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OVERHEADS COST CONTROL: A STUDY

Dr. Suresh Kumar Rajora*

ABSTRACT

Large manufacturing establishments are being set up both in the private and public sectors. In these establishments, huge expenses of indirect nature are incurred for mass production. As a result, the cost of production in a modern unit is appreciably increasing. In many enterprises, overheads represent the second highest item of cost (after direct materials) incurred for production. This necessitates proper and effective accounting and control of overheads. It should be ensured that when the method of production does not undergo any change, there should not be any appreciable change in overheads[1]. In this paper, overheads cost control is discussed.

KEYWORDS: *Private and Public Sector, Control of Overheads, Large Manufacturing Establishments.*

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Introduction

Broadly speaking, any expenditure incurred over and above prime cost is known as overheads. Overheads have been defined in the Terminology as 'the total cost of indirect materials, indirect labour and indirect expenses'. The term 'indirect', in this connection, means that which cannot be allocated, but which can be apportioned[2] to, or absorbed by, cost centres or cost units.

In some cases, it is difficult to establish the distinction between overhead cost, on the one hand, and direct material and direct labour, on the other.-This is due to the fact that classification of a cost element into direct and indirect depends upon the nature of production, the size of the factory, the extent of automation, the degree of convenience, etc. For example, in one shoe factory, the cost of thread used may be treated as direct material cost by charging it to the cost of each pair of shoes manufactured while in another factory it may be treated as overheads; the management in the second factory may not consider it justified to have an elaborate system for identifying the costs to production units. Likewise, certain small labour operations may be treated as indirect labour in one factory as against direct labour treated in another.

Absorption of Overhead

After ascertaining total overhead-of production department, overhead of each production department is absorbed by units produced during the period. Here total overhead of production department, includes overhead allocated, overhead in primary apportionment and overhead in secondary apportionment[3],

- Absorption on the basis of figure of the previous year.
- Absorption on the basis of anticipated volume of production.
- Absorption on the basis of normal volume of output or capacity.

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* Assistant Professor, Department of ABST, Faculty of Commerce, Sri Sant Sundardas Govt. P.G. Girls College, Dausa, Rajasthan, India.

1 Polimeni,R.S., et.al.,Cost Accounting: Concepts and Application for managerial Decision Making (NewYork,McGraw-Hill), 2010,p.143

2 For distinction between 'allocation1 and 'apportionment' see p. 218.

3 Leonard and sasser,"The Incline of Quality," pp. 163-71.

Absorption of Factory Overhead

After ascertainment of prime cost, factory overheads are absorbed on a suitable basis which may depend upon quantity of goods produced or material used. It may be computed on the basis of percentage of different items of cost or on hourly rate basis.

- **Production Unit Method[1] :** In this method factory overhead per unit is computed by dividing total factory overhead by number of units produced during the period. This method is also known as units or output method. This method is suitable only if all units produced during the period are of the same type. Factory overhead per unit in this method is computed as follows:

$$\textbf{Factory overhead per unit} = \frac{\text{Total Factory Overhead}}{\text{Units Produced}}$$

- **On the Basis of Quantity of Material Consumed[2] :** In some factories, amount of factory overhead depends upon quantity of material processed for a particular job. For example, when utensils are produced in a press machine, it makes no difference whether utensils are of aluminum or steel as it takes same time to process one sheet. However, time consumed for finishing may be different. In such industries factory overhead can be absorbed on the basis of quantity of material used for a product. Factory overhead per unit of material can be computed as follows:

$$\textbf{Factory overhead per unit of material} = \frac{\text{Total Factory Overhead}}{\text{Quantity of Material}}$$

- **On the Basis of Percentage of Direct Material[3] :** Factory overhead can be absorbed as a fixed percentage of direct material. Percentage of direct material cost to factory overhead can be computed as follows :

$$\textbf{Factory overhead rate} = \frac{\text{Factory Overhead}}{\text{Cost of Direct Material}} \times 100$$

