COST ANALYSIS IN IRON AND STEEL INDUSTRY IN INDIA
(A Comparative Study of SAIL & Tata Steel)

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Abstract :

Cost analysis has a key role to play in business economics as every business decision almost involves a comparison between costs and returns.

Heavy industrialisation and large scale production have, by and large, made the competition tough and tight. It is of utmost importance, therefore for a company not only increase its sales but also to ensure that its operations relating to production, administration and Sales are economical. Keen competition in international markets makes it imperative to minimize the cost of operation so as to make the exports feasible and more profitable.

The cost analysis approach is thus a necessary device which enables the company to detect and foresee the sources of waste and cost escalation in respect of production and marketing. This provides a vital information for the company's management for effective control over the day to day operations.

Keywords : Costs, Cost analysis, SAIL, Tata Steel, resources, profitability, cost control, efficiency etc.

1. INTRODUCTION :

Cost analysis is a process of identifying, measuring, comparing, and interpreting costs related with various activities in a business. This key financial tool provides break down of costs, helping organizations, understand how their resoruces are allocated and used.

It assesses the costs and benefits of a business decision, project or service. It helps businesses make enlightened decisions about production, pricing and investment.

2. OBJECTIVES OF THE STUDY :

* To identify, measure and record costs to help with decision making, control costs and determine profitability.
* To calculate the costs of a business's products or services and to use their information to make conclusions.
* To provide organizations with a broad understanding of their costs and cost drivers.
* To control on cost through identify and reduce unnecessary expenses.

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* Recognize and apply cost control measures across materials, labours and overheads to achieve economics in operations.

3. METHODOLOGY :

The primary purpose of present study has been to obtain a deep insight and full familiarity with the costs of the companies of steel industry in India. India is among the top producers of all forms of steel in the world. The present study is based on the secondary data i.e. money control.com, annual reports of the companies, books, journals, subject related websites etc. A five yearly period commencing from 2019-20 to 2023-24 has been taken. There are two major units of Iron and Steel Industry in India. One is Steel Authority of India Ltd. (SAIL) in public sector and the other one is Tata Steel in private sector have been selected for the purpose of the study.

With the help of the data comprised in the financial statements Cost analysis tables have been prepared. Various techniques of financial statement analysis were applied and conclusions have been drawn after interpreting the analysed data. In support of the findings and conclusions statistical techniques have also been used. Hypothesis has been tested by using '*t*' test.

With the help of conclusions drawn, suitable, significant and useful suggestions have been made to optimize costs and improve profitability.

4. SIGNIFICANCE OF THE STUDY :

* It helps businesses make best decisions about their projects, products and services.
* It helps businesses know their costs, recognize inefficiencies and find ways to save money.
* It helps decision makers make informed choices about how to allocate resources.
* It helps determine how much to charge for a product or service.
* It helps businesses find ways to less costs and increase profitability.
* It helps firms and governments decide whether to invest in a project or program.

5. COST ANALYSIS OF IRON AND STEEL INDUSTRY IN INDIA:

The cost trends of major iron and steel units 'SAIL' and 'Tata Steel' have been studied under the heads Raw Materials Consumed, Employee Benefit Expenses, Finance Cost, Depreciation AND Amortisiation Expenses, Other Expenses. The expenditure on each item of cost and the percentage that each item bears to the total cost have been calculated for the period of study from 2019-20 to 2023-24 in table-1 and table-2.

5.1 Raw Materials Consumed :

Iron are, Coal Coke, Lime Stone, Dolomite, Manganese, Chromite and other raw materials are used in producing Iron and Steel.

