
UNIT 6 MAINTENANCE COSTING AND BUDGETING

Information Technology
(IT) Enabled Maintenance
Management

Objectives

After studying this unit, you should be able to:

- understand the importance of maintenance costing and budgeting,
- identify the cost elements of maintenance,
- classify the cost elements,
- understand the applications of costing and budgeting,
- prepare the budget of maintenance department,
- prepare Zero Based Budget.

Structure

- 6.1 Introduction
- 6.2 Maintenance Costing
- 6.3 Costing Sheet
- 6.4 Applications of Maintenance Costing
- 6.5 Objections to Maintenance Costing
- 6.6 Maintenance Budgeting
- 6.7 Zero Based Budgeting
- 6.8 Summary
- 6.9 Self Assessment Questions
- 6.10 Bibliography and Suggested Readings

6.1 INTRODUCTION

All the big manufacturing units maintain their own Maintenance and Repair department. To ascertain the exact cost of each maintenance or repair work, a series of service order accounts are opened. Each service order will be given a distinct number, and will be debited with all expenditure on material, labour or other direct charges for repair and maintenance. An addition is also made for works and office indirect expenses on a suitable basis. The total will then be included in factory overheads and is also used for maintenance planning, budgeting and control. In case the repair work is done by an outside agency, there will be no difficulty in ascertaining the exact cost of repair and the same will be included in factory overheads.

Sometimes an expenditure is incurred by the company's own workmen, which give rise to a capital asset. In such cases, the expenses on material and labour are debited to Capital Order Account. A charge is also made for works and office overheads to ascertain the true cost of the work performed. All such expenditures will not be debited to work overhead but be capitalized by passing an appropriate entry in the books of account. In cases major repair is carried out to prolong the life of an asset, cost of such repairs is also spread over the years during which the benefits are expected to come. Thus maintenance cost is generally the total cost incurred in doing the maintenance job and keeping a maintenance organization. The treatment of costs associated with other activities like construction, modification, rearrangement and removal of building equipment and assets depend on the nature of job undertaken.

Costs of no maintenance or inadequate maintenance are in the nature of opportunity cost. These lost opportunities includes lower rate of output, poor quality of products, wastage, defectives, damage to equipment, reduction in the

Maintenance Resource equipment etc. These costs are not recorded in any of the accounting system and often overlooked while exercising control over maintenance costs. A good maintenance policy should incorporate both the maintenance cost and the cost of lost opportunity due to inadequate maintenance.

6.2 MAINTENANCE COSTING

Costing is the technique of ascertaining costs. It consists of analyzing, recording, classifying and appropriate allocation of expenditure for the determination of the costs of products or services, comparing against standards or budgets, reporting and recommending. It renders information for the guidance of the management for proper planning, operation, control and decision making.

The costing of maintenance department involves three steps:

- i) Collection and classification of maintenance costs
- ii) Departmentalization of maintenance cost
- iii) Absorption of maintenance cost

Collection and Classification of Maintenance Costs

The maintenance costs include cost incurred on large number of activities. Some of these activities are as follows:

- Cost of manpower and facilities dedicated to maintenance department for repair and maintenance.
- Cost of preventive maintenance to improve the availability of the assets.
- Cost of resources like equipment and other facilities for condition monitoring and diagnostic maintenance.
- Cost of materials like spares lubricants and other consumables, tools etc.
- Cost of purchase and stores department looking after the activities of maintenance including salaries of clerk etc.
- Cost of stationery, printing of formats, computer and accessories etc.
- Cost of subcontracting maintenance work to outside agencies.
- Cost of training of maintenance personnel

Maintenance costs may be classified according to their nature, function and a number of other characteristics. A typical chart showing the classification of maintenance costs is given in *Figure 6.1*. The classification can be summarized as follows:

According to Nature

- Material: - Cost of spare parts, lubricating oil. Cotton waste etc.
- Labour: - Salary paid to the maintenance manager and other officers
 - Wages to Maintenance workers and supervisors including contributions to provident fund and other perquisites.
 - Overtime wages
- Overheads: - Those costs of the maintenance department which cannot be directly allocated to a specific job, but which must be absorbed by apportioning a share to all jobs and operations.
 - Store expenses including salaries of storekeepers and other expenses in handling of spare parts and other stores related to maintenance.
 - Cost of training new employees.

