SUPREME AUDIT INSTITUTION OF INDIA
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Report of the Comptroller and Auditor General of India on Inventory Management in Steel Authority of India Limited

Union Government
Ministry of Steel
No. 10 of 2025
(Performance Audit - Commercial)

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PREFACE

The Performance Audit Report on Inventory Management in Steel Authority of India Limited has been prepared under the provisions of Section 19(1) and 19-A of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The Audit has been carried out in line with the Regulations on Audit and Accounts, 2007 (amended in 2020) and Performance Audit Guidelines, 2014 of the Comptroller and Auditor General of India.

The Audit covered the period from 2016-17 to 2022-23. The Report is based on the scrutiny of documents pertaining to the Steel Authority of India Limited.

This Report examines the adequacy of policies and guidelines for procurement of inventory in the Company and the adherence to stipulated norms, timely action for sale and adequacy of controls with respect to Inventory Management in the Company.

EXECUTIVE SUMMARY

Steel Authority of India Limited (SAIL), a Maharatna Company under the Ministry of Steel, is one of the leading steel producing companies in India. It has five integrated steel plants at Bhilai, Bokaro, Rourkela, Durgapur, and Burnpur; three special steel plants at Durgapur, Salem and Bhadravati, and a Ferro Alloy Plant at Chandrapur. The Company has captive mines for iron ore, limestone, dolomite and coal. The marketing of SAIL products is administered from the Company's Central Marketing Organisation, Kolkata.

Justification for taking up this audit

SAIL requires significant quantities of raw materials, stores and spares and other consumable items to manufacture steel and operate steel plants. The entire requirement of iron ore is met from its captive mines, while a major portion of coal, limestone and dolomite are purchased from outside sources. The audit objectives of this performance audit were to assess whether:

i. Norms for stock of raw materials and Maximum/Minimum/Reordering/Danger/ Economic Order Quantity levels in respect of stores and spares were prescribed and the same were adhered to optimum inventory of raw materials and finished stock after judicious demand assessment was maintained.

ii. A consistent, uniform and well documented policy and guidelines for procurement of materials exist in the Company; Requirements of materials were determined realistically, and procurement process was fair, equitable, transparent and in line with the policies and guidelines, ensuring efficiency, economy and accountability.

iii. Consumption of raw materials was within the norm fixed by the Company.

iv. Timely and adequate action for sale of Saleable Steel, secondary and by-products, slag, slime and sub-grade iron ore fines was taken.

v. Robust IT system for the management of inventory exists and effective internal control mechanisms exist and are adhered to.

Significant Audit Findings & Recommendations

Inventory is tangible property held for sale in the ordinary course of business or in the process of production for such sale or consumption in the production of goods or services for sale. Inventory management refers to the process of ordering, storing, using and selling a company's inventory. As inventory is a significant part of assets, economy, efficiency and effectiveness of management of inventory by SAIL is key to successful operation of the Company. A summary of significant audit findings and recommendations is given below:

Management of Inventory

SAIL, on an average, had an inventory of ₹ 21,698 crore during 2016-17 to 2022-23 which constitutes about 67 *per cent* of its current assets. Despite this, the Company had not fixed any benchmark for inventory carrying cost per tonne of raw material, semi-finished material and finished goods.

Recommendation 1: The Company may fix norms for holding stock of inventory and devise a formula for determining a benchmark for its inventory carrying cost per tonne of raw material, semi-finished material and finished material for better control of its costs.

(Para 3.2)

Buffer stock of 80,000 tonnes per day of iron ore lump was to be maintained at Bokaro Steel Plant to ensure continuity in production. Bokaro Steel Plant could maintain the average monthly buffer stock only in 22 months during 2017-2023. Audit analysed total delay hours of Blast Furnace and noted that 39 *per cent* of the delay was due to shortage of iron ore. Due to the failure of Bokaro Steel Plant to maintain iron ore stock, the Blast Furnace was kept off-blast during that period resulting in inability to produce 2.98 lakh tonnes of Hot Metal and subsequent inability to earn potential revenue of ₹477.26 crore.

In Durgapur Steel Plant, delay in supply of input materials resulted in disturbance in production and Blast Furnace was put under off-blast state. During 2016-2023, there were instances of delay in supply of coke, raw material, and sinter due to which Blast Furnace was put under off-blast state. Non-maintenance of timely supply of raw materials to Blast Furnace resulted in inability to produce 1.84 lakh tonnes of Hot Metal and inability to earn potential revenue of ₹211.35 crore.

Rourkela Steel Plant was unable to produce 4.50 lakh tonnes of Hot Metal in Blast Furnace due to shortage of raw materials during 2016-17 to 2020-23, resulting in its inability to earn potential revenue of ₹ 542.91crore. No shortage of raw materials was noted in IISCO Steel Plant, Burnpur and Bhilai Steel Plant.

Recommendation 2: The Company may strive to maintain appropriate stock level of iron ore and other raw materials as per prescribed norms to avoid less Hot Metal production.

(Para 3.3 A)

As per clause 5.6 of the Corporate Material Management Group Guidelines on inventory management, non-moving inventory should not exceed three *per cent* of total inventory. Audit noted that the total non-moving inventory of stores and spares at SAIL Plants had increased from ₹ 137.40 crore in 2016-17 to ₹ 212.57 crore in 2022-23, which showed an increase of ₹ 75.17 crore (55 *per cent*).

The non-moving inventory ranged between 6.10 *per cent* to 8.38 *per cent* of total inventory in SAIL, which was always higher than the norm of three *per cent* during the last seven years. Excess procurement of inventory without considering the requirement resulted in blocking-up of capital in non-moving items.

Recommendation 3: The Steel Plants may adhere to the Corporate Material Management Group Guidelines and reduce the non-moving/surplus inventory so as to avoid the blocking of funds. Steel Plants may constitute a Committee for quarterly review so that stipulated norms could be achieved.

(Para 3.4.2)

Procurement of Inventories

As per the Purchase Contract Procedure of SAIL, time allowed between the raising of indent by the department concerned and placement of purchase order was around six months (186 days). Audit noted that out of 1,55,087 purchase orders issued during 2016-17 to 2022-23, the purchase orders were issued within the stipulated time in 90.29 *per cent* cases. However, in 15,087 cases (9.71 *per cent*) the Steel Plants of SAIL took more days than the stipulated time in issuance of purchase orders. The delay ranged between 187 to 365 days in 11,420 cases, 366 days to 1,000 days in 3,459 cases and more than 1,000 days in 178 cases.

Apart from above, Steel Plants fixed the norm for lead time for purchase orders ranging between 49 and 70 days. Audit observed that the norm was not achieved in Bokaro and Bhilai Steel Plant in any of the years during 2016-17 to 2022-23 (except during 2016-17 and 2022-23 in Bhilai Steel Plant). Durgapur Steel Plant achieved the norm in 2016-17, 2018-19, 2019-20 and 2022-23 whereas Rourkela Steel Plant had achieved the same in 2016-17, 2018-19 and 2022-23.

Recommendation 4: Company may make effort for timely issuance of purchase requisition and tender enquiry etc., so that the timelines stipulated under Purchase Contract Procedure in respect of placement of purchase orders and the lead time in purchase orders is complied with. Higher management and Board may review the exception reports at regular intervals.

(Para 4.2)

SAIL has Fuel Supply Agreement (FSA) with Bharat Coking Coal Limited for purchase of boiler coal for its captive power plants with annual contracted quantity of 0.31 million tonnes. As per clause 4.10.1 of the Fuel Supply Agreement, SAIL was to pay incentive, if the seller delivered more than 90 *per cent* of the annual contracted quantity of coal. SAIL lifted 152.73 *per cent* of Fuel Supply Agreement quantity (0.48 million tonnes) in 2020-21, despite the availability of coal from other suppliers under existing Fuel Supply Agreements. SAIL procured coal from Bharat Coking Coal Limited at ₹ 3,456 per tonne whereas coal procured from other suppliers (subsidiaries of Coal India Limited) was between ₹ 891 per tonne and ₹ 3,174 per tonne.