Table-1
TOTAL COST OF GOODS SOLD IN SAIL
(2019-20 to 2023-24)

(Rs. in Crores)*

Items	2019-20	2020-21	2021-22	2022-23	2023-24
Raw Materials Consumed	23657.05 (40.30)	27404.75 (43.29)	42491.47 (48.22)	56930.96 (55.05)	54265.92 (53.20)
Employee Benefit Expenses	8781.32 (14.96)	10445.94 (16.50)	12846.24 (14.58)	12053.62 (11.65)	11747.92 (11.52)
Finance Cost	3486.76 (05.94)	2817.14 (04.45)	1697.88 (01.93)	2037.47 (01.97)	2473.81 (02.43)
Depreciation and Amortisiation Expenses	3755.05 (06.40)	4102.00 (06.48)	4274.17 (04.85)	4962.52 (04.80)	5277.45 (05.17)
Other Expenses	19023.17 (32.40)	18531.28 (29.28)	26813.46 (30.42)	27438.71 (26.53)	28229.04 (27.68)
Total Cost	58703.35 (100.00)	63301.11 (100.00)	88123.22 (100.00)	103423.28 (100.00)	101994.14 (100.00)

Source : Annual Reports and Accounts of SAIL, 2019-20 to 2023-24

***** Figures in parenthesis show the percentages of respective items taking the respective total cost as hundred.

Table-2
TOTAL COST OF GOODS SOLD IN TATA STEEL
(2019-20 to 2023-24)

(Rs. in Crores)*

Items	2019-20	2020-21	2021-22	2022-23	2023-24
Raw Materials Consumed	18405.73 (33.96)	24622.44 (36.03)	37525.14 (42.35)	60336.74 (52.44)	58090.63 (47.50)
Employee Benefit Expenses	5036.22 (09.29)	5741.94 (08.40)	6365.80 (07.18)	6616.29 (05.75)	7402.31 (06.05)
Finance Cost	3031.01 (05.59)	4541.02 (06.65)	2792.08 (03.15)	3792.14 (03.30)	4178.61 (03.42)
Depreciation and Amortisiation Expenses	3920.12 (07.23)	5469.26 (08.00)	5463.69 (06.17)	5434.61 (04.72)	5969.79 (04.88)
Other Expenses	23803.18 (43.93)	27966.07 (40.92)	36458.65 (41.15)	38870.96 (33.79)	46648.71 (38.15)
Total Cost	54196.26 (100.00)	68340.73 (100.00)	88605.36 (100.00)	11505.74 (100.00)	12290.05 (100.00)

Source : Annual Reports and Accounts of Tata Steel, 2019-20 to 2023-24
***** Figures in parenthesis show the percentages of respective items taking the respective total cost as hundred.

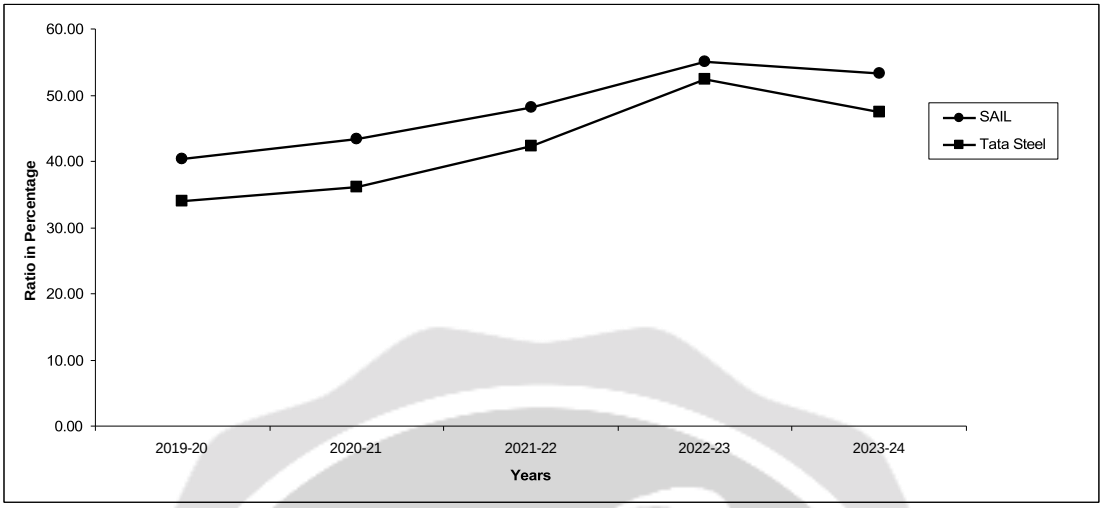
Table-3
Proportion of Raw Materials Consumed to Total Cost
(2019-20 to 2023-24)