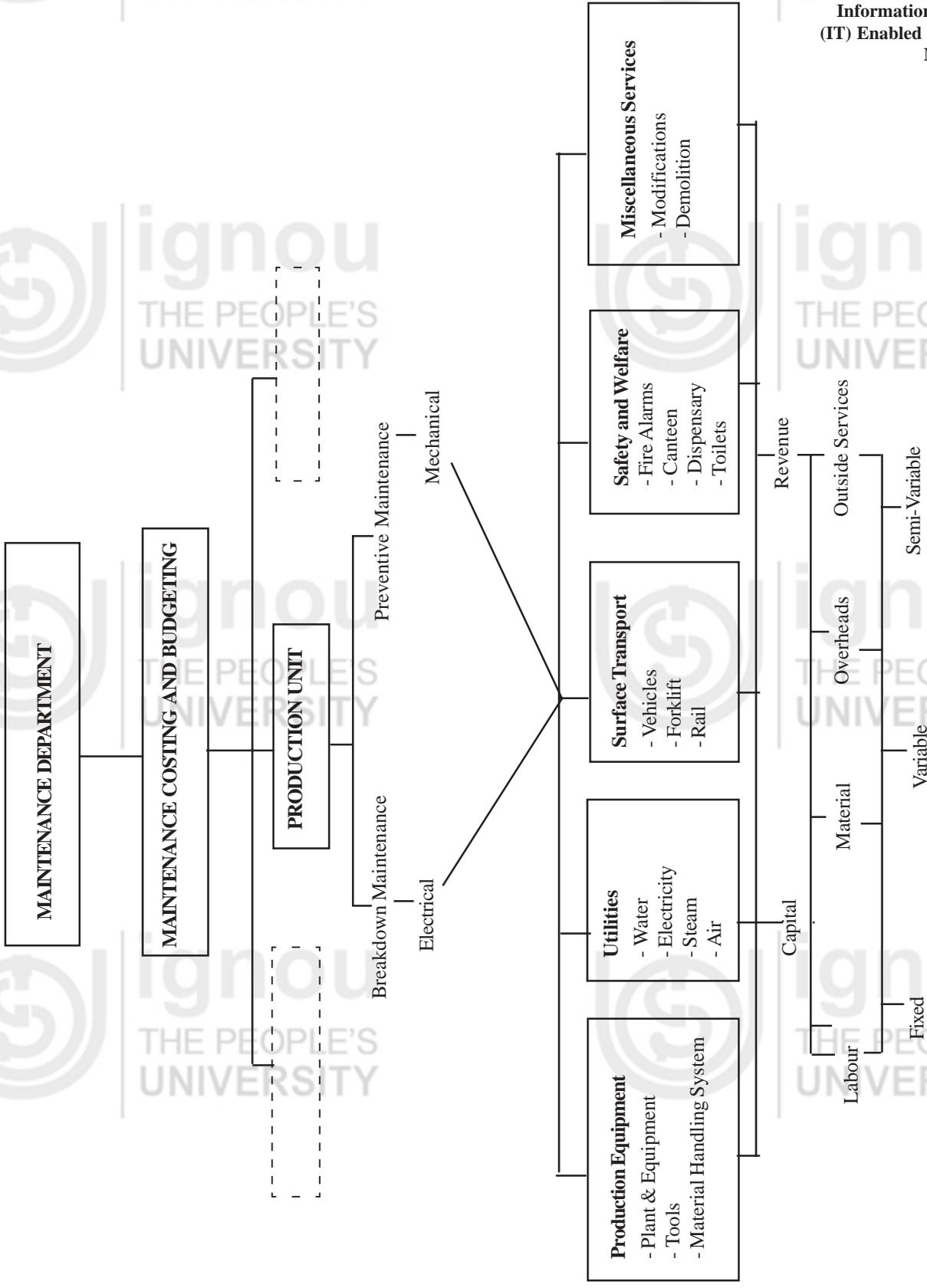


Figure 6.1 : Classification of Maintenance Costs for a Typical Organization

Maintenance Services:- External labour and supervisory services engaged in addition to the resources of the activity concerned, the costs of which include the provider's overheads. Engineering services and hire of mobile plant, tools and equipment are also included. The services of central workshop may also be included in common with the services of external firm.

According to Normality

- Normal maintenance cost
- Abnormal maintenance cost

Normal maintenance cost refers to the cost, which is expected to be incurred. This is unavoidable.

According to type of Maintenance Action

- Breakdown Maintenance activity
- Preventive/ Planned Maintenance Activity

According to Controllability

- Controllable Cost
- Uncontrollable Cost

According to Behaviour

- Fixed Cost
- Variable Cost
- Semi Variable Cost

According to Impact of Maintenance

- Direct Maintenance Cost :The cost incurred to keep the equipment and systems operable.
- Cost of Standby Equipment
- Opportunity cost due to under repair

According to the type of Budget

- Revenue Cost
- Capital cost

Revenue costs include those expenditures, which are covered by revenue budget allocated for various normal maintenance activities. Capital costs are covered by capital budget, which are specifically sanctioned for specific job on specific equipment generally for improving the features or the life of the equipment.

After classification of maintenance costs, cards are maintained for every service order. Entries in the card are made periodically from purchase journal, stores requisitions, petty cash book, wage analysis book etc. The details regarding the source of information is recorded in the remarks column.

Activity A

For your organization, or the organization you are familiar with, collect the costs related to maintenance department during the last financial year. Classify these costs according to different classifications.

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Departmentalization of Maintenance Cost

After classification and collection of maintenance cost, the next step is distribution of cost to the different processes, equipment, product or departments. It involves the allocation and apportionment of maintenance cost.

a) **Allocation of Maintenance Cost**

