Proper Identification of Items

Maintenance Scheduling:

Scheduling refers to timing and sequences of operations.

It is an important segment of the production planning & control activity as well as the service operations like plant maintenance

Importance of scheduling

- Facilitates optimum use of highly paid maintenance staff
- Equipments can be utilized effectively
- Eliminates undue interruptions in the production flow
- Eliminates chances of sudden breakdown
- Facilitates proper sequence in maintenance service

Reliability :

- Component Reliability
- Product Reliability

Component Reliability :

Definition: It is the probability that a part or a component will not fail in a given time period or number of trials under ordinary conditions of use.

MEASUREMENT

- Component reliability is usually measured by reliability, failure rate and mean time between failures, i.e
- CR=1-FR
- Where FR=$\frac{Number\ of\ failures}{number\ of\ components\ tested}$
- FRn= $\frac{number\ of\ failures}{unit-hrs\ of\ operation\ of\ the\ component}$
- MTPF=$\frac{1}{FRn} = \frac{unit-hrs\ of\ operation}{number\ of\ failures}$

PRODUCT RELIABILITY OR SYSTEM RELIABILTY

When components or parts are combined into a larger system, such as a machine or a product, the combined reliability of all the components or parts from the basis for product or system reliability.

CALCULATION OF PRODUCT OF SYSTEM RELAIBILITY

- **When critical components interact during the operation of the product or system, the reliability of the product or system is determined by computing the product of the reliabilities of all the interacting critical components**

$$SR = CR1 \times CR2 \ldots. \times CRn$$

TURN OUT A RELIABLE PRODUCT

FIVE KEY AREAS

- Design of the product
- Production
- Measurement and testing
- Maintenance
- Field of operation

Conclusion:

- To ensure effective implementation of activities, it is important that the production facilities need to be maintained in good working condition.
- Reduces cost, machinery breakdown etc.
- Quality assurance

Therefore maintenance managements is an important aspect for any organization