SAIL lifted only 61.18 to 71.5 *per cent* of Fuel Supply Agreement quantity from other sources. There was excess procurement of 0.17 million tonnes of coal from Bharat Coking Coal Limited which resulted in avoidable expenditure of ₹ 4.65 crore.

Recommendation 5: ***Company may monitor and regulate the quantity of coal supplied under Fuel Supply Agreements by different suppliers as per requirement of the Plants since, shortfall/ excess in lifting of coal results in either payment of penalty or performance incentive.***

(Para 4.3.1)

Consumption of Raw Materials

Indigenous coking coal has a higher ash percentage and coke of desired quality is, therefore, prepared by blending the indigenous coal with imported coal. Norms for the same are being fixed annually by Management. The steel plants consumed imported coal in excess of these norms during 2016-17 to 2022-23, which was costlier than the indigenous coal. Higher consumption of imported coal in the Steel Plants during 2016-2023 resulted in potential additional expenditure to the extent of ₹ 2,539.68 crore.

Recommendation 6: Company may work towards achieving continuous availability of indigenous coal as per the norms to enable its blending with the imported coal in line with the Annual Business Plan and thereby optimize the cost incurred on production.

(Para 5.2)

Bokaro Steel Plant has been using Open Ladle Car having capacity of 100-110 tonnes for transportation of Hot Metal from Blast Furnace to the Steel Melting Shop. Torpedo Ladles are an upgraded version of ladles for transportation of Hot Metal to converter. Use of Torpedo Ladles to transport molten iron from Blast Furnace to Steel Melting Shop was beneficial in view of better receiving temperature, prevents heat loss, reduce the loss of Hot Metal etc.

As per Management's estimate, loss of Hot Metal in case of use of Torpedo Ladle car would be between two to three *per cent*. However, the transit loss was between 3.03 and 4.54 *per cent* at Bokaro Steel Plant due to use of Open Ladles. The contract was awarded in September 2008 for replacement of Open Ladles with eight Torpedo Ladle Cars. However, even after 13 years of scheduled completion (October 2010), only six Torpedo Ladle Cars were operational (December 2023) of which four were made operational from August 2018. Transit loss was within the norms at Steel Melting Shops where Torpedo Ladles were used.

Recommendation 7: Bokaro Steel Plant may expedite completion of the project so that Torpedo Ladle Cars are used in place of conventional mode of Ladles to minimise loss of Hot Metal.

(Para 5.6)

Sale and Disposal of Inventories

Against production target of 119.66 million tonne of saleable steel envisaged in the Annual Business Plan for the period 2016-17 to 2022-23, production by five integrated steel plants of the Company was 106.15 million tonne (89 *per cent*). The capacity utilisation by these plants was between 77 *per cent* (2020-21) and 89 *per cent* (2022-23). The Order Conformance Index (orders booked vis-à-vis the production) for the Central

Marketing Organisation was 115 *per cent* (which was better than the acceptable range of 90-110 *per cent*), whereas the Order Conformance Index for Steel plants (being orders placed vis-à-vis the actual despatches made) was 77 *per cent* during the period 2016-2023 (as against the acceptable range of 90 *per cent*). Thus, despite having demand in the market, shortfall in production was one of the main factors towards non-achievement of sales plan.

Recommendation 8: The Company may take measures to attain the production levels envisaged in Annual Business Plan by ensuring optimum capacity utilisation of steel plants.

(Para: 6.2)

As against total production of 106.15 million tonne of saleable steel and orders booked by Central Marketing Organisation for 121.86 million tonne, despatches from Plants were 93.75 million tonne i.e. 77 *per cent* of orders booked. SAIL Board, after considering increase in Saleable Steel stock at Plants and rake restrictions by Railways, had advised/recommended for improvement in road despatches. Road transport by SAIL remained low at 10 *per cent* during 2016-23 against direction of Chairman, SAIL to augment road despatch to a level of minimum 30 *per cent*. Lower despatch of materials than the requirement of customers led to delay in liquidation of stock and increase in inventory carrying cost on the stock lying at Steel Plants.

Recommendation 9: The Company may adhere to the norms fixed by the Management to optimise the despatch of steel materials through road transport and increase the use of road transport by removing bottlenecks in infrastructure and also regularly pursue with railway administration to achieve maximum despatch of material in a timely and cost effective manner.

(Para 6.2 & 6.3)

Crude Steel is further processed to produce finished steel or sold as semi-finished (semis) steel called Billets, Blooms and Slabs. Out of total export by SAIL, export of semis was 65 *per cent* whereas the total export of steel from India during 2016-23 included 25 *per cent* of semis. Market share of SAIL in export of semis was 21 *per cent* against its market share in total export of eight *per cent*. Export of finished steel fetched higher contribution (₹ 599 per tonne to ₹ 11,792 per tonne) than that of semis during 2016-23. SAIL exported 0.50 million tonne more semis than envisaged in the Annual Business Plan during 2016-17, 2017-18, 2019-20 and 2021-22 which resulted in potential loss of opportunity to earn revenue of ₹ 176.99 crore.

Recommendation 10: The Company may undertake efforts to improve conversion of semis to finished products and minimise export of semis and increase export of finished products to improve Net Sales Realisation.

(Para 6.4 (i) & (ii))

In a Steel Plant, Blast Furnace produces Hot Metal which is raw material to produce Crude Steel (Steel Melting Shop) from which the finished steel is produced. If Steel Melting Shop is unable to accept Hot Metal, the same is poured into Pig Casting

Machines and made into solid iron called Pigs. Pig Iron has economic value and is utilised internally and also sold in open market.

Audit noticed that Pig Iron was produced more than the plan whenever there was excess of Hot Metal with respect to Steel Melting Shop requirement at that point of time due to limitations in the Steel Melting Shop to consume total Hot Metal produced. At Rourkela Steel plant, the upgradation of Caster-1 and 2 of Steel Melting Shop–II as envisaged in the Modernisation and expansion plan (2008) had not been carried out. Had the steel plants timely increased their capacity to convert Hot Metal into Saleable Steel, and converted Hot Metal into Saleable Steel, instead of making Pig Iron, the plants could have potentially generated more revenue because contribution of Saleable Steel was more as compared to Pig Iron. Excess production of Pig Iron beyond the target during 2016-17 to 2022-23 has resulted in inability to earn potential revenue of ₹ 1,022.15 crore.

Recommendation 11: The Company may keep the downstream facilities ready to complete the steel making process after production of Hot Metal to minimise the production of Pig Iron beyond the targets fixed in the Annual Business Plan.

(Para 6.5)

In Alloy Steels Plant, 14,192 tonnes of materials valuing ₹ 77.07 crore were lying for more than five years. In Visvesvaraya Iron and Steel Plant, Bhadravati, 5,032 tonnes of special steel valuing ₹ 25.20 crore was unmoved for more than five years. In Salem Steel Plant, 843.38 tonnes of materials worth ₹ 16.99 crore was lying for more than five years.

Audit noticed that Saleable steel in these Special Steel Plants of SAIL is produced as per specifications of customers. Production of materials at three special steel plants, without linkage to any order/excess production resulted in blocking-up of inventory worth ₹ 119.26 crore as of March 2023 for more than five years.

Recommendation 12: Management may take timely and adequate action to sell the finished stock to avoid loss towards carrying cost and realise the revenue.

(Para 6.8)

To maintain availability of iron ore in market and considering economic rationale for realisation of full value of mineral extracted from captive mines, Government of India allowed (September 2019) SAIL to sell sub-grade minerals lying at the mines pit head, subject to requisite permission from State Governments concerned. Whereas State Governments of Odisha and Chhattisgarh had accorded permission for sale, Government of Jharkhand had not permitted the same till date (March 2024).

It was seen that out of 43.17 million tonne sub-grade iron ore fines available, SAIL disposed only 1.62 million tonne till March 2023 leaving 41.55 million tonne of sub-grade iron ore fines valuing ₹ 3,995.75 crore remaining undisposed. The inventory of such sub-grade iron ore fines constitutes 12.35 *per cent* of the total inventory of SAIL as on 31 March 2023.