- **Percentage of Direct Labour Cost[4]:** In this method, rate of factory overhead is computed on the basis of direct wages with the help of following formula :

$$\textbf{Rate of Factory overhead} = \frac{\text{Factory Overhead}}{\text{Direct Wages}} \times 100$$

- **Percentage of Prime Cost[5]:** If material and wages, both are forming major part of cost, factory overhead can be absorbed on the basis of prime cost. In this method rate of factory overhead is computed as follows:

$$\textbf{Rate of Factory overhead} = \frac{\text{Factory Overhead}}{\text{Prime Cost}} \times 100$$

It is the combination of first two methods. Therefore, it has the same merits and demerits as are applicable for earlier two methods.

- **Labour Hour Rate[6] :** As factory overhead mainly relates to time used for a particular product, overheads are absorbed on the basis of labour hours for the period. In this method, sufficient records are maintained for man hours incurred for each job as well as for the period so that factory overheads may be absorbed on this basis. Labour hour rate is computed as follows :

$$\textbf{Factory overhead per man hour} = \frac{\text{Factory Overhead}}{\text{Man Hours}}$$

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1 John J. Bunch,Cost and Management Accounting,West Publishing Co., Saint Paul,2012
2 Michael Chatfield and Dewnis Neilson,Cost Accounting, Harcourt Brace Javanvich,2011
3 Pierre L. Titard, Managerial Accounting,Chicago: The Dryden Press,2010
4 T.Lucky, Management Accounting D.P. Publications,2012
5 Tulsian P.C., Cost Accounting, New Delhi ; S.Chand & Sons, 2010,pp.8.1
6 Banerjee Bhabatosh, Fundamentals of Cost Accounting,New Delhi, PHI,2010 pp189

This method is an improvement over percentage of wages method and it is having same merits and demerits as are applicable for it. This method is suitable only if wages is paid on the basis of time. This method is also known as production hour rate.

- **Machine Hour Rate Method[1]:** This method of absorption of overheads is used in those industries where goods are mainly produced by-machines. Machine hour rate is the cost of running a machine per hour. It is obtained by dividing the factory overheads by the number of machine hours as follows :

$$\textbf{Machine hour rate} = \frac{\text{Factory Overhead}}{\text{Machine hours}}$$

Following three types of information is required for the purpose of computing machine hour rate:

- **Standing Charges or Fixed Charges :** Expenses which are incurred for the department and which are not affected by the operation of machines are known as standing expenses, such as rent and rates, factory lighting and heating, insurance and taxes, indirect material, labour welfare expenses, lubricating oil, factory supervision, general factory expenses etc.
- **Machine Expenses[2] :** Machine expenses are those expenses which are directly related to operation of machines. For each type of machine expenses separate rate per hour is computed so that one can control cost of machine hour rate, if cost of any type of machine expenses is increased. It mainly includes three types of expenses, i.e. depreciation, power and repairs of machines which are discussed as follows :
  - **Depreciation:** Depreciation is a semi-variable cost as it depends upon use of machine and lapse of time but for computation of machine hour rate it is treated as variable cost. If machine hour rate is computed on the basis of machine hours for a month but rate of depreciation is given for a year then it should be converted into rate of depreciation p.m. or vice versa. If rate of depreciation is not given but cost of machine, scrap value of machine and working hours of machine for the life time of machine is given, rate of depreciation can be computed with the help of following formula :

$$\textbf{Depreciation per hour} = \frac{\text{Total investment - Scrap value of machine}}{\text{Number of hours during life time of machine}}$$