(in Percentage)

Year	SAIL	TATA STEEL
2019-20	40.30	33.96
2020-21	43.29	36.03
2021-22	48.22	42.35
2022-23	55.05	52.44
2023-24	53.20	47.50
Average	**48.01**	**42.45**
SD	**5.62**	**6.90**
C.V. (%)	**11.71**	**16.25**

Source : Author's own calculation

Proportion of Raw Materials to total Cost
(2019-20 to 2023-24)



Inference :

In SAIL, it can be noted from the above table-3 that the proportion of raw materials to total cost showed an increasing trend during the period of study except 2023-24. The raw materials ratio was 40.30 percent in 2019-20 which constantly kept an increasing trend and came upto 55.05 percent in 2022-23. At last it came down to 53.20 percent in 2023-24.

There was an increase of the proportion of raw materials in 202-21 to 2022-23 due to global economic uncertainties; energy crisis; inflationary pressures; interest rate hikes; pandemic restrictions, volatility of steel prices and foreign fluctuation risks etc.

There was a decrease of 1.85 percent in 2023-24 in the proportion of raw materials due to lower iron ore and metallurgical coal costs; efforts to improve capacity utilization; geopolitical factors and supply chain disruptions etc.

In Tata Steel, the proportion of raw materials to total cost showed an increasing trend during the period of study except 2023-24. It was 33.96 percent in 2019-20 which constantly keep an increasing trend and came up to 52.44 percent in 2022-23. At last it came down to 47.50 percent in 2023-24.

Increase in proportion of raw materials in 2020-21 to 2022-23 due to Global economic conditions, some raw materials prices increased and supply chain disruptions etc.

There was a decrease in the proportion of raw materials in 2023-24 due to reduced demand; increase production; reduced procurement from Russia; energy efficiency improvements etc.

Average proportion of the raw materials was higher in SAIL than Tata Steel. The coefficient of variation in SAIL was 11.71 percent while in Tata Steel was 16.25 percent which shows that SAIL is more consistent in raw material ratio.

Test of Significance (‘*t*’ – Test)

Null Hypothesis (H_o) : There is no significant difference in the proportion of raw materials to total cost of the companies under study.

Computed value of ‘*t*’ = 1.39
Degree of Freedom (v) = 5 + 5 – 2 = 8

Critical value of ‘*t*’ at 5 percent level of significance (for v = 9) is 2.31

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 can be concluded that there is no difference in the proportion of raw materials to total cost of the companies under the study. In other words both the companies are same as regards the proportion of raw materials to total cost.

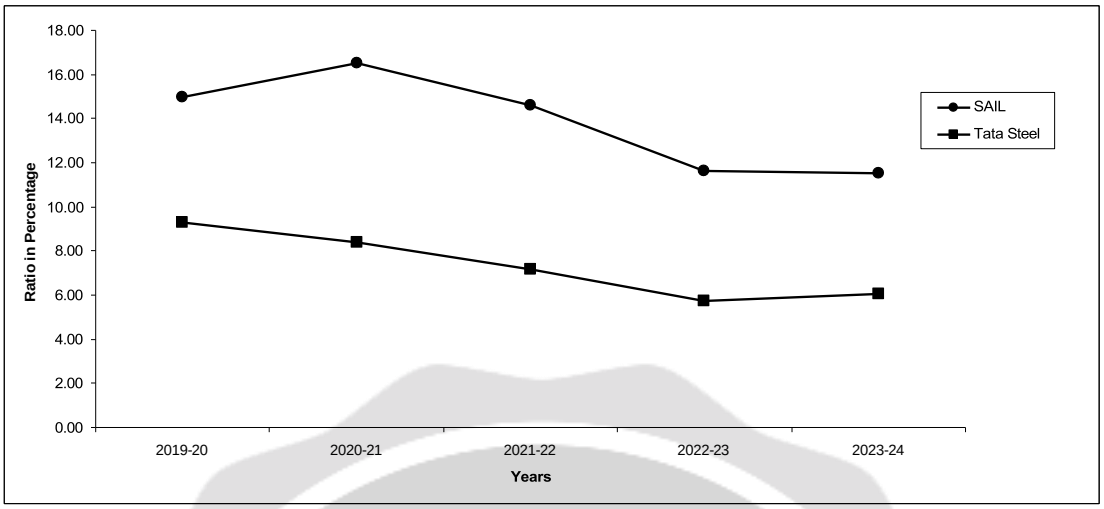
Table-4
Proportion of Employee Benefit Expenses to Total Cost
(2019-20 to 2023-24)