Iron ore extracted from mines are cleaned/washed with water to reduce the presence of silica and alumina to desired level for use in steel plants. The impurities removed from ore are sent to tailing dam and are known as tailing fines. These fines have *Fe* content in the range of 55 to 62 *per cent*. Tailing fines/slime amounting to 102.72 lakh tonnes valuing ₹ 492 crore was lying at Dalli and Barsua mines as on 31 March 2023. Apart from above, 116.85 lakh tonne of tailing fines/slime was accumulated and lying undisposed at Bolani, Kiriburu and Meghahataburu Iron Ore Mines for which valuation was not done.

Recommendation 13: The Company may take necessary steps to utilise the sub-grade iron ore fines and tailing fines and ensure the security of the material. Company may also take necessary steps to sell the inventory to unlock the commercial value remaining blocked in such inventory.

(Para 6.12 B)

Rourkela Steel Plant dumps Blast Furnace Slag (which could not be granulated) and Linz-Donawitz slag at Slag Dump area of the Plant. Linz-Donawitz Slag contains some element of Steel Scrap. Nominal quantities of these scraps are routinely extracted and consumed in the Plant or sold. However, due to very little utilisation of Linz-Donawitz slag at steel plants, the slag had accumulated in large quantity which gradually had taken the shape of hills. Rourkela Steel Plant did not take the initiative to recover these inventories and liquidate it. Total unprocessed Linz-Donawitz slag as on 31 March 2023 was 29.64 lakh tonnes. The inventory of extractable iron and steel scrap embedded in Linz Donawitz slag was 0.56 lakh tonnes valuing ₹ 56.14 crore as on March 2023.

Bhilai Steel Plant assessed 4.14 lakh tonnes of iron scrap valued at ₹ 326.59 crore embedded in 202.60 lakh tonnes of Blast Furnace Slag as of March 2021. During 2020-21, it offered 7.10 lakh tonnes Blast Furnace Slag for sale to liquidate the inventory of iron scrap in a commercial manner, an initiative it had not taken before. The undisposed quantity as on 31 March 2023 was 4.08 lakh tonnes valuing ₹ 404.21 crore resulting in blocking up of funds.

Audit noted that in the absence of time bound action plan to liquidate the stock, there was minimal sale/utilisation of the Linz-Donawitz slag over the years and the stock was mounting up year after year.

Recommendation 14: Management may initiate time bound action plan to liquidate the stock of Linz-Donawitz Slag and Blast Furnace Slag at the earliest to minimise the blocking of its funds.

(Para 6.12 C)

A Long-term slag sale agreement for 30 years was entered into in July 2008 for sale of Blast Furnace slag which was to be provided by Bokaro Steel Plant. Audit noted that during 2009-14, market price of slag was between ₹ 500 and ₹ 1,220 per tonne whereas rate provided in the agreement was between ₹ 336.65 and ₹ 444.24 per tonne. This was due to faulty price fixation clause (5.2.1) adopted in the agreement which favoured the buyer and resulted in loss to SAIL in sale of slag under this agreement during the above

period. This fact was also reported in the Para 5.1 of CAG Audit Report (Union Government-Commercial) No. 21 of 2015.

Audit noted that SAIL while entering into new agreement with a different company did not apply due diligence and continued with the existing pricing formula ignoring the market conditions. This was detrimental to the financial interest of the Company. Sale of slag at a lower rate under the new agreement resulted in inability to earn revenue of ₹ 441.40 crore during 2015 to 2023.

Recommendation 15: Management may ensure that sale price of slag in the agreement is fixed based on the market/fair price to avoid sale of slag at lower rate.

(Para 6.12 F)

IT System and Internal Control Mechanism

SAIL implemented ERP solution with the objective to cover the entire spectrum of its business operations. Audit noticed that the ERP has been implemented phase-wise in four integrated Steel Plants of SAIL located at Bhilai, Durgapur, Rourkela and Bokaro and at Central Marketing Organisation between April 2009 and April 2012. It went live in IISCO Steel Plant, Burnpur and Corporate Office in July 2019 but was yet to be implemented in the three special steel plants at Salem, Bhadravati and Durgapur, Ferro Alloy Plant at Chandrapur, SAIL offices at Ranchi, Central Coal Supply Organisation, Mines, Collieries and SAIL Refractory Unit.

Due to non-integration of the ERP in SAIL, the Corporate Office does not have real time access to raw material/stores and spares data of SAIL as a whole at any point of time. Real time information regarding status of stock of various inventory items at different Plants cannot be known instantly. This could lead to potential situations wherein an inventory item could be available in surplus quantity with one unit whereas another unit may not be able to meet its production targets due to non-availability of that item. Since Central Coal Supply Organisation maintains data of indigenous coal procured over the year, in absence of integration with SAIL plants, sharing of timely information may not be possible. SAIL had recently developed a web based portal which would help in making available information to all heads of Material Management and officials of Material Management Department and Corporate Material Management Group.

Recommendation 16: Management may ensure early implementation of the ERP systems in all its units and integration of the same across all units to ensure that the potential benefits of having a organization wide integrated ERP system was achieved which include having a comprehensive inventory management system for SAIL as a whole.

(Para 7.1.1 a, b)

The warehouse module in the ERP system provided for selection recording weighment at the time of delivery of finished steel either through automatic entry or manual entry. Legal Metrology Department (State Government of Telangana) observed (February 2017) that the manual options should not be allowed as per rule and the same should be removed from the system. Manual option of entering weight was still

(March 2023) operational in Central Marketing Organisation. Tare weight of vehicles was taken manually in 2.59 lakh out of 44.57 lakh cases. This created a vulnerability in the process where there is a risk of recording more weight than the actual weight of vehicles and therefore the possibility of delivery of excess materials due to recording of lower weight in the invoice.

Recommendation 17: Management may consider to disallow manual options in the Warehouse module to ensure a foolproof system of recording of weight without manual intervention.

(Para 7.1.1 (c))

The stock verification report was not prepared as prescribed in the guidelines (November 2016) on stock verification of Central Marketing Organisation, which stipulated that physical verification should ascertain the discrepancies in existence of stock and reasons thereof. The stock verification report was only a copy of the inventory report and stocks were merely tick-marked on visual inspection/eye estimation basis. Audit noticed that, in 46 out of 49 stockyards, stock verification was not conducted on half yearly basis, as prescribed in the policy, in one or more years during 2016-17 to 2022-23. Out of this, in 10 stockyards, stock verification had not been conducted at all during this period.

Audit noticed that old materials, which were lying inside the yard and were found to be in excess than the stock recorded in SAP, over a period of time, were not linked with the ERP system. Consequently, there were delays in their identification/disposal leading to the blocking up of funds. The delay in linking Saleable steel in stockyard system could have been avoided with effective and timely stock verification.

Recommendation 18: Management may ensure that the process of physical verification of stock is strengthened in SAIL to ensure highlighting the discrepancies in stock accurately and to prevent delays in identification/disposal of old materials.

(Para 7.1.6)

Chapter 1

Chapter 1 Introduction

1.1 Introduction

Steel Authority of India Limited (SAIL), a Maharatna Company under the Ministry of Steel, is one of the leading steel-producing companies in India. It has five integrated steel plants[1] at Bhilai, Bokaro, Rourkela, Durgapur and Burnpur; three special steel plants[2] at Durgapur, Salem and Bhadravati and a Ferro Alloy Plant at Chandrapur. The Company has captive mines for iron ore, limestone, dolomite and coal. Marketing of SAIL products is administered from the Company's Central Marketing Organisation, Kolkata.

Inventory is tangible property held for sale in the ordinary course of business or in the process of production for such sale or consumption in the production of goods or services for sale. Inventory management refers to the process of ordering, storing, using and selling a company's inventory. SAIL, on an average, had an inventory of ₹ 21,698 crore during 2016-17 to 2022-23 which constitute about 67 *per cent* of its current assets. As inventory is a significant part of assets, economy, efficiency and effectiveness of management of inventory by SAIL is key to successful operation of the Company.

1.2 Overview of Steel making process

In a steel plant, Blast Furnace produces Hot Metal using iron ore, coke, sinter, pellets, flux and other materials which are the base materials for steel making. Oxygen is blown onto the Hot Metal to burn unwanted elements in a converter producing Crude Steel. The Crude Steel is then cast into solid slabs and processed into finished products (Saleable Steel) in several rolling operations. Saleable Steel is sold to customers for further processing or for direct use/consumption.