  - **Power Expenses:** Most of the machines are operated through electric power but If it is operated through fuel such as coal or diesel then cost of coal or diesel will be treated as variable cost. Power consumption per hour is computed by observing meter reading and then-multiplying by rate per unit of power. While computing total working machine hours for power consumption, hours consumed for machine repair & maintenance should be subtracted, as no power is consumed during repairs unless it is specifically mentioned.
  - **Repairs & Maintenance:** Cost of repairs and maintenance is also semi variable cost but while computing machine hour rate it is treated as variable cost. Per hour repairing charges is computed by dividing total repairing expenses by number of machine hours.
- **Normal Working Hours[3]:** It is essential to compute normal working hours for computation of standing charges per hour and cost of depreciation, power and repairs per hour. Normal working hours are also known as effective working hours. Effective working hours means number of hours for which a machine may normally be used for production work during a particular period in normal conditions. Sometimes, given working hours are per week while all types of expenses are given per month. In such a situation it may be assumed that there are four weeks in a month and accordingly working hours per month are calculated by multiplying weekly hours by 4. If all expenses are given for a year then weekly hours should be multiplied by 52 as there 52 weeks in a year. But, if it is given that there are 50 weeks in a year, then it should be multiplied by 50.

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1 Bion B. H oward & Miller Upton: Introduction to Business Finance, op. cit., p. 147

2 J.F. Weston and E.F. Brigham: Essential of Managerial Finance, op.cit., p. 48.

3 N.L.Hingorani,A.R. RamAnathan and T.S.G. Rewal, Op. cit.,p.127

Preparation of Statement Showing Machine Hour Rate

While preparing statement, at first standing charges are mentioned and standing cost per hour is computed by dividing total standing charges by normal working hours. After this cost per hour for each type of machine expenses is computed and total of standing charges per hour and cost per hour for each type of machine expenses is known as machine hour rate[1].

Suitability of Machine Hour Rate

It is a most scientific method for absorption of factory overhead where goods is mainly produced through machines. However, where many types of machines are used, there may be some problem in apportionment of different type of factory overhead on different machines.

Absorption of Administrative Overhead

Administration overheads cannot be absorbed as a percentage of direct material, .direct wages or prime cost because they are not related to administration overheads. Administration overheads may be absorbed on the following basis:

- **As a Percentage of Work Overheads [2]:** Following formula is used when administrative overheads are absorbed on the basis of works overhead:

  $$\textbf{Percentage of Absorption} = \frac{\text{Administrative Overhead}}{\text{Works Overhead}} \times 100$$

- **As a Percentage of Work Costs[3] :** Generally, administrative overheads are absorbed on the basis of works cost. Following formula is used for this purpose :

  $$\textbf{Percentage of Absorption} = \frac{\text{Administrative Overhead}}{\text{Works Cost}} \times 100$$

Absorption of Selling and Distribution Overheads

If selling and distribution overheads are very less in a concern, it is added in administrative overhead and in that case it is not absorbed separately. But, if it is of significant amount it may be absorbed by any of the following methods[4]:

- **As a Percentage of Selling Price:** Whenever, selling price is fixed or it can be estimated easily, selling and distribution overhead can be absorbed on the basis of estimated sales. Following formula is used for this purpose:

  $$\textbf{Percentage of Absorption} = \frac{\text{Selling \& Distribution Overhead}}{\text{Estimated Sales}} \times 100$$

- **Rate per Unit Sold:** If selling and distribution overheads mainly depend upon number of units sold instead of sales in Rs.. it can be absorbed on the basis of estimated number of units sold as follows :

  $$\textbf{Rate of Absorption} = \frac{\text{Selling \& Distribution Overhead}}{\text{Estimated Number of units Sold}}$$

- **Percentage on Works Cost or Cost of Production:** It is an easy method in which selling overhead can be absorbed as a percentage of works costs or cost of production, It can be computed with the help of following formula:

  $$\textbf{Percentage of Absorption} = \frac{\text{Selling \& Distribution Overhead}}{\text{Works Cost}} \times 100$$

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1 J.C. Van Home, Cost Accounting and Policy,op.cit.,p.726

2 M.Y. Khan and P.K. Jain , Cost Accounting, (New Delhi: Tata Mc Graw Hill Publishing Co. Ltd., 2012)p.239

3 G. Taguchi and Y. Wu, Introduction to off-line Quality Control (Nagoya, Japan: Central Japan Quality Control Association,2012).