(in Percentage)

Year	SAIL	TATA STEEL
2019-20	14.96	9.29
2020-21	16.50	8.40
2021-22	14.58	7.18
2022-23	11.65	5.75
2023-24	11.52	6.05
Average	**13.84**	**7.33**
SD	**1.95**	**1.35**
C.V. (%)	**14.08**	**18.41**

Source : Author’s own calculation

Proportion of Employee Benefit Expenses to Total Cost (2019-20 to 2023-24)



Inference :

In SAIL the Proportion of employee benefit expenses to total cost showed decreasing trend during the period of study except 2020-21. The proportion was 14.96 percent in 2019-20 which increased to 16.50 percent in 2020-21 due to wages revisions, enhanced performance incentives, increased pension liabilities and potential pandemic – related support provided. Further it decreased to 14.58 percent in 2021- 22, 11.65 percent in 2022-23, 11.52 percent in 2023-24 due to reduced work force size, cost – cutting measures and improved operational efficiency etc.

In Tata Steel, the proportion of employees benefit expenses to total cost also showed decreasing trend during the period of study except 2023-24. The proportion was 9.29 percent in 2019-20 which decreased to 8.40 percent in 2020-21, 7.18 percent in 2021-22, 5.75 percent in 2022-23. Decrease in 2020-21 due to reduced work force, in 2021-22 due to a transformation program that generated savings across multiple initiatives in 2022-23 due to global economic volatility that impacted the steel industry.

At last, the proportion increased to 6.05 percent in 2023-24 due to expansion projects, higher salary revisions to attract and retain talent, rising health care costs, additional employee welfare programs, and potential government mandated benefits implemented.

Average proportion was higher in SAIL than Tata Steel. Coefficient of variation was higher in Tata Steel than SAIL gives on idea that the variation was higher in Tata Steel.

Test of Significance (*'t'* – Test)

Null Hypothesis (H_o) : There is no significant difference in the proportion of employee benefit expenses to total cost of the companies under study.

Computed value of '*t'* = 6.13
Critical value of '*t*' at 5 percent level of significance = 2.31

Decision :

Since the computed value of '*t*' is more than the critical value of '*t*', hence the null hypothesis is rejected and it is concluded that there is a significant difference in the proportion of employee benefit expenses to total cost of the companies under study.

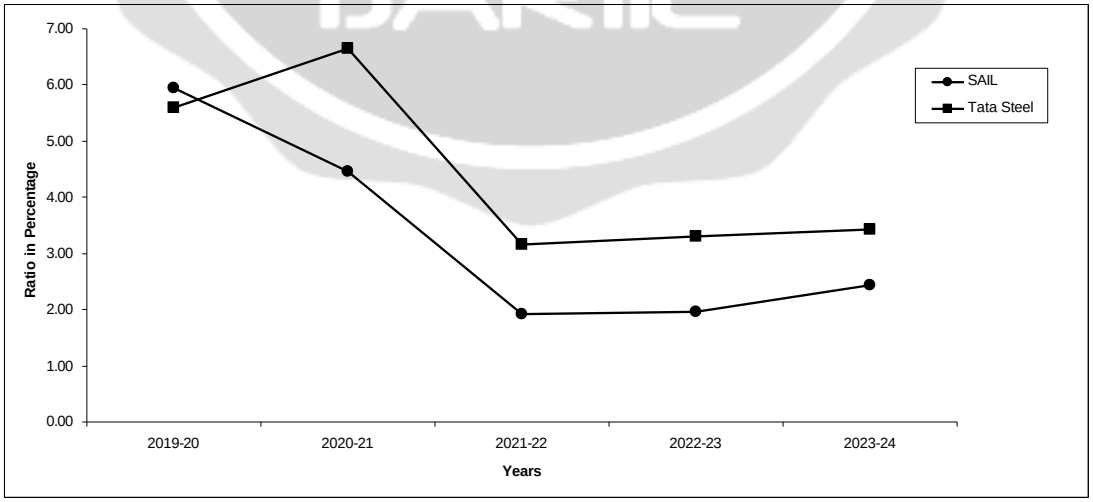
Table-5
Proportion of Finance Cost to Total Cost
(2019-20 to 2023-24)

