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Maintenance Engineering

→ maintenance engineering is a specialist area that involves systematic ~~and~~ planning, designing & implementation of maintenance related activities to ensure ^{the} efficient functioning of equipment, machinery & infrastructure within an industrial setting.

Objectives or aim!

- i) To ensure machinery & equipments function optimally to minimize down time.
- ii) To maximize operational efficiency & ~~reduce~~ ^{minimize} maintenance cost.
- iii) To create & maintain a safe working environment for workers.
- iv) To ensure final products & services meet defined standards through equipment performance.
- v) To prolong the life span of assets through proactive maintenance strategies.
- vi) To train personnel in specific maintenance skills.
- vii) To ensure compliance with environmental regulations.

⑩ Functions of Maintenance Department

Primary Functions

- i) Regular machinery & equipment inspection, cleaning & lubrication.
- ii) maintenance of existing buildings & grounds.
- iii) maintenance of existing plants & infrastructures.
- iv) to conduct preventive maintenance programs,
- v) to implement safety protocols & measures.
- vi) Giving training to new personnel & documentations.
- vii) New installations of buildings & equipments.

Secondary Functions

- i) Risk assessments and mitigation.
- ii) making insurance against theft & fire.
- iii) protecting plant against fire & explosion.
- iv) Ensuring compliance with environmental regulations,
- v) Pollution & noise control.
- vi) waste storage, handling & disposal.

ii)

Types of maintenance

i) Proactive maintenance strategies :-

a) Preventive maintenance :-

⇒ preventive maintenance is defined as taking precautionary steps & action to prevent equipment failures before they occur.

b) Predictive maintenance :-

⇒ Predictive maintenance is a proactive approach that used systems & sensor to monitor equipment & predict failures before they occur.

c) Planned maintenance :-

⇒ Planned maintenance is a maintenance of machinery & equipments i.e. planned, scheduled or documented according to a scheduled plan.

d) Condition based maintenance :-

⇒ condition based maintenance refers to the process of taking quick action on a machine or equipment i.e. in the early stage of failure.

ii) Responsive maintenance strategies :-

a) Reactive maintenance :-

⇒ Reactive maintenance is the process of taking any response or actions to fixing a failed machinery or equipment that needs repair.

b) Emergency maintenance!

→ Emergency maintenance is similar to reactive maintenance but it poses some type of threat to health & safety.

c) Corrective maintenance!

→ corrective maintenance refers to the process of fixing or repairing a machinery or equipment after a failure or malfunction has been occurred.

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→ type

→ benefits

→ cost of implementation

→ Eg.

TOOLS FOR MAINTENANCE!

i) safety gears!

- Gloves
- safety goggles
- Bar Protection
- masks

ii) Storage equipment!

- Tool box
- Shelves
- Lockers

iii) Power & Hand tools!

- power drills
- chain saws
- screw drivers
- Hammer
- wrenches
- hand saws

iv) Electrical tools!

- wire & cable strippers
- multimeter - V & I
- crimpers

v) Cleaning equipments.

- vacuum cleaner
- cleaning chemical
- sponges

vi) Land scaping equipments!

- lawn mowers
- trimmers
- clippers

wear

(R)

⇒ wear refers to the gradual loss of material due to contact with another surface on relative motion between two surfaces.

Types of wear:

(i) Abrasive wear:

⇒ Abrasive wear is a type of wear that occurs when hard particles on surfaces rubbed against softer ones.

(ii) Adhesive wear:

⇒ Adhesive wear is a type of wear that occurs when two surfaces stick & then separate, causing material transfer.

(iii) Corrosive wear:

⇒ Corrosive wear is a type of wear that occurs due to the chemical reaction between the surface & its environment.

(iv) Erosive wear:

⇒ Erosive wear is a type of wear that occurs due to the impact of solid particles or liquid droplets on a surface.

(v) Fatigue wear:

⇒ Fatigue wear is a type of wear that occurs due to repeated loading & unloading of materials.

(vi) Fretting wear:

⇒ Fretting wear is a type of wear that occurs due to small oscillatory motions between two surfaces in contact.

wear Reduction methods!

- Prevent overloading.
- maintain a proper clearance.
- Providing better lubrication.
- Improving the surface finish.
- Doing proper surface treatment
- Choosing material of high surface hardness.