4 "Managing Quality Improvement," Statement on Mangement Accounting No.4-R (Montvale, NJ: Institute of Management Accountants,2011),pp.10-12

Conclusion

- **Interest should not be treated as part of cost rather percentage of profit should be increased to include interest:** Interest should not be treated as a part of cost as it will increase burden of cost accountant.
- **If it is included, real as well as implied interest should be included as part of cost:** To compare cost of one concern from another concern having different capital structure, it is better if interest of borrowed capital as well as owned capital is treated as a part of cost.
- **It should be considered in decision making:** While taking decisions related to make or buy and production through man or machine, interest should be treated as a part of cost otherwise correct decision will not be taken. So, even if interest is not considered at the time of ascertaining cost per unit, it should always be considered in decision making.

Over Absorption and Under Absorption of Overhead

As mentioned earlier, in cost books, generally absorption costing method or full costing method is followed. In this method overheads are absorbed on a predecided basis. If overhead absorbed during a period is less than actual overhead it is known as under absorption of overhead but if overhead absorbed during a period is more than actual overhead it is known over absorption of the overhead.

Causes of Over Absorption and Under Absorption

Overheads are absorbed on a suitable basis which is generally units produced during a .period so if there is any change in number of units produced during a period, in total amount of overhead or both, there will be a difference between overhead absorbed during the period and actual overhead. There may be various reasons for it which are as follows:

- **Actual expenditure is less or more than expected expenditure:** If actual expenditure is less than expected expenditure, then there will be a situation of over absorption and if actual expenditure is more than expected expenditure, then there will be a situation of under absorption of overhead.
- **Actual production is less or more than expected production:** If actual production is less than expected production then less overhead will be absorbed and if actual production is more than expected production then more overhead will be absorbed causing under absorption or over absorption respectively.
- **Inappropriate method of absorption of overhead:** If overheads are absorbed on a basis which is not much related to actual production during the year then there may arise a situation of under absorption or\over absorption even if there is not much change in the level of production[1].
- **Change in mix of different types of products:** It may be possible that total number of units produced during a period is same as planned earlier but there is change in mix of different products out of which some are consuming more time and others are consuming less time then there may arise a situation of under absorption or over absorption of overhead.

Treatment of Over and Under Absorption in Cost Accounts

There may be following three alternatives for treatment of over and under absorption in cost accounts:

- **Transferring balance in profit and loss account:** If amount of under absorption or over absorption of overhead is less, it can be transferred to costing profit and loss account without affecting cost of the products produced during the period.
- **Transfer its balance from one period to another:** It is preferred in seasonal industry where production in the months of off season is quite less compared to production in the months of full season such as in case of industry manufacturing products for winter or summer. In this method debit balance (under absorption of overhead) of one or more months is automatically adjusted with the credit balance (over absorption of overhead) in the months of full season[2].

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1 James Jiambalvo, Managerial Accounting, John Wiley and Sons, New York,2011

2 John. K. Shank and Vijay Govindrajan, Strategic cost Management, Free Press,2011

- **Use of Supplementary Rate:** When under absorption or over absorption of overhead is due to change in amount of "expenditure or wrong computation of overhead absorption rate, a supplementary rate of overhead is charged on units produced during the year. It should be noted that after applying supplementary rate overhead charged for the period are just equal to historical cost of the production so full benefit of cost accounts is not obtained. If there is a case of over absorption of overhead, supplementary rate will be negative otherwise it will be positive.

Analysis of Factory Overhead

The factory overhead incurred by the companies under study has been shown in the following Table 1

Table 1: Factory Overhead in Selected Public and Private Sector Companies under study (From 2007-08 to 2011-12)

(Rs. in Crore)

Years	Public Sector		Private Sector	
	BHEL	SAIL	Tata Steel	L & T
2007-08	5586.58	16198.38	9215.55	9338.70
2008-09	6074.56	16664.53	10303.48	12885.09
2009-10	7815.28	14568.86	10366.04	14813.71
2010-11	8265.90	14205.61	12085.99	17776.15
2011-12	9875.48	15833.57	14433.21	20910.05
Average	7525.96	15494.19	11280.85	15144.74
S.D.	1730.92	1060.36	2039.80	4446.59
C.V. (%)	23.00	6.84	18.08	29.36

