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**Replacement of Equipment’s: Reasons, Factors and Problems**

After reading this article you will learn about Replacement of Equipment’s: 1. Reasons for Replacement of Equipment 2. Factors Necessary for Replacement of Equipment 3. Problems.

Reasons for Replacement of Equipment’s:

Equipment are generally considered for replacement for the following reasons:

(i) Deterioration:

It is the decline in performance due to wear and tear or misalignment indicated by;

(i) Increase in maintenance costs.

(ii) Reduction in product quality and rate of production.

(iii) Increase in labour costs, and

(iv) Loss of operating time due to breakdowns.

(ii) Obsolescence:

Technology is progressing fast, newer and better equipment are being developed and produced every year.

The equipment gets obsolete due to advancement in technology and the unwarranted manufacturing costs arising from such obsolete equipment will:

(i) Reduce profits.

(ii) Impair competition.

(iii) Cause loss in value of machinery.

(iii) Inadequacy:

When the existing equipment becomes inadequate to meet the demand or it is not able to increase the production rate to desired level, the question of replacement arises.

(iv) Working Conditions:

It may be thought of replacing the old equipment and machinery which creates unpleasantness i.e. give rise to unsafe conditions for workers and leads to accidents, making the environment noisy and smoky etc.

(v) Economy:

The existing units/equipment have outlived their effective life and it is not economical to continue with them.

Factors Necessary for Replacement of Equipment:

The factors which necessitate the replacement of machinery and equipment can be classified as:

(i) Technical Factors.

(ii) Financial or Cost Factors.

(iii) Tangible Factors.

(i) Technical Factors:

They tend to consider:

(i) Whether the present equipment has become obsolete due to technological developments,

(ii) If the present equipment is inadequate in meeting increased product demand.

(iii) Whether the present equipment has deteriorated due to wear and tear. It may be indicated by increase in maintenance costs, reduction in product quality, rate of output, and increase in labour cost and down time etc.

(iv) Reduced safety as compared to new machine available/developed.

(v) Can the present equipment provide desired surface finish?

(vi) If the present equipment is polluting or spoiling working condition of the industry.

(vii) Possibility of performing additional operations by new machine.

(viii) Does the present equipment make noise and vibrations and thus causing diversion of the workers.

(ix) How often the present equipment requires maintenance and repairs.

(ii) Financial/Cost Factors:

These are:

(i) High repair and maintenance cost of the existing equipment/machinery).

(ii) Possibility of combining some operations and resulting increase in productivity by challenger (new machine).

(iii) The initial cost of challenger.

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(iv) Salvage value of existing equipment and challenger at the end of its useful life.

(v) Improvement in productivity and quality by use of challenger.

(vi) Saving in space by use of new machine.

(vii) Reduction in scrap and waste by use of new machine.

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(viii) Down time cost of present machine.

(ix) Reduction in cost of jigs and fixtures by using challenger.

(x) Effect on consumption of power by replacing the existing machine by new machine.

(iii) Tangible Factors:

These factors involve sociological and humanitarian considerations with far reaching effects:

(i) Like replacing the existing machine which causes unpleasantness (may be noise and smoke pollution) and unsafe working conditions leading to accidents.

(ii) Replacement may cause displacement of workers.

At the time of replacement a well-designed replacement policy should be adopted, rather than considering only the factors pertaining to the particular equipment involved, should compare thoroughly all the existing equipment with its possible replacement.

For the purpose of sound economic comparison all factors should be converted into cost and possible increase in revenue. Break even analysis can be utilized for the purpose of taking replacement decision or selection of investment alternatives.

Problems in Replacement of Equipment:

The problem of equipment replacement is a routine phenomenon of industrial enterprises. Normally, it is experienced in systems where machines, individuals or the capital assets are the main job performing units. It is the common phenomena that performance or efficiency of an item in a system deteriorates with the passage of time.

The remedy is either to adopt maintenance measures to resort to the requisite level of performance or to replace the item with some new items. Thus it is required to formulate a most economic replacement policy which is in the best interest of the enterprise or system.

The various types of replacement problems can be expressed broadly in the following situations:

(i) Replacement of Equipment/Machine/Item which Deteriorate with Time:

This situation arises when the efficiency is measured as the discounted value of all future costs associated with each alternative. The simplest replacement model in such cases is one where the deterioration rate is predictable in terms of increasing maintenance costs and decreasing salvage value with time.

The maintenance cost of the machine/assets/equipment always increases with time and a stage comes when maintenance cost is so high that it is more economical to replace it by new one.

In such cases the decision may not be to re-palace the equipment if the next year maintenance cost is less than the average cost of the previous year and replace the equipment if the next year’s maintenance expenses is more than the average cost of the previous year.

There are two methods to find the appropriate solution in this case i.e.:

(i) Annual cost method.

(ii) Present worth method.

(ii) Replacements of Items that Fail Completely are Expensive to be Replaced:

In general it is a common characteristic that the probability of failure of any item in a system increases with the period of use or passage of time. A machine or equipment consisting of a number of parts/items may be considered as a system.

The system may be such that the whole system may result in breakdown with the failure of any item. This break down implies loss in production, idle labour, idle inventory and other units of the system.

It is possible that the nature of item which requires replacement may be such that immediate replacement is not available or possible. Thus there is necessity of formulating some appropriate replacement policy in such cases.

There are two possible solutions:

(a) Individual Replacement Policy:

Whenever any item fails, it should be immediately replaced.

(b) Group Replacement Policy:

All the items/parts are replaced after a certain period of time T inspite of these being in working condition, with a provision that if any item fails before this time T it can be replaced immediately. This approach decreases the probability of breakdown in the system. This approach is essential if the sudden breakdown of the equipment/machine is hazardous.

Such policy requires two fold considerations namely:

(i) The rate of individual replacement during the period.

(ii) The total cost incurred on individual and group replacements during the selected/chosen period of replacement.

The period for which the total cost is minimum is considered as optimal.

The following information is required to take decision in this procedure in such cases:

(A) Probability of failure at different periods of time

(B) Loss incurred due to these failures

(C) Cost of individual replacement and

(D) Cost of group replacement.

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