1.3 Production Performance

Production of Hot Metal, Crude Steel and Saleable Steel in SAIL during 2016-17 to 2022-23 is as shown in Chart 1.1.

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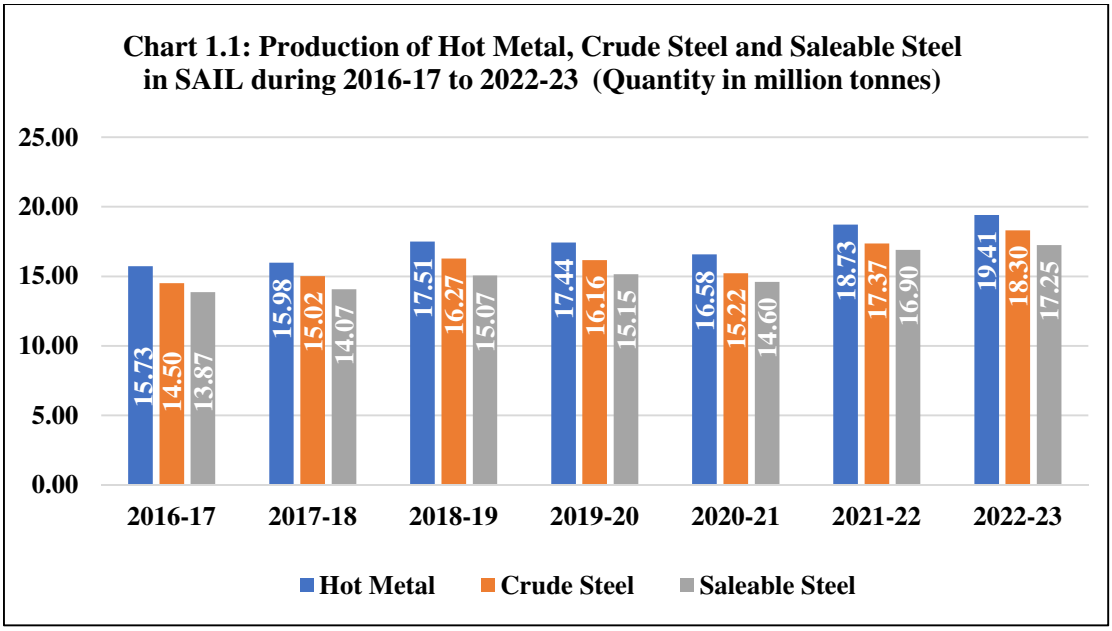
1 ***Bhilai Steel Plant, Bhilai, Bokaro Steel Plant, Bokaro, Rourkela Steel Plant, Rourkela, Durgapur Steel Plant, Durgapur, IISCO Steel Plant, Burnpur.***

2 ***Alloy Steels Plant, Durgapur, Salem Steel Plant, Salem and Visvesvaraya Iron and Steel Plant, Bhadravati (VISP).***



Source: Annual Report of SAIL for respective years

1.4 World Steel Scenario[3]

- World Steel production of crude steel in 2023 was 1892.2 million tonne (1735 million tonne in 2017)
- India produced around 144.29 million tonne of crude steel in 2023-24 (127.19 million tonne in 2022-23)
- India is ranked 2nd in world in steel production (2023)
- Market share of SAIL was 12.30 *per cent* of Crude Steel production in India (2022-23)

1.5 Financial Performance

Financial performance of SAIL during last seven years 2016-17 to 2022-23 is given in table below.

Table 1.1: Financial performance of SAIL during 2016-17 to 2022-23

(Amount: ₹ in crore)

Year	Turnover	Total Expense	Profit Before Tax	Net worth
2016-17	49,180	54,937	(-)4,851	36,009
2017-18	58,297	60,232	(-)759	35,714
2018-19	66,267	63,773	3,338	38,152
2019-20	61,025	58,703	3,171	39,777
2020-21	68,452	63,301	6,879	43,495
2021-22	1,02,805	88,123	16,039	52,017
2022-23	1,03,768	1,03,423	2,637	52,139

Source: Annual Report of SAIL for respective years

[3] ***Source: Annual Report of Ministry of Steel for the year 2023-24 and SAIL Market Signal Report.***

The Company was in loss in 2016-17 and 2017-18 but became profitable from 2018-19 onwards. The profit in 2018-19 was mainly on account of higher production, increase in Net Sales Realisation, lower coke rate. The profit for 2019-20 was mainly on account of valuation of sub-grade iron ore fines, embedded iron and steel scrap and valuation of slime containing the iron ore fines. In 2020-21, higher turnover was on account of increase in Net Sales Realisation of Saleable Steel and higher sales volume. There was significant improvement in turnover (50 *per cent*) and profit (133 *per cent*) of the Company in 2021-22 as compared to last year. Improvement in performance of SAIL in 2021-22 was mainly on account of higher production of Saleable Steel, increase in sales realisation, reduction in interest charges etc. Capital repairs of Blast furnaces were completed during 2021-22 or just the preceding period and consequently, the availability of Blast furnaces in SAIL plants increased during 2021-22. During 2022-23, though turnover has increased by ₹ 963 crore, the profit for 2022-23 came down from ₹ 16,039 crore in 2021-22 to ₹ 2,637 crore mainly on account of higher input cost (imported coal), increase in stores and spares consumption, repairs and maintenance expenses etc.

1.6 Inventory

Inventory comprises of raw materials, work-in-progress, finished goods including by-products, stores and spare parts and loose tools. Raw materials include iron ore, sinter, coke, limestone, dolomite, pellets, scrap and ferro alloys. Work-in-progress includes blooms[4], billets[5], slabs[6] etc. Finished goods can be long products[7], flat products[8], and special steel. SAIL's finished products also include rails, wheels, axle and wheel sets, stainless steel, alloy steels, electric resistance welded and spiral welded pipes.

1.7 Inventory Management

SAIL requires significant quantity of Raw Materials, Stores and Spares and other Consumable items to manufacture steel and for operation of steel plants. SAIL has captive mines for iron ore, coal, limestone and dolomite. Entire requirement of iron ore is met from its captive mines. Major portion of coal, limestone and dolomite are purchased from outside sources. Coking coal is the basic material for steel making. The overall availability of coking coal from indigenous sources is inadequate to meet the requirement of SAIL plants and to bridge the gap, SAIL imports about 90 *per cent* of the requirement of coking coal. SAIL also procures thermal coal from indigenous sources for its own or Joint Venture power plants.

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[4] ***Blooms are input material to produce Heavy sections and Sheet piling sections normally by hot rolling.***

[5] ***Billets are input material for production of long products viz., bars & rods, light sections etc.***

[6] ***Slabs are semi-finished rectangular steel products intended to produce Plates, Sheets, Strips etc.***

[7] ***Long products consist of Thermo Mechanically Treated Bars and Coils, Angles, Channels, Beams, Wire Rods, Rounds, Crane Rails and Special Sections etc.***

[8] ***Flat Products consist of Hot Rolled Coils, Sheets & Plates, Cold Rolled Coil and Sheets, Galvanised Plain Sheets & Coils, Galvanised Corrugated Sheets and Electrical sheets.***

1.8 Organisational Structure

Corporate Material Management Group at Corporate Office is the nodal agency to formulate policies and guidelines relating to inventory management in SAIL. In the steel plants/units/mines, the Materials Management Department, Indenting/Production Departments and Stores Department of each plant are responsible for management of inventory. Materials Management Department is responsible for purchasing raw materials (other than coking coal), stores and spares and other consumable items, their storage and inspection.

Coal Import Group at the Corporate Office, SAIL coordinates for import of coking coal. Central Coal Supply Organisation of SAIL at Dhanbad procures indigenous coking coal and boiler coal of various grades for the steel plants mostly from the subsidiaries of Coal India Limited.

The Marketing Department in each steel plant looks after disposal of slag, surplus/obsolete stores, old/used conveyor belts and other secondary products. The norms for consumption of all the raw materials are fixed yearly by the Management considering process requirements, previous consumption patterns and quality of the product as well as raw materials.