There are certain maintenance costs, which can be directly estimated for different departments. These expenses are cost of spare parts, wages of maintenance workers associated with only one department, contribution to provident fund and other perquisites paid to these workers etc. Such expenses are directly charged to these departments, for which they are incurred. This is called allocation of maintenance cost.

b) **Apportionment of Maintenance Cost**

Certain expenses such as salary of maintenance manager and maintenance staff catering to more than one department, consumables like lubricating oil, gloves, cotton waste etc are incurred for the factory as a whole, and therefore they will have to be apportioned over all departments. There is no hard and fast rule as regards the basis to be applied for apportionment of maintenance cost, the following methods can work as guiding rules.

- i) According to capital value of assets:
- ii) According to technical estimate
- iii) According to production hours of the equipment
- iv) Actual services utilized, if records are available
- v) According to hours worked on each equipment/ department
- vi) According to past experience

Distribution of Office and Administration Overheads of Maintenance Department

The office overheads of maintenance department shall be charged to different equipment/ processes/ departments on a suitable basis. Since the maintenance overheads constitute a small portion of the total cost, it will not be advisable to follow a complicated method for their absorption. A blanket overhead rate may be computed for the entire maintenance work.

$$\text{Maintenance Overhead Rate} = \frac{\text{Total Maintenance Overheads}}{\text{Total Maintenance Cost}} \times 100$$

The documentation and procedure for the accumulation and distribution of maintenance costs are best devised and operated on the basis that it is an accounting process, administered through the finance department, but established in close collaboration with the maintenance management, so that their joint needs are met. The following are some of the guidelines in devising a procedure:

- Avoid duplication and unnecessary work in meeting the different needs of the accounting and maintenance department.
- Ensure that the procedure provides timely information to both departments in a form which aids effective control.

