Plant Maintenance

Minimum maintenance cost require sound engineering right from the proper selection and arrangement of equipment to the development of efficient tools and methods in maintenance work. Ease of maintenance is very important in the choice of a machine and also adds to its reliability.

Preplanned Maintenance

The chief feature of organizing proper maintenance is the adoption of orderly and systematic methods. A regular programme should be drawn up in advance for the routine inspections, adjustments and lubrication of machines. Bearings should be checked, gib strips tightened, clutches adjusted, felt washers and wipers cleaned, alignments examined, blacklash of screws corrected, motors blown out and tested, wiring checked and contacts cleaned and adjusted.

When a machine is well cleaned and serviced, both the maintenance man and the operator feel proud of it and try to maintain it still better. *Cleanliness directly helps in tracing cracks and other incipient defects.* When Ford bought an abandoned railway, his first order was that all the buildings and rolling stock should be cleaned and painted in bright colours. It has

been estimated that 75 percent of the break down are due to lack of lubrication which in turn is the result of absence of preplanned maintenance.

Main reasons suggesting for preplanned maintenance are :

(i) **Increased mechanization** Because of increased mechanization, the maintenance work has increased so much that a detailed study of the labour and materials has become a bare necessity. Experience has shown that to retain a large maintenance staff for meeting emergencies is uneconomical and can be avoided by systematic and planned inspections.

(ii) Minimum stock between operations make interruptions to production very expensive. According to Factory Regulations, payment has to be made for waiting time to workers working on daily basis as well as to those working on output basis.

(iii) Interruptions to production often result in failure to make deliveries according to schedule which may ultimately mean loss of good-will and business.

(iv) Service expenses for electricity, steam and water etc., are reduced as a result of regular maintenance.

(v) Preplanning of maintenance operation reduces the quantity of spare parts and thus the risk of their obsolescence.

(vi) Correction of the defects decreases the cost of the repairs and also maintains the performance efficiency of machinery with regard to quality and quantity, as "stitch in time saves nine."

Types of maintenance

(1) Breakdown maintenance

(2) Preventive maintenance

Breakdown maintenance : In this case the repairs can be done after the breakdown which may occur due to unpredictable failure of the components that cannot be prevented. Defects are rectified only when the machine cannot perform its function any longer. The method is very expensive. Because of disruption of production, there is increased depreciation cost payment to idle operations and overtime to the maintenance staff.

Planning maintenance work : In small sized plants, the master mechanic usually requires only a regular routine maintenance schedule, receives requests from different foremen for non-routine work and manages his staff by itinerant supervision during the day. In bigger modern plants to promote economy, there should be orderly and planned dispositions of maintenance staff to meet the current requests and routine requirements. The plant engineer is generally responsible for the plant conditions and maintenance procedure and should better be helped by a job order clerk or maintenance despatcher for the daily routine of work assignments.

The following routine will facilitate the procedure :

(a) **When the estimated cost of a job exceeds a** given minimum, approval of the plant engineer must be obtained.

(b) **An equipment record** showing the maintenance history of each important equipment must be kept.

(c) **A schedule of the works to be done** is needed. It should mention the three classes of works viz.,

(i) jobs to meet contingencies,

(ii) jobs which may vary with the conditions but which can be fitted in the future time schedule and

(iii) jobs which can be definitely planned ahead.

(d) A **tickler file** is convenient for keeping the work orders and data for the forth-coming jobs.

(e) **A daily force report** must be maintained to show the disposition of the maintenance staff according to the jobs.

(f) **A long-term planning** or annual planning may be adopted to ascertain a stabilized maintenance staff.

Preventive maintenance

It is also termed as "planned maintenance" or "scheduled maintenance". It is a very important function for the reduction of maintenance cost and to keep the good operational condition of equipment and hence it increases the reliability. It aims to locate the sources of trouble and to remove them before the breakdown occurs.

Objectives of preventive maintenance

(i) To obtain maximum availability of the plant by avoiding breakdown and shut-down period.

(ii) To keep the machine in proper condition in order to maintain the quality of product.

(iii) To preserve the value of plant.

(iv) To ensure safety of the workers

(v) To maintain the maximum productive efficiency of the plant.

(vi) To keep the maintenance economical and at optimum cost.

Functions of preventive maintenance

(i) Proper and timely inspection

(ii) Lubrication

(iii) Planning and scheduling

(iv) Records and analysis

(v) Training the maintenance staff

(vi) Storage of spare parts.

Advantages

1. Reduction in production downtime
2. Less overtime pay for maintenance staff
3. Less standby equipment
4. Less expenditure on repairs
5. Due to planned spare parts replacement lesser spare parts are needed to be kept in store at all time.
6. Greater safety of employees due to less breakdowns.