# FAQ

## Fandamentals Of Maintenance Engineering

Q1) Define maintenance. List different typer of maintenance and explain in brief predictive maintenance and corective Maintenance.

Ans Maintenance :-

"To keep the machines, plants & process equipments in their efficient condition, the maintenance activities are planned and carried out is known as "maintenance". "

Types of Maintenance :

i) Capital replacement
ii) Breakdown maintenance
iii) Corrective maintenance
iv) Scheduled maintenance
v) Planned maintenance

vi) Productive maintenance.
vii) Predictive maintenance.
viii) Modular maintenance.

1) Predictive maintenance:

-> By using the knowledge related to maintenance field and using sensitive instrument like vibration analyzer, amplitude meter, pressure, temperature & resistance strain gauges, the faulty conditions which may spoil the machine are found out.

-> The faults are traced before machine stops functioning and repairing & replacement work is done alongwith adjustment required to prevent the machine breakdown.

-> The good & efficient condition of machine is obtained, the products quality improves in this predictive maintenance.

-> The work of planning and record keeping is also reduces considerably.

-> This type of maintenance is modern

approach, in which the factors which are responsible to make the machine faulty are continuosly searched by using precision instruments.

-> This modern work is carried out by the skilled workers.

-> This latest technique based work gathers the needy informations continuously for the machines, units and parts as regards to their conditions.

-> As a result of which this maintenance prove of utmost importance.

-> The modern approach to supervise the condition of a machine and machine shop as a whole is developing day by day by the combine efforts and use of skilled workers and precision instruments.

-> As a result of which new remedial measures are made available, and hence modern maintenance as per the need of modern time is done by using the approch of predictive maintenance.

2) Corrective maintenance :-

-> Corrective maintenance is planned with a view to reduce break-down, machines, units and parts of the units if found failing repeatedly due to same defect, then units & their parts are redesigned and used to prevent the breakdown.

-> New design of machine become safe in operation

-> To reduce the machine downtime engineering analysis is done and based on that new design for the machine is prepared.

-> Parts are made stronger & wearing surface of the parts are made wear resistant.

-> Machines are corrected in the sense of their construction.

-> As the machine is becoming strong, the target of production can be achived very easily.

-> Cost of production can be controlled.

-> The machines modified by corrective ~~key~~ maintenance can give high quality products and hence the wastage, rejection etc. are reducing.

-> Following are some of the work carried out in corrective maintenance.

Q2) List different methods use in selection of replacement. Explain briefly 'MAPI' method as used in replacement decision.

Ans)

Methods use in selection of replacement are as follows:

1) Annual cost method of replacement.

2) Mapi method of replacement.

3) Total life average method of replacement.

4) Rate of return method of replacement.

5) Present worth method of replacement.

## Mapi method of replacement:

-> The capital investment of each machine and equipment can be recovered in certain fixed years.

-> The capital cost is recovered by the saving of depreciation.

-> Machinery & allied products institute is as 'MAPI'.

-> The MAPI has given a quantitative approach for deciding replacement.

-> When machine will become old then it will become obsolete is the principle adopted in this method.

-> By applying this principle the economical service-life of the machine is calculated as under:

Let G = Inferiority gradient proportional to the life of the machine.

N = Retentive period or economical service life of the machine.

I = Interest rate.
S = Salvage value
C = Capital cost or purchase cost.
F = Annual expenses of first year.

$$\text{Economical service life, } N = \frac{2(C-S)}{G}$$

By calculating the value of 'N', we can decide when the machine should be replaced At the time of replacement total cost can be given by the formula

$$\text{Total cost} = \frac{G(N-1)}{2} + F + \frac{C-S}{N} + \frac{i(C+S)}{2}$$

=> The time is the important factor for capital investment in machinery, equipment and method.

-> By using the present or detending machine for one year more, how much cost will increase.

-> If replacement is done easier, then the operating cost will will increase.