Activity B

In activity A, you have classified costs according to nature - material, labour, overheads, outside services. Give a brief account of the method of allocation and apportionment of overheads. How the office and administration overheads are distributed.

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Maintenance Resource
Management and Costing

COSTING SHEET

A consolidated statement of the maintenance costing can be prepared as given in *Table 6.1*. In this table, the various activities are listed row wise and the elements of cost are listed column wise. To ease the determination, distribution and control of maintenance cost, a suitable coding system should be established. This must be prepared keeping in view the activities of the organization and details of the costing required.

Table 6.1: Consolidated Statement of Maintenance Costing

UNIT ACTIVITY	Code	CAPITAL (200)				REVENUE (300)			
		Labour (210)	Material (220)	Overheads (230)	Outside Service (240)	Labour (310)	Material (320)	Overheads (330)	Outside Services (340)
Production Equipment	00								
Plant and Equipment	01								
Tools	02								
Material Handling System	03								
Utilities	20								
Water	21								
Electricity	22								
Steam	23								
Air	24								
Surface Transport	30								
Vehicles	31								
Rail	32								
Safety and Welfare Services	40								
Fire Alarm	41								
Canteen	42								
Dispensary	43								
Toilets	44								
Miscellaneous Services	50								
Modifications	51								
Demolition	52								

The production establishment of the organization and the work classification within them, must be coded in a manner that segregates them by units, operations, or plant. Similar items at different units should have a common code, modified to identify the particular unit concerned. Further, these operations and activities must be allotted the appropriate cost account classification, which must be so coded as to segregate them. If these two requirements are met, costs can be equitably distributed and controlled with any desired degree of refinement. Purpose less analysis must, of course, be avoided.

Activity C

Prepare a costing sheet for your organization as per the format of *Table 6.1*.

6.4 APPLICATIONS OF MAINTENANCE COSTING

- 1) Costing makes comparisons possible : If the costing records are regularly kept, comparative cost data for different periods and various types of repair is available. It helps the management in planning future course of action.
- 2) A good maintenance costing system provides a complete, valid evaluation of not only the maintenance organization but production facilities as a whole.
- 3) The data should present the following information:
 - A broad analysis and summation of maintenance costs for each unit and for the group.
 - An indication of trends or comparisons with standard costs or budgeted costs.
 - A measure of the incidence of the breakdowns in terms of their effect on production.
 - A measure of the relative volumes of planned and unplanned work carried out.
 - The effect of the maintenance in terms of plant availability
 - Abnormal cost arising from unsuitability or abuse of plant and equipment.
 - A breakdown of maintenance cost into their elements for each unit and for the group.
 - A measure of labour utilization and performance and of material costs.
 - Control indices, which promote the satisfactory accountability of maintenance as a service to the production.
- 4) The reports of the costing can be useful in the following manner:
 - Labour control and productivity improvement
 - Work load measurement
 - Formulation of objectives and policies
 - Production cooperation
 - Staff department service
 - Effectiveness of material control
 - Observance of safety procedures
 - House keeping

Activity D

Briefly describe the various applications of the reports from maintenance costing in decision making.

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6.5 OBJECTIONS TO MAINTENANCE COSTING

Some managers are averse to putting the maintenance costing system and give the following arguments:

- 1) The system is quite expensive because analysis, allocation and apportionment of cost and absorption of overheads require considerable amount of clerical time.
- 2) Costing system in itself does not control cost or improve efficiency. If the management is alert and efficient, it can control costs without the aid of this system.

These arguments are untenable. Costing helps in minimizing costs by avoiding wastage at all levels. The system will not be expensive, if it is introduced after taking into account technical details and advice of the technical personnel of the maintenance department. Thus it will be a profitable investment and it will be wrong to call it expensive. The costing is a must for maintenance department because each repair activity requires use of materials, labour etc. In the competitive environment a manufacturer must know the cost of its activities and avoid wasteful expenditure. This is possible only by maintaining proper costing system and hence it is wrong to say that it is unnecessary.