Source: Annual Reports and Accounts of Selected Companies under study (From 2007-08 to 2011-12)

Table 1 shows the amount of factory overheads incurred in the selected companies of public and private sector companies under study. It can be understood from the above table that the amount of factory overheads in **BHEL** showed an increasing trend during the whole period under study. The amount of factory overheads during the year 2007-08 was Rs.5586.58 crores which continuously kept on increasing and reached to Rs. 9875.48 crores in 2011-12. The average of the factory overheads for the period of study was Rs. 7525.96 crores with standard deviation as Rs. 1730.92 crores. The coefficient of variation was 23 percent denoting a moderate fluctuating trend. However, it is suggested that the management of the company should try to control the increasing trend of the factory overheads and reduce the amount of indirect factory expenses.

SAIL

The factory overheads in SAIL showed a fluctuating trend during the period of study and fluctuated within the range of Rs. 16664.53 crores in 2008-09 to Rs. 14205.61 crores in 2010-11. The average of the factory overheads was Rs. 15494.19 crores with the standard deviation as Rs. 1060.36 crores. The coefficient of variation was 6.84 percent denoting a consistent trend. Though the management of the company has tried to control the factory overheads but, however, it is suggested that the management of the company should try to control the increasing trend of the factory overheads and keep the cost of production under control.

TATA STEEL

In Tata Steel the factory overheads showed an increasing trend throughout the period under study. The amount of factory overheads during the year 2007-08 was Rs. 9215.55 crores which kept on increasing and increased to Rs. 14433.21 crores in 2011-12. The average of the factory overheads was Rs.11280.85 crores with the standard deviation as Rs. 2039.80 crores. The coefficient of variation was 18.08 percent denoting a consistent trend but this consistency should be maintained after controlling the increasing trend of factory overheads.

L&T

The factory overheads in L&T also showed an increasing trend during the whole period of study. The factory overheads which were Rs. 9328.70 crores in the year 2007-08 increased to Rs. 20910.05 crores in 2011-12. The average of the factory overheads for the period of study was Rs. 15144.74 crores with standard deviation as Rs. 4446.59 crores. The coefficient of variation was 29.36 percent showing a fluctuating trend which should be kept under control. Though the production of L&T showed an increasing

trend but the factory overheads come under controllable cost. Therefore, it is suggested that the management of the company should try to control the increasing trend of factory overheads and reduce the amount of factory overheads. An overall comparison of factory overheads among all the companies under study shows that the factory overheads showed an increasing trend for all the companies under study except in SAIL. To control the cost of production, it is suggested that the management of all the companies should try to control the increasing trend of factory overheads to reduce the cost of production.

Test of Significance for the Average of Factory Overheads among the Companies under Study

To test the significance of the average of the factory overheads, t test has been applied and the following hypotheses have been formulated

- **Null Hypothesis (H_o)** There is no significant difference in the mean values of factory overheads of the companies under study.
- **Alternative Hypothesis (H_a)**: There is a significant difference in the mean values of factory overheads of the companies under study.

For the purpose of carrying out the t test the comparison has been done in the following manner

- **Between BHEL and SAIL**

  Computed value of t =8.77

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: Since the computed value of t is more than the critical value of t at 5 percent level of significance, hence the null hypothesis is rejected and it can be concluded that the difference in the mean values of factory overheads of BHEL and SAIL is significant.

- **Between BHEL and Tata Steel**

  Computed value of t = 3.14

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: As the computed value of t is greater than the critical value of t at 5 percent level of significance, hence there is no evidence of accepting the null hypothesis. Therefore, the alternative hypothesis is accepted and it is concluded that the difference in the mean values of factory overheads between BHEL and SAIL is significant.