Central Marketing Organisation of the Company coordinates and oversees both domestic and export sale of steel products through its marketing set up of four Regional Offices[9] and 37 Branch Sales Offices. The Transport and Shipping Department of SAIL is responsible for chartering of vessels for import of coking coal and limestone and unloading them at various ports[10] and despatches to steel plants. Transport and Shipping Department is also engaged in handling port operations for the export of steel.

All the five integrated steel plants of SAIL have implemented SAP-ERP system and use its Materials Management module for procurement, inventory management and logistics at the integrated steel plants and at the Central Marketing Organisation.

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[9] ***Eastern Region-Kolkata, Northern Region-Delhi, Western Region-Mumbai and Southern Region-Chennai***

[10] ***Visakhapatnam, Gangavaram, Paradip, Dhamra and Haldia***

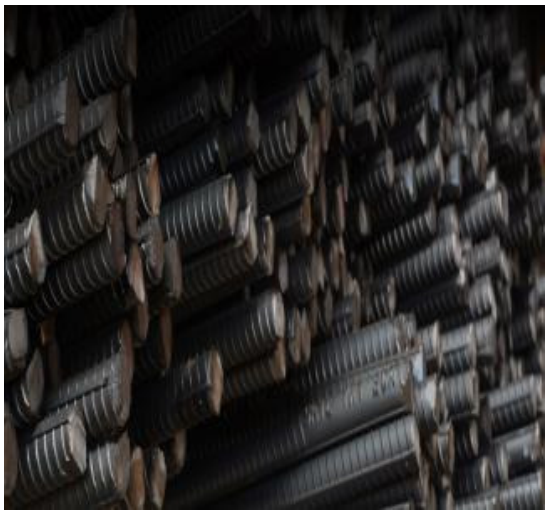
Figure 1.1: Major inventory items at SAIL

Bloom

Billet

Rails

Pipes



Thermo Mechanically Treated Bar

Wheels

Chapter 2

Chapter 2 Audit Approach

2.1 Audit Objectives

The audit objectives were to assess whether:

i. Norms for stock of raw materials and Maximum/Minimum/Reordering/Danger/ Economic Order Quantity levels in respect of stores and spares were prescribed and the same were adhered to. Optimum inventory of raw materials and finished stock after judicious demand assessment was maintained.

ii. A consistent, uniform and well documented policy and guidelines for procurement of materials exist in the Company; Requirement of materials were determined realistically and procurement process was fair, equitable, transparent and in line with the policies and guidelines, ensuring efficiency, economy and accountability.

iii. Consumption of raw materials was within the norm fixed by the Company.

iv. Timely and adequate action for sale of Saleable Steel, secondary and by-products, slag, slime and sub-grade iron ore fines was taken.

v. Robust IT system for the management of inventory exists and effective internal control mechanisms exist and are adhered to.

2.2 Audit criteria

The audit criteria was derived from:

- Annual Business Plan of SAIL for respective years
- Policy Guidelines of the Company on Inventory Management of Stores and Spares
- Maximum/minimum/reordering/danger/economic order levels of inventories and holding of non-moving /surplus stores and spares
- Purchase/Contract procedures (Purchase Contract Procedure) - 2014 and 2020 of SAIL
- SAIL Policy for import of coal and coke
- Minutes of the Tender Committees, Technical Evaluation Committees and Commercial Evaluation Committees for purchase of materials
- Memoranda of Understanding/contracts with Government authorities/private ports for handling and storage of shipments at ports.
- Movement Plans, Management Information System and Supply Chain Management
- Warehouse Manual, Handling Contract Manual, Consignment Agency Manual
- Contracts with Handling contractors and Conversion Agent Contracts
- IT Manual of Material Management module

2.3 Scope of Audit

Audit reviewed records and other evidences pertaining to all the SAIL steel plants, Chandrapur Ferro Alloy Plant, captive mines, Coal Import Group, Corporate Material Management Group, Central Coal Supply Organisation and Central Marketing Organisation of SAIL for a period of five years from 2016-17 to 2020-21. Records relating to import of coal was examined for four years period[11] from 2017-18 to 2020-21. Status of the audit observations have been updated till 31 March 2023.

Audit of 'Refractory Management in SAIL' for a period of five years from 2015-16 to 2019-20 was included in CAG Audit Report (Commercial) No. 8 of 2022. Audit findings on excess inventory holding of refractories, failure to develop a good vendor base, procurement of refractory on single tender basis, procurement of refractory sets from the same supplier on proprietary basis, extra expenditure incurred due to delay in placement of orders and procurement from outside sources at higher cost etc., were included in the above report. Therefore, procurement of refractories was not under the scope of this audit.

2.4 Audit Methodology

An online entry conference was held with the Management on 9 November 2021, wherein the scope, objectives, criteria and methodology of audit was discussed and agreed upon. Audit examined the relevant records and held discussions with the Management. Draft Performance Audit Report was issued to the SAIL Management on 12 August 2022 and Ministry of Steel on 17 October 2022. Exit conference was held with the Ministry on 10 January 2023. Replies of the Management/Ministry received have been duly incorporated in the report.

2.5 Audit Sampling

In view of large population of purchase orders, stratified random sampling and systematic sampling were applied for the selection of purchase orders. Total purchase orders placed by the Steel Plants and the erstwhile Raw Material Division[12] (excluding coking coal and refractories items) during 2016-17 to 2020-21 were 1,43,947 valuing ₹ 41,748 crore. Of these, all purchase orders valuing more than ₹ 10 crore[13]; 10 *per cent* of the purchase orders valuing between ₹ 10 crore and ₹ one crore[14] were selected through stratified random sampling. Systematic sampling was conducted for the selection of purchase orders valuing less than ₹ one crore[15]. A minimum sample size of five purchase orders per Plant was selected to make the sample more representative.

All 13 Long Term Agreements/Work orders/Letters of Intent placed on coking coal exporters for import of coking coal during 2017-18 to 2020-21 were selected for audit.

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[11] ***Audit of 'Import, Shipping and Transportation of coal' in SAIL was conducted for the period upto 2016-17 and included in CAG Report 11 of 2018.***

[12] ***Raw Material Division of SAIL was disintegrated with effect from July 2020. Now the captive mines of SAIL are under the control of the steel plants based on geographic location.***

[13] ***628 purchase orders of ₹ 23,453 crore (56.18 per cent)***

[14] ***362 purchase orders of ₹ 1,069.49 crore (2.57 per cent)***

[15] ***157 purchase orders of ₹ 16.96 crore (0.04 per cent)***

The value of coal supplied during the above period was ₹ 62,460 crore. All eight agreements relating to purchase of indigenous coal entered into with coal supply companies valuing ₹ 8,520 crore during 2016-17 to 2020-21 were also reviewed.

Sampling was not used for the inventory holding. All cases relating to disposal of slag, scrap, obsolete, surplus and non-moving inventories were reviewed. Consumption of raw materials (except those which are consumed in Blast Furnace[16]) compared to the norms fixed by the Company and reasons for any deviation were analysed. Stockyards were grouped into three categories- (i) Stockyard with the handling of more than 1.50 million tonnes of material during 2016-2021, (ii) Stockyard handling material between 0.60 million tonnes and 1.50 million tonnes and (iii) Stockyard handling less than 0.60 million tonnes of materials. Out of 49 stockyards, 14 stockyards[17] were selected for examination.

2.6 Acknowledgement

Audit acknowledges the co-operation extended by the Management of the Company and the officials of Ministry of Steel in facilitating the conduct of this Performance Audit.

[16] ***An audit on 'Performance of Blast Furnaces in SAIL' is currently underway and issues relating to consumption of raw materials in Blast Furnaces would be included there.***

[17] ***The warehouses were divided into three categories based on the volume and the number of warehouses from each category were selected as: 10 per cent from the lowest strata, 50 per cent from the second strata and 100 per cent from the highest strata. Selection of a particular warehouse within each category was done on the basis of judgemental sampling. 14 stockyards selected were:***
Eastern Region (Kolkata, Patna and Durgapur); Northern Region (Faridabad, Ghaziabad, Kanpur and Chandigarh), Western Region (Mumbai, Nagpur, Bhilai and Gwalior) and Southern Region (Chennai, Hyderabad and Vishakhapatnam).