(in Percentage)

Year	SAIL	TATA STEEL
2019-20	5.94	5.59
2020-21	4.45	6.65
2021-22	1.93	3.15
2022-23	1.97	3.30
2023-24	2.43	3.42
Average	**3.34**	**4.42**
SD	**1.59**	**1.42**
C.V. (%)	**47.60**	**32.12**

Source : Author's own calculation

Proportion of Finance Cost to Total Cost
(2019-20 to 2023-24)



Inference :

In SAIL the Proportion of finance cost to total cost showed fluctuating trend during the study period. It was 5.94 percent in 2019-20 which decreased to 4.45 percent in 2021-22 due to improving operational efficiencies and reducing inventory levels. It again came down to 1.93 percent in 2021-22 due to a reduction in current and long term debt.

It increased to 1.97 percent in 2022-23 and 2.43 percent in 2023-24 due to inflationary pressures, supply chain disruptions and interest rate hikes.

In Tata Steel, the proportion of finance cost to total cost also showed fluctuating trend. It was 5.59 percent in 2019-20 which increased to 6.65 percent in 2020-21 due to higher amortization of loan issue expenses and other long term liabilities. It decreased to 3.15 percent in 2021-22 due to better inventory management, faster collection from debtors, and extended credit period from suppliers etc. It increased to 3.30 percent in 2022-23 and 3.42 percent in 2023-24 due to higher energy costs, raw material price volatility and capital allocation for growth etc.

Average proportion was higher in Tata Steel than SAIL. Coefficient of variation was higher in SAIL. It showed higher variation in SAIL than Tata Steel.

Test of Significance (‘*t*’ – Test)

Null Hypothesis (H_o) : There is no significant difference in the proportion of finance cost to total cost of the companies under study.

Computed value of ‘*t*’ = 1.13
Critical value of ‘*t*’ at 5 percent level of significance = 2.31

Decision :

Since the computed value of ‘*t*’ is less than the critical value of ‘*t*’, hence the null hypothesis is accepted and it can be concluded that there is no significant difference in the proportion of finance cost to total cost of the companies under study.

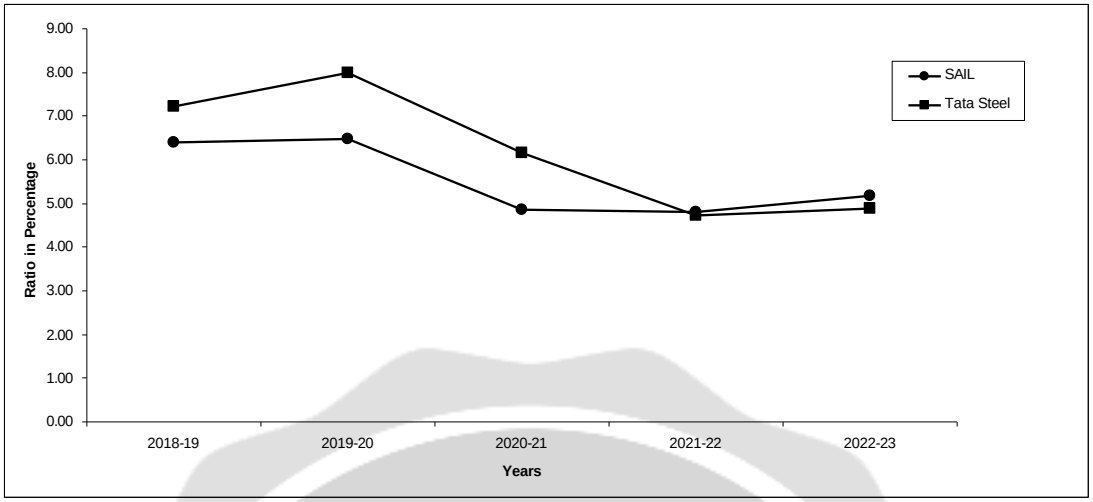
Table-6
Proportion of Depreciation and Amortisation Expenses to Total Cost
(2019-20 to 2023-24)