- **Between BHEL and L&T**

  Computed value of t = 3.57

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: The calculated value of t (3.57) is more than the table value of t (2.306) at 5 percent level of significance. Therefore, the null hypothesis is rejected and it may be concluded that the difference in the average values of factory overheads between BHEL and L&T is significant.

- **Between SAIL and Tata Steel**

  Computed value of t = 4.10

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: The null hypothesis is rejected because the computed value of t is more than the table value at 5 percent level of significance. Hence, the alternative hypothesis is accepted and it is concluded that the difference between the mean values of factory overheads of SAIL and Tata Steel is significant.

- **Between SAIL and L&T**

  Computed value of t = 0.17

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: As the computed value of t is less than the critical value of t at 5 percent level of significance, hence the null hypothesis is accepted and it is concluded that the difference between the mean values of factory overheads of SAIL and L&T is not significant.

- **Between Tata Steel and L&T**

  Computed value of t = 1.77

  Critical value of at 5 percent level of significance (for V=8) is 2.306

  Decision: Since the computed value of t is less than the critical value of t at 5 percent level of significance, hence the null hypothesis is accepted and it is concluded that the difference in the mean values of factory overheads of Tata Steel and L&T is not significant.

Test of Significance of the Variance of Factory Overheads of the Companies under study (F Test)

Two way F test has been applied to find whether the difference in the prime cost the companies under study differs significantly. For this purpose following hypotheses have been tested

- **Null Hypothesis(H_o):** There is no significant difference in the factory overheads between the companies under study
- **Null Hypothesis (H_o):** There is no significant difference in the factory overheads within the companies under study.

Table 2: ANOVA Table

Source	Sum	Degree of Freedom (d.f.)	Variance (Sum /d.f)	F Ratio
Between Companies (SSC)	219.39	(c-1)=(4-1)=3	70.13	F= 16.27 (Between Companies)
Within Companies(SSR)	60.48	(r-1)=(5-1)=4	15.12	F= 3.50 (Within Companies)
Error	51.76	(c-1)(r-1)=12	4.31	

- **F Test Between the Companies**

$$F = \frac{\text{Higher Variance}}{\text{Smaller Variance}} = \frac{70.13}{4.31} = 16.27$$

Critical value of F at 5 percent level of significance (for V1=3 & V2=12) =3.49

Decision: As the computed value of F is more than the critical value of F at 5 percent level of significance, hence the null hypothesis is rejected and it is concluded that the difference in the factory overheads between the companies under study is significant.

- **F Test Within the Companies**

$$F = \frac{\text{Higher Variance}}{\text{Smaller Variance}} = \frac{15.12}{4.31} = 3.50$$

Critical value of F at 5 percent level of significance (for V1=4 & V2=12)=3.26

Decision: Since the computed value of F is greater than the table value of F at 5 percent level of significance. Therefore, the null hypothesis is rejected and alternative hypothesis is accepted and it is hereby concluded that the difference in the factory overheads within the companies under study is significant.

Analysis of Works Cost: Table 3 shows the works cost in the companies under study.

Table 3: Works Cost in Selected Public and Private Sector Companies under study (From 2007-08 to 2011-12)

(Rs. in Crore)

Years	Public Sector		Private Sector	
	BHEL	SAIL	Tata Steel	L & T
2007-08	17030.63	37021.82	14704.93	21275.34
2008-09	22649.89	43857.53	18613.30	28907.63
2009-10	29146.08	35919.20	18294.35	31424.62
2010-11	32551.55	41078.23	21309.19	37291.57
2011-12	38600.02	45420.85	26243.10	46288.14
Average	27995.63	40659.52	19832.97	33037.46
S.D.	8416.37	4146.57	4284.29	9376.59
C.V. (%)	30.06	10.20	21.60	28.38

Source: Annual Reports and Accounts of Selected Companies under study (From 2007-08 to 2011-12)

It can be noted from the above table that the works cost of **BHEL** showed an increasing trend during the whole period of study and fluctuated within the range of Rs. 38600.02 crores in 2011-12 to Rs. 17030.63 crores in 2007-08. The increasing trend of the works cost was mainly due to the increasing level of production. The works cost is the sum of prime cost and factory overheads. The average of works cost in BHEL was Rs. 27995.63 crores which cannot be regarded higher considering the increased production. However, it can be suggested that the management of the company should try to control the indirect expenses being incurred in the factory. The standard deviation was Rs.8416.37 crores with coefficient of variation as 30.06 percent indicating a fluctuating trend which should be controlled by the management of the company.