Chapter 3

Chapter 3 Management of Inventory

3.1 Management of Inventory refers to the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials and finished goods so that adequate supplies are available and the avoidable costs on account of over-stocking/ under-stocking are minimised. Audit was conducted with an objective to assess whether norms of raw materials and maximum /minimum/ reordering/ Danger/ Economic Order Quantity in respect of stores and spares were prescribed and the same were adhered to and optimum inventory of raw materials and finished stock was maintained.

To assess these objectives, the audit was conducted in all the SAIL Steel Plants and Corporate Office of SAIL. The records relating to Annual Business Plans, Goods Receipt Notes, minutes of Material Review Board meetings, Stock review records at the steel plants were examined. At Central Marketing Organisation, Stock position extracted from Business Intelligence Reports, Memoranda of Understanding with Ministry of Steel and achievements against specific parameters, data relating to orders fed by Central Marketing Organisation, production and despatch from steel plants, export statistics, data published on Central Marketing Organisation intranet and files relating to Monthly review meetings were reviewed.

The inventory holding as at the end of each year during 2016-17 to 2022-23 is given in the table below:

Table 3.1: Raw material, stores and spares, work-in-progress and finished products in SAIL during 2016-17 to 2022-23

(₹ in crore)

As on	Raw material	Stores and Spares	Work in progress	Finished products	Others- By products (Sub-grade fines)	Total Inventory
31 March 2017	4,040	1,865	3,984	5,822	0	**15,711**
31 March 2018	7,169	2,184	3,213	4,431	0	**16,997**
31 March 2019	6,105	2,976	3,396	6,965	0	**19,442**
31 March 2020	5,396	3,169	2,478	8,913	3,791	**23,747**
31 March 2021	5,144	3,121	2,399	4,507	4,337	**19,508**
31 March 2022	9,270	3,330	2,398	4,881	4,249	**24,128**
31 March 2023	12,013	3,650	3,900	8,607	4,182	**32,352**

Source: Annual Report of SAIL for respective years

It may be seen from above that the inventory at the end of 31 March 2023 had increased by 106 *per cent* as compared to 31 March 2017. Increase in inventory was mainly on account of valuation of sub-grade iron ore fines (₹ 3,791 crore) during 2019-20. During 2020-21, the stock of finished goods had reduced but there was increase in stock of sub-

grade iron ore fines. During 2021-22, stock of raw materials increased significantly on account of higher price of coal because of which the total inventory went up to ₹ 24,128 crore. The total inventory has gone up to ₹ 32,352 crore as of 31 March 2023 mainly due to increase in value of imported coal and increase in stock of finished goods.

The issues noticed in management of inventory have been further discussed in detail in the succeeding paragraphs.

3.2 Fixing of norms for maintaining stock of raw materials, levels of inventory and inventory carrying cost

Corporate Material Management Group had formulated (June 2017) Policy Guidelines on inventory management of stores and spares. As per these guidelines, the norms for stocks of stores and spares (in terms of number of days of consumption) were fixed in all the steel plants. However, guidelines for the management of inventory of raw materials and work-in-progress were not formulated either by SAIL Corporate Office or any of the Plants.

Audit noted instances of non-compliance with Corporate Material Management Group guidelines on stores and spares wherein excess holding of stores and spares beyond the norms (stipulated in terms of months of consumption) led to blocking up of funds and avoidable carrying cost and have been discussed in *para 3.4* below.

The various inventory levels (Maximum/Minimum/Re-order/Danger/Economic Order Quantity levels) were prescribed in all the Steel Plants with respect to the items under Automatic Procurement (AP)[18]. Audit did not notice any instance of non-adherence to these norms. However, as stated by the Management, the levels of inventory (Maximum/Minimum/Re-order/Danger/Economic Order Quantity levels) were not prescribed in respect of inventory items which were not being regularly procured[19], due to insufficient procurement data available in SAP. Audit noted instances of non-maintenance of required stock of raw materials leading to lower production and emergency procurement due to shortage of iron ore which have been highlighted in *para 3.3* below.

Inventory carrying costs are the various costs[20] a business incurs for holding inventory in stock. SAIL, on an average, had an inventory of ₹ 21,698 crore during 2016-17 to 2022-23 which constituted about 67 *per cent* of the current assets[21]. Despite this, Company had not fixed any benchmark for inventory carrying cost per tonne of raw material, semi-finished material and finished goods to act as a tool to control, manage and compare the actual carrying cost over the years.

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[18] ***Automatic Procurement items are those items whose indents can be automatically generated through the system based on the prefixed norms of regular consumption and existing stock levels. These are generally multi-user items whose availability is monitored by Material Management Department of Plants like screw, gasket, tape steel, stationery, pipes, plugs, socket, bearings etc.***

[19] ***Like refractories items, limestone, dolomite, minor/major raw materials etc.***

[20] ***Include warehouse storage fees, taxes, insurance, employee costs etc.***

[21] ***Includes inventories of iron ore fines (sub-grade) and slag dump (embedded scrap) presently under the head 'Non-current inventories' in the financial statements of SAIL.***

Management stated (October 2022) that it had not fixed inventory carrying cost due to wide range of products portfolio of the Company. However, during Exit Conference (January 2023), SAIL Management assured to constitute a Committee to consider the fixation of inventory carrying cost. The Management has formed (February 2023) a Committee for review of stock holding norms including optimisation of inventory cost for different raw materials.

Though, inventory carrying costs are among the top inventory management challenges dealt with by Management, SAIL had not fixed any benchmark for inventory carrying cost per tonne of raw material, semi-finished material and finished materials. Further, the guidelines for management of inventory of raw materials and work-in-progress were not formulated. Additionally, funds were also blocked and avoidable carrying cost being incurred on instances of non-compliance with Corporate Material Management Group guidelines on stores and spares.

Recommendation 1: The Company may fix norms for holding stock of inventory and devise a formula for determining a benchmark for its inventory carrying cost per tonne of raw material, semi-finished material and finished material for better control of its costs.

3.3 Non-maintenance of stock of raw materials

(A) Lower production due to shortage of raw material

In case of iron ore lump, buffer stock of 80,000 tonnes per day was to be maintained at Bokaro Steel Plant to ensure continuity in production. Audit noted that Bokaro Steel Plant maintained the stock in 2016-17 but could maintain the average monthly buffer stock only in 22 months during 2017-2023. Audit analysed total delay hours of Blast Furnace[22] and noted that 39 *per cent* of the delay was due to shortage of iron ore. During last six years, total delay hours (off-blast)[23] were 5,714 hours, out of which delay hours due to shortage of iron ore were 2,216 hours (39 *per cent*). Thus, due to failure of Bokaro Steel Plant to maintain iron ore stock, the Blast Furnace was kept off-blast during that period resulting in inability to produce 2.98 lakh tonnes of Hot Metal and subsequent inability to earn potential revenue of ₹ 477.26 crore[24].

Similarly, in Durgapur Steel Plant, delay in supply of input materials resulted in disturbance in production and Blast Furnace was put under off-blast state. During 2016-2023, there were instances of delay in supply of coke, raw material and sinter due to which Blast Furnace was put under off-blast state. Non-maintenance of timely supply

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[22] ***It is the duration during which production in Blast furnace is lowered due to planned events/unplanned issues.***

[23] ***Furnace is said to be off blast when the hot blast going to furnace becomes nil due to schedule shut down or any other reason.***

[24] ***Year wise production loss of Saleable Steel due to shortage of raw materials multiplied by year wise average contribution of Saleable Steel. (2017-18: ₹ 49.34 crore, 2018-19: ₹ 96.55 crore, 2019-20: ₹ 14.64 crore, 2020-21: ₹ 87.76 crore, 2021-22: ₹ 217.08 crore, 2022-23: ₹ 11.89 crore)This is the amount of contribution to fixed costs (Net Sales Realisation- Variable Costs).***

of raw materials to Blast Furnace resulted in inability to produce 1.84 lakh tonnes of Hot Metal and consequent inability to earn potential revenue of ₹ 211.35 crore[25].