(in Percentage)

Year	SAIL	TATA STEEL
2019-20	6.40	7.23
2020-21	6.48	8.00
2021-22	4.85	6.17
2022-23	4.80	4.72
2023-24	5.17	4.88
Average	**5.54**	**6.20**
SD	**0.55**	**1.28**
C.V. (%)	**9.92**	**20.64**

Source : Author’s own calculation

Proportion of Depreciation and Amortisation Expenses to Total Cost (2019-20 to 2023-24)



Inference :

In SAIL, the proportion of depreciation and amortisation expenses to total cost showed fluctuating trend during the study period. It was 6.40 percent in 2019-20 which increased to 6.48 percent in 2020-21. It decreased to 4.85 percent in 2021-22, 4.80 percent in 2022-23. At last it increased to 5.17 percent due to geopolitical factors, inflation disruptions in the supply chain, raised interest rates, and demand for steel in China decreased.

In Tata Steel, the proportion of depreciation and amortisation expenses to total cost also showed fluctuating trend during the study period. It was 7.23 percent in 2019-20 which increased to 8.00 percent in 2020-21. It decreased to 6.17 percent in 2021-22, 4.72 percent in 2022-23. At last it increased to 4.88 percent in 2023-24 due to increased assets additions in European operations, particularly due to expansion projects, coupled with unfavourable exchange rate movements, leading to a higher depreciation charge on those assets etc.

Average proportion was higher in Tata Steel than SAIL. Coefficient of variation was higher in Tata Steel than in SAIL which shows that SAIL is more consistent in this ratio.

Test of Significance (‘*t*’ – Test)

Null Hypothesis (H_o) : There is no significant difference in the proportion of depreciation and amortization expenses to total cost of the companies under study.

Computed value of ‘*t*’ = 1.05
Critical value of ‘*t*’ at 5 percent level of significance = 2.31

Decision :

Since the computed value of '*t*' is less than the critical value of '*t*', hence the null hypothesis is accepted and it is concluded that there is no significant difference in proportion of depreciation and amorization expenses to total cost of the companies under study.

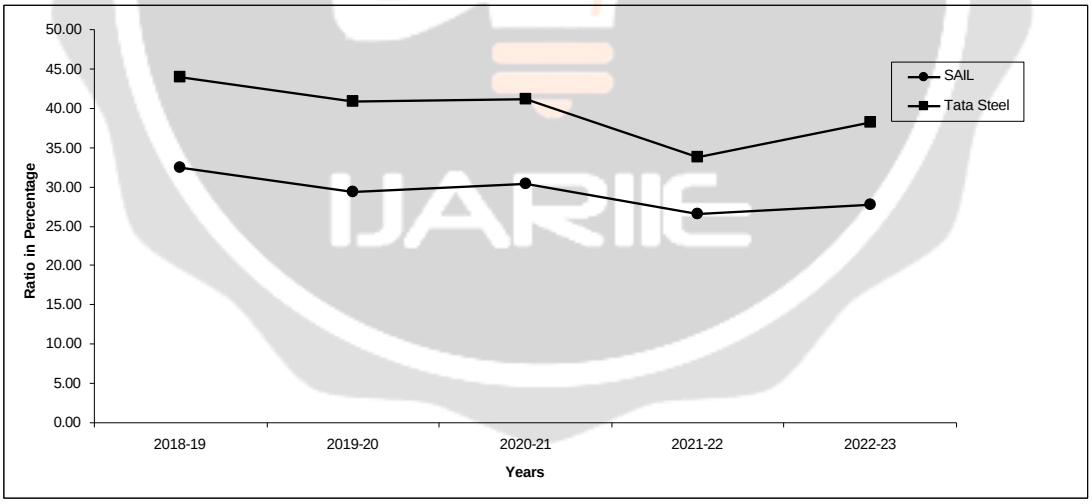
Table-7
Proportion of Other Expenses to Total Cost
(2019-20 to 2023-24)