-> The mapi method is comparing the cost of new machine or challenger.

-> The machine purchased today needs replacement after some year due to the development of technology.

-> MAPI method is giving exact information for the future.

-> Till the total cost of machine remains minimum, it is used and thereafter a desision for replacement is taken.

-> Inflexicity gradient is the rate of obsolescence and deterioration.

-> Due to the combine effect of obsolescence & deterioration, increase in operating cost is noticed.

Q3) State the aims of maintenance department.

Ans -> To maintain the machines & equipments to obtain quality products as well as to maintain the productivity.

-> To prevent sudden and incidental breakdown of machines.

-> To achieve safe utilization of machines.

-> To overhaul the machine as per schedule to make them efficient.

-> To obtain maximum efficiency to machines by maintaining them.

-> To reduce the downtime of machine which became out of productions

-> To reduce the cost of maintenance.

-> To exercise the maintenance activities as per higher engineering standards.

-> To prevent or reduce the production wastage.

-> To reduce cost of production by bringing economy in maintenance.

-> To maintain the position of industry in these days of competitive age.

-> To carry out every maintenance activity with the aid of both technical knowledge and experiences.

-> To increase the service life of plants & machineries.

-> To maintain the record of maintenance work for future guidelines.

-> To provide in time infrastructural facilities to the industrial unit.

-> To prevent the occurrance of accidents and to bring safety in the industry.

-> To reduce the loss to the industry owing to the accidental fire.

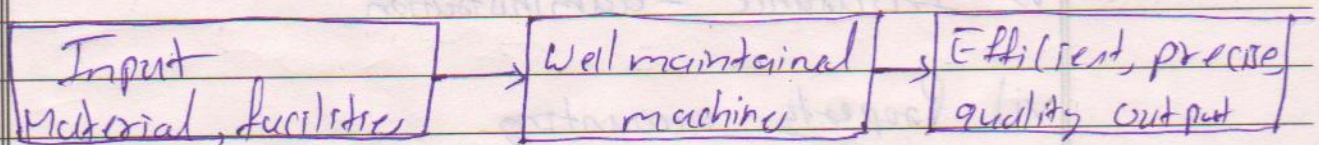
→ To carry out maintenance, repair & replacement periodically.

Q4) Explain the term maintenance and state the primary and secondary functions of maintenance department.

Ans

Maintenance :-

To keep the machines, plants & process equipments in their efficient conditions the maintenance activities are planned and carried out is known as "maintenance". This results into the reduced downtime of the machine, and give accurate and best quality of products produced by using the various facilities in an industry.




1) Primary functions:

i) Maintenance of existing plant and machineries
ii) Inspection and lubrication of equipments

iii) Proper distribution of utility services.

iv) Modification or alternation of existing equipment.

v) Installation of new equipments & construction of building.

vi) Maintenance of existing building & ground.

2) Secondary function:

i) Protection of the plant

ii) Waste disposal of the plant

iii) salvage

iv) Maintenance of store

v) Insurance - administration.

vi) Property accounting.

vii) Pollution and noise - control

viii) Sanitation & service facility administration.

ix) other services

Q5) Define the term maintenance cost and state the factors affecting maintenance cost.

Ans Maintenance cost :-

Maintenance cost is the cost incurred not for to increase the production capacity and accepted service life of the equipments but it is the cost of maintaining the equipments in its efficient condition.

Factors affecting the maintenance cost:

i) Frequency of inspection, lubrication and repairing
ii) Standardisation of parts and machine
iii) Excess stock of the replacement parts.
iv) Excess maintenance stuff.
v) Insufficient inspection of maintenance job.
vi) Time interval between successive maintenance.
vii) Design and maintainability of equipments

viii) Inspection types and their number in use.

ix) Skill of the maintenance stuff.

x) Payment of overtime.

xi) Method of repairing

xii) Utilisation of uneconomical materials for repairing.