Rourkela Steel Plant was unable to produce 4.50 lakh tonnes of Hot Metal in Blast Furnace due to shortage of raw materials during 2016-17 to 2020-23, resulting in its inability to earn potential revenue of ₹ 542.91 crore[26]. No shortage of raw materials was noted in IISCO Steel Plant, Burnpur and Bhilai Steel Plant.

The major reasons for such shortage were inaccurate assessment of raw material requirement *vis-à-vis* constraints at mines at the time of finalisation of Annual Business Plan, underutilisation of railway rake capacity, receipt of poor-quality raw materials from mines during monsoon season and delay in supply of raw materials.

Management replied (October 2022) that stock of iron ore could not be maintained at the desired level in few situations due to insufficient supply from captive mines. The synchronisation in Hot Metal production failed due to input and logistic problems. Delay due to input raw material is approximately one *per cent* of the total available running hours in Durgapur Steel Plant. Efforts are being made to reduce the delays.

Ministry stated (December 2022) that shortage of raw material at Bokaro Steel Plant was due to depletion of mining reserve in Kiriburu and Meghahatuburu Mines, shortage in supply of rakes by railways, suspension of production at Barsua mines and delay in obtaining Stage-2 Forest Clearance for developing South Central Block of Kiriburu and Meghahatuburu. Presently, Bokaro Steel Plant is maintaining the required level of buffer stock of iron ore and the same would be ensured in future also. In Durgapur Steel Plant, actions have been initiated for improving reliability of equipment in stock house and also for closer monitoring of stock levels of sinter, coke and iron ore by the respective departments. At Rourkela Steel Plant, the shortfall in production during 2016-17 and 2017-18 was due to blowing down of Blast Furnace. During 2018-19 and 2019-20 the lower production was due to unavailability of iron ore.

Reply may be viewed in the light of the fact that in case of Bokaro Steel Plant reasons such as depletion of mining reserves, suspension of production at Barsua and delay in Stage-2 forest clearance were known to Management. Further, Management was not able to effectively utilise the rakes provided to it as rakes were often loaded less than the permissible carrying capacity[27]. Audit noted that stock was not maintained during 2021-22 and 2022-23 also, as such shortage of iron ore has resulted in inability to produce 91,150 tonnes and 10,500 tonnes of Hot Metal respectively. In Rourkela Steel

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[25] ***Year wise production loss of Saleable Steel due to shortage of raw materials multiplied by year wise average contribution of Saleable Steel. (2016-17:₹13.34 crore, 2017-18: ₹13.73 crore, 2018-19: ₹14.74 crore, 2019-20:₹ 40.04 crore, 2020-21: ₹55.76 crore. 2021-22: ₹66.75 crore, 2022-23: ₹ 6.99 crore).***

[26] ***Year wise production loss of Saleable Steel (Equivalent of Hot Metal) due to shortage of raw materials multiplied by year wise average contribution of Saleable Steel. (2016-17: ₹ 7.86 crore, 2017-18: ₹ 4.20 crore, 2018-19: ₹ 351.63 crore, 2019-20: ₹ 60.02 crore, 2020-21: 119.20 crore, 2021-22: Nil, 2022-23: Nil).***

[27] ***As has been highlighted in Para 12.1 of CAG Report No. 11 of 2018.***

Plant, Audit noted that there was shortage of raw materials of 11,115 tonnes and 4,583 tonnes during 2016-17 and 2017-18 respectively. Further, there was shortage of raw materials during 2018-19, 2019-20 and 2020-21 also. Moreover, Audit has considered only those production losses which are due to shortage of raw materials and resultant inability to earn potential revenue. In Durgapur Steel Plant, though the delay was one *per cent*, such delays have significant financial impact on the Company. The loss of production due to shortage of raw materials amounted to almost 21 *per cent* of the total loss of production during the period 2016-17 to 2022-23.

Ministry further stated (December 2023) that a Committee had been constituted (February 2023) to review the stock holding norms for different raw materials for SAIL Plants and propose changes in the norms, if required. It further added that the Committee had submitted its report on which appropriate action was being taken by Management.

Recommendation 2: The Company may strive to maintain appropriate stock level of iron ore and other raw materials as per prescribed norms to avoid less Hot Metal production.

(B) Emergency procurement due to shortage of iron ore

In order to meet the Annual Business Plan target of Hot Metal production of 5.39 lakh tonnes for the month of March 2021, Bhilai Steel Plant revised its requirement of iron ore lumps from 11,600 to 13,900 tonnes/day. To overcome the shortfall, Bhilai Steel Plant requested (8 March 2021) Raw Materials Division and Rajhara mines for additional rakes. Bhilai Steel Plant's captive mines agreed to supply the pellets (at the rate of three rakes per day i.e.10,500 tonnes per day approx.) by 31 March 2021 whereas Raw Materials Division agreed to supply one lakh tonnes of iron ore from April 2021 onwards. However, to fulfil the deficit, Bhilai Steel Plant placed an order (8 March 2021) on NMDC Limited on emergency basis for supply of 40,000 tonnes of iron ore at ₹ 39.33 crore. Audit noticed that Bhilai Steel Plant was required to maintain stock of iron ore to meet its consumption requirement of 11 to 18 days as per the norm (1,52,900 to 2,50,200 tonnes approximately). But during March 2021, Bhilai Steel Plant was left with iron ore stock of only 12,846 tonnes, which indicated a stock-out situation. Further, as Bhilai Steel Plant's captive mines and Raw Materials Division agreed to despatch the iron ore by 31 March and April 2021 onwards respectively, Bhilai Steel Plant placed order on NMDC for supply of 8,000 tonnes of iron ore to be delivered by 31 March 2021 and balance 32,000 tonnes was to be delivered by 31 August 2021. Thus, Bhilai Steel Plant could have managed its requirement for iron ore from captive mines judiciously through proper planning. Audit did not notice any other instance of such emergency procurement of iron ore due to shortage in any other Steel Plant during the period of audit.

Management/Ministry replied (October 2022/ December 2022) that due to low *Fe* content, slag rate from Blast Furnaces had gone up affecting the total production at Bhilai Steel Plant. To mitigate the shortfall situation, 40,000 tonnes (10 rakes) was sourced from NMDC. However, as per the subsequent requirement and stock

availability, only 3 rakes (12,023 tonnes) were taken from NMDC and remaining was short closed. This resulted in overall benefit for Bhilai Steel Plant.

The reply may be seen in the light of the fact that Annual Business Plan was prepared well in advance. Therefore, Bhilai Steel Plant should have planned to source the iron ore from its captive mines judiciously. Further, despite such procurement from NMDC, Bhilai Steel Plant failed to achieve the production target of March 2021. Against the target of 5.39 lakh tonnes, the actual production was 5.20 lakh tonnes.

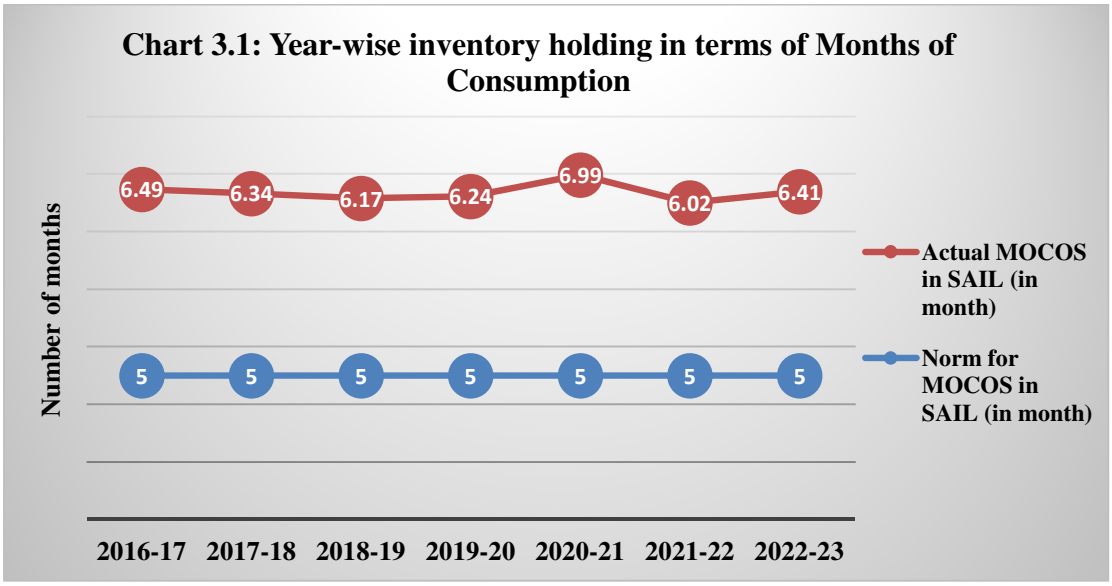
Thus, due to deficient planning, Bhilai Steel Plant resorted to emergency procurement of iron ore from NMDC at a higher price than the cost of production of iron ore from its captive mines. Through better planning, the Company could have avoided the incremental amount of ₹ 8.80 crore that was incurred for such purchase.