SAIL

It can be noted from the above table that the works cost of SAIL showed a fluctuating trend during the whole period of study because of fluctuating trend of the production in the company and the works cost fluctuated accordingly. During the year 2007-08 the works cost was Rs. 37021.82 crores increased to Rs.43857.53 crores in 2008-09 but decreased to Rs. 35919.20 crores in 2009-10. The works cost increased to Rs. 41078.23 crores in 2010-11 and further to Rs. 45420.85 crores in 2011-12. The average works cost amount to Rs. 40659.52 crores with the standard deviation of Rs. 4146.57 crores. The coefficient of variation was 10.20 percent showing a consistent trend of the works cost. However, it is suggested that the factory overheads should be kept under control by the company to reduce the cost of production.

TATA STEEL

The works cost in Tata Steel registered an increasing trend throughout the period under study except in the year 2009-10 and fluctuated within the range of Rs. 26243.10 crores in 2011-12 to Rs. 14704.93 crores in 2007-08. The increasing trend of the works cost because of the increasing level of the production. The average of the works cost of Tata Steel was Rs. 19832.97 crores with the standard deviation of Rs. 4284.29 crores. The coefficient of variation was 21.60 percent denoting a fluctuating trend because of the increasing trend of the works cost.

L&T

The works cost in L&T showed an increasing trend during the period of study and varied within the range of Rs. 46288.14 crores in 2011-12 to Rs. 21295.34 crores in 2007-08. It should be noted here that the factory overheads showed an increasing trend because of increasing production but the amount of works overheads also showed an abnormal increasing trend and the miscellaneous expenses of factory showed an abnormal increase. The average of the works cost of the company was Rs. 33037.46 crores with the standard deviation of Rs. 9376.59 crores. The coefficient of variation of the works cost was 28.38 percent indicating a fluctuating trend which should be kept under control by the management of the company. It is further suggested that the management of the company should try to keep works overheads under control to reduce the cost of production.

An overall analysis of the works cost of all the companies under study reveals that it showed an increasing trend during the whole period of study except SAIL. The average works cost was highest for SAIL at Rs. 40659.52 crores followed by L&T at Rs.33037.46 crores, BHEL at Rs. 27995.63 crores and Tata Steel at Rs. 19832.97 crores. The fluctuations in works cost were highest for BHEL as the coefficient of variation was 30.06 percent followed by L&T, Tata Steel and SAIL. It is suggested that the management of all the companies under study should try to reduce the works cost by controlling the factory overheads.

Test of Significance for the Average Amount of Works Cost of the Companies under Study:

To test the significance of the average amount of works cost of the companies under study, t test has been applied and the following hypotheses have been formulated and tested-

- **Null Hypothesis (H_o)**: There is no significant difference in the mean values of works cost of the companies under study.
- **Alternative Hypothesis (H_a):** There is a significant difference in the mean values of works cost of the companies under study.

For the purpose of carrying out the t test the comparison has been done in the following manner

- **Between BHEL and SAIL**

  Computed value of t =3.02

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: Since the computed value of t is more than the critical value of t at 5 percent level of significance, hence the null hypothesis is rejected and it can be concluded that the difference in the mean values of works cost between BHEL and SAIL is significant.

- **Between BHEL and Tata Steel**

  Computed value of t = 0.98

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: As the computed value of t is less than the critical value of t at 5 percent level of significance, hence there is no evidence of rejecting the null hypothesis. Therefore, null hypothesis is accepted and it is concluded that the difference in the mean values of works cost between BHEL and SAIL is not significant.