6.6 MAINTENANCE BUDGETING

A budget is a detailed plan of operations for some specific future period. It is an estimate prepared in advance of the period to which it applies. Different types of budgets are prepared by an industrial concern for different purposes. The maintenance budget is an estimate of its requirements for spare parts, manpower, consumable and other expenses. It is prepared to bring efficiency and economy in the maintenance activities.

Since the importance of the maintenance costs lies in their influence on production costs, the budgets must therefore portray them in production terms, and must result from discussions between the maintenance department, the production department and the financial control. The maintenance management provides information relating to expenditure under the various maintenance classifications. The production management gives information relating to production targets, and plant, equipment and service requirements. The finance control completes and correlates the information, prepares the budget statement and issues the periodic returns and statistics relating to actual performance against forecasted performance.

6.7 ZERO BASED BUDGETING

A zero based budget breaks the overall demand for maintenance services into its constituents, that is, assets or areas. In addition to the unit or asset list, a zero based budget has allocations for certain areas that are hard to define as assets such as electrical system on pavement. All these maintenance activities can be traced back to one of the following eight demands. A demand is a categorization of where maintenance labour or materials are expended.

- a) **Preventive Maintenance:** Based on the facility and equipment size, construction and the standard times of the preventive maintenance (PM) activities, the total time for PM activities is calculated. In a Total Productive Maintenance (TPM) shop, some of the PM hours will come from shop floor workers. Materials used for each service are also added. Some time for the short repairs that the machine will get is also included. Since PM has flexibility in scheduling, the PM can be considered as a level demand activity throughout the year.
- b) **Corrective Maintenance:** The deficiencies in the facility or equipment found during PM are recorded separately and taken up as scheduled maintenance. These are considered schedule work so long they don't interrupt job in process. Previous years data can be used to know this demand.
- c) **User Maintenance:** User maintenance (UM) is the maintenance based on the requests received from the user department. This includes both routine as well as breakdown maintenance requests. Previous year data can be used to budget this exercise.
- d) **Seasonal Maintenance:** Review of roofing, checking of air conditioners before summer are seasonal maintenance (SM). Some percentage of seasonally driven emergencies are also included in this list. Budgets are based on history.
- e) **Replacement/ Rehabilitation Maintenance:** This type of maintenance is also called capital improvement maintenance. This is required either at the end of useful life or to improve the performance of the equipment.
- f) **Social Demand:** These activities include preparation for visiting dignitaries, or work on non organization equipment and facilities (charity work). Estimate the hours and material on these activities.
- g) **Expansion:** Any expansion in the size of facility, size of work force, addition of scope of control will expand the overall budget requirements. New facilities disrupt the current activities as well as taking direct time. Estimation of additional time and other resources is to be made.
- h) **Catastrophes:** Every part of the country has characteristic catastrophes. This can include flood, hurricane, fire etc. Add some labour hours and materials to the budget.

6.8 SUMMARY

Maintenance costing and budgeting is a planning and control technique to improve the functioning of maintenance department. The costing of the maintenance is best devised and operated on the basis that it is an accounting process administered through finance department but established in close collaboration with maintenance management so that their joint needs are met. Similarly the exercise of preparing budget must result from discussion between the maintenance management, the production management and the financial control.

In this unit, you have learned the importance and application of maintenance costing and budgeting and procedure to prepare them. A detailed discussion is presented to classify and apportion the costs related to maintenance management. An effective costing system and budget can improve not only the performance of maintenance department but also provide information for production department

6.9 SELF ASSESSMENT QUESTIONS

- a) Explain what is meant by cost absorption and cost apportionment? Illustrate each with two examples from maintenance department. Discuss the methods of cost absorption and state which method do you consider to be the best and why?
- b) What are the main sources of collection of maintenance cost? State the procedure with examples for collection of data from these sources.
- c) What is the importance of maintenance budgeting? Give the advantages of Zero Based Budget.

6.10 BIBLIOGRAPHY AND SUGGESTED READINGS

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