(in Percentage)

Year	SAIL	TATA STEEL
2019-20	32.40	43.93
2020-21	29.28	40.92
2021-22	30.42	41.15
2022-23	26.53	33.79
2023-24	27.68	38.15
Average	**29.26**	**39.58**
SD	**2.05**	**3.42**
C.V. (%)	**7.00**	**8.64**

Source : Author's own calculation

Proportion of Other Expenses to Total Cost
(2019-20 to 2023-24)



In SAIL, the proportion, of other expenses to total cost showed fluctuating trend during the period of study. It was 32.40 percent in 2019-20 which decreased to 29.28 percent in 2020-21 due to COVID-19 pandemic. Again it increased to 30.42 percent in 2021-22 due to increase in input costs, raw material prices, maintenance expenses, purchased power rates and security expenses etc. It decreased to 26.53 percent in 2022-23 but at last it increased to 27.68 percent in 2023-24 due to rising raw material costs, inflationary pressures potential supply chain disruptions, increased interest rates on borrowing etc.

In Tata Steel, proportion of other expenses to total cost also showed fluctuating trend during the study period. It was 43.93 percent in 2019-20 which decreased to 40.92 percent in 2020-21 due to corona epidemic, reduction in debt, repayment of borrowing etc. It increased to 41.15 percent in 2021-22 but decreased to
33.79 percent in 2022-23. At last it increased to 38.15 percent in 2023-24 due to operational issues at their European subsidiary, higher maintenance costs, lower production volumes and market fluctuations etc.

Average proportion was higher in Tata Steel than SAIL. Coefficient of variation was higher in Tata Steel than SAIL which shows that SAIL is more consistent in this ratio.

Test of Significance (‘*t*’ – Test)
Null Hypothesis (H_o) : There is no significant difference in the proportion of other expenses to total cost of the companies under study.

Computed value of ‘*t*’ = 5.78
Critical value of ‘*t*’ at 5 percent level of significance = 2.31

Decision :
Since the computed value of ‘*t*’ is more than the critical value of ‘*t*’, hence the null hypothesis is rejected and it is concluded that there is a significant difference in the proportion of other expenses to total cost of the companies under study.

6. CONCLUSION AND SUGGESTIONS :

Cost analysis is a critical practice that provides insights into a business efficiency, financial health and profitability. It entitles organizations to make thoughtful decisions, optimize their operations and set competitive prices.

Overall both the companies should focus on improving capacity utilization, optimizing resource utilization, improving operating practices in the mines, and realigning customer demand to optimize the product mix.

7. FUTURE SCOPE OF THE STUDY :

The future scope of cost analysis is expected to involve the use of advanced analytics, anticipating modeling, and other technologies to optimize costs and improve profitability. It can help businesses simplify complex decisions by quantifying costs and benefits, optimizing product design and sourcing strategies to minimize costs while maintaining quality standards.

8. LIMITATION OF THE STUDY :

* The evaluation of this study is based on secondary data only so its findings are depended only upon the accuracy of such data.
* The study is carried out for limited number of steel companies, so it is difficult to draw conclusion from selected steel companies.

* The study is carried out for a period of five years to derive conclusions about the performance of the steel companies as a whole but this number of years is not enough for a thorough understanding of business movements and their reactions to the changes of the economy.

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