- **Between BHEL and L&T**

  Computed value of t = 0.89

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: The calculated value of t (0.89) is less than the table value of t (2.306) at 5 percent level of significance. Therefore, the null hypothesis is accepted and it may be concluded that the difference in the average of values works cost between BHEL and L&T is insignificant.

- **Between SAIL and Tata Steel**

  Computed value of t = 7.81

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: The null hypothesis is rejected because the computed value of t is more than the table value at 5 percent level of significance. Hence, the alternative hypothesis is accepted and it is concluded that the difference between the mean values of works cost of SAIL and Tata Steel is significant.

- **Between SAIL and L&T**

  Computed value of t = 1.66

  Critical value of t at 5 percent level of significance (for V=8) is 2.306

  Decision: As the computed value of t is less than the critical value of t at 5 percent level of significance, hence the null hypothesis is accepted and it is concluded that the difference between the mean values of works cost of SAIL and L&T is not significant.

- **Between Tata Steel and L&T**

  Computed value of t = 2.86

  Critical value of at 5 percent level of significance (for V=8) is 2.306

  Decision: Since the computed value of t is more than the critical value of t at 5 percent level of significance, hence the null hypothesis is rejected and it is concluded that the difference in the mean values of works cost between Tata Steel and L&T is significant.

Test of Significance of the Variance of Works Cost of the Companies under study (F Test)

Two ways F test has been applied to find whether the difference in the amount of works cost of the companies under study differs significantly. For this purpose following hypotheses have been tested

- **Null Hypothesis(H_o):** There is no significant difference in the works cost between the companies under study
- **Null Hypothesis (H_o):** There is no significant difference in the works cost within the companies under study.

Table 4: ANOVA Table

Source	Sum	Degree of Freedom (d.f.)	Variance (Sum /d.f)	F Ratio
Between Companies (SSC)	3.89	(c-1)=(4-1)=3	1.30	F= 2.31 (Between Companies)
Within Companies(SSR)	5.98	(r-1)=(5-1)=4	1.50	F= 2.67 (Within Companies)
Error	6.71	(c-1)(r-1)=12	0.56	

- **F Test between the Companies**

$$F = \frac{\text{Higher Variance}}{\text{Smaller Variance}} = \frac{1.30}{0.56} = 2.31$$

Critical value of F at 5 percent level of significance (for V1=3 & V2=12) =3.49

Decision: As the computed value of F is less than the critical value of F at 5 percent level of significance, hence the null hypothesis is accepted and it is concluded that the difference in the amount of works cost between the companies under study is not significant.

- **F Test Within the Companies**

$$F = \frac{\text{Higher Variance}}{\text{Smaller Variance}} = \frac{1.50}{0.56} = 2.67$$

Critical value of F at 5 percent level of significance (for V1=4 & V2=12)=3.26

Decision: Since the computed value of F is less than the table value of F at 5 percent level of significance. Therefore, the null hypothesis is accepted and alternative hypothesis is rejected and it is hereby concluded that the difference in the amount of works cost within the companies under study is not significant.

References

⇒ Anthony, Robert N., and Vijay Govindarajan. Management Control Systems. Chicago: Irwin, 1997.

⇒ Cooper, Robin, and Robert S. Kaplan. The Design of Cost Management Systems. Upper Saddle River, NJ: Prentice Hall, 1998.

⇒ Cooper, Robin, and Regine Slagmulder. "Micro-Profit Centers." Management Accounting, June 1998.

⇒ Hamilton, Martha M. "Who's Chainsawed Now? Dunlap Out as Sunbeam's Losses Mount." Washington Post, 16 June 1998. Rotch, William, et al. Cases in Management Accounting and Control Systems. 3rd ed. Englewood Cliffs, NJ: Prentice Hall, 1995.

⇒ Shank, John K., and Vijay Govindarajan. Strategic Cost Management. New York: Free Press, 1993.

⇒ Readmore: https://www.referenceforbusiness.com/encyclopedia/Cos-Des/Cost-Control.html#ixzz5vXIMG68E

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