3.4 Non-moving/Surplus inventory

3.4.1 Non-compliance with Corporate Material Management Group guidelines on stores and spares regarding inventory holding in terms of months of consumption

As per clause 5.2 of the policy guidelines formulated by Corporate Material Management Group on Inventory Management of Stores and Spares in 2017, inventory holding shall be measured in terms of Months of Consumption. Plants/units may maintain different levels of inventory holding for different material categories in a manner that at any month-end, the overall inventory holding in terms of Months of Consumption shall not exceed five months. Audit noted that total inventory of stores and spares at SAIL Plants increased from ₹ 2,104.93 crore in 2016-17 to ₹ 3,367.54 crore in 2022-23, which showed an increase of ₹ 1262.61 crore (59.98 *per cent*). Further, inventory holding by SAIL, in terms of Months of Consumption, was always high during 2016-17 to 2022-23. It ranged between 6.02 to 6.99 months against the norm of five months. Details are given below:

Chart 3.1: Year-wise inventory holding in terms of Months of Consumption



Source: Inventory and Consumption Report (Stores and Spares) furnished by CMMG, SAIL
Note: MOCOS is Inventory holding measured in terms of Months of Consumption.

Due to non-achievement of the norms by the SAIL Plants/units, significant amount of funds were blocked up in stores and spares. Excess holding of the stores and spares resulted in non-compliance with Corporate Material Management Group Guidelines along with blocking up of funds and avoidable estimated carrying cost of ₹ 328.78 crore[28] (2016-23). This may be viewed in the light of the fact that SAIL borrows funds from Banks and other financial institutions and total borrowings as on 31 March 2023 was ₹ 30,773 crore. Such borrowing of funds and the consequent interest liability could have been reduced by avoiding excess blocking of funds in stores and spares.

Management replied (October 2022) that during 2016-17 to 2020-21, a number of projects under the Modernisation and Expansion Plan were commissioned for which additional operation/maintenance spares were to be procured, thereby adding to overall inventory of stores and spares. Corporate Material Management Group has been taking up the matter with Plants/units for reduction in inventory and adherence with the Inventory guidelines. Audit observation related to regular monitoring/review was noted by the Management.

Audit noted that inventory holding in terms of Months of Consumption was fixed considering all the factors including Modernisation and Expansion plan of SAIL, since most of the Modernisation and Expansion plan projects had already been completed in 2017 when the guidelines were formulated.

Ministry assured (December 2022) that inventory holding in terms of Months of Consumption would be regularly monitored and reviewed with Plants/units.

Audit, however, noted that the MOCOS in 2022-23 and 2023-24 was 6.41 months and seven months respectively which was more than the norms.

3.4.2 Non-compliance with Corporate Material Management Group guidelines on stores and spares regarding non-moving inventory

As per clause 5.6 of the Corporate Material Management Group Guidelines on inventory management, non-moving inventory should not exceed three *per cent* of total inventory[29]. Audit noted that the total non-moving inventory of stores and spares at SAIL Plants increased from ₹ 137.40 crore in 2016-17 to ₹ 212.57 crore in 2022-23, which showed an increase of ₹ 75.17 crore (55 *per cent*). Details of Non Moving Inventory Norms and Actuals in SAIL is given in chart below-

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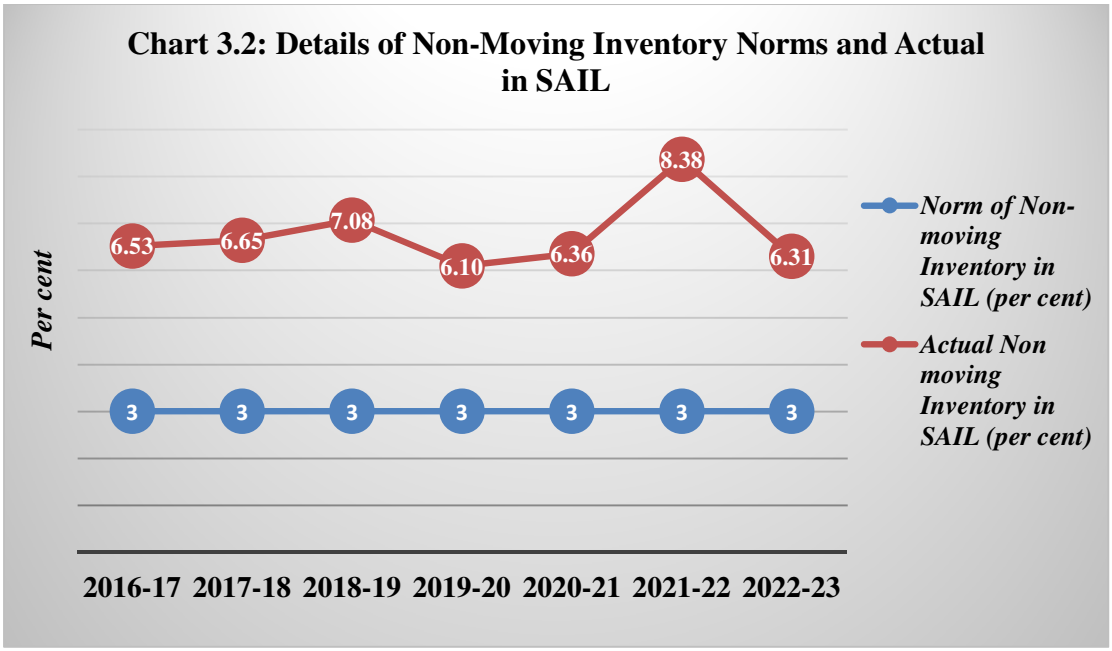
[28] ***Calculated by multiplying the excess inventory beyond Months of Consumption in each year with the cost of finance in respective years.***

[29] ***Total inventory here refers to the inventory of Stores and Spares only.***



Source: Inventory and Consumption Report (Stores and Spares) furnished by CMMG, SAIL

The non-moving inventory ranged between 6.10 *per cent* to 8.38 *per cent* of total inventory in SAIL which was always higher than the norm of three *per cent* during the last seven years. Excess procurement of inventory without considering the requirement resulted in blocking-up of capital in non-moving items.

Management replied (October 2022) that Corporate Material Management Group has been regularly taking up the matter for reduction in inventory, including non-moving inventory and for adherence to the prescribed norms under the guidelines with Plants. Ministry added (December 2022) that non-moving inventory would be regularly monitored and reviewed with Plants/units. Efforts would be made to reduce the levels to within norms. SAIL further stated (January 2023) that status of non-moving inventory is reviewed every quarter at Head of Material Management Department's level.

Audit, however, noted that during the period 2023-24, the total non-moving inventory further increased to ₹ 272.86 crore which was 7.10 *per cent* of total inventory

Recommendation 3: The Steel Plants may adhere to the Corporate Material Management Group Guidelines and reduce the non-moving/surplus inventory so as to avoid the blocking of funds. Steel Plants may constitute a Committee for quarterly review so that stipulated norms could be achieved.

3.4.3 Higher Inventory holding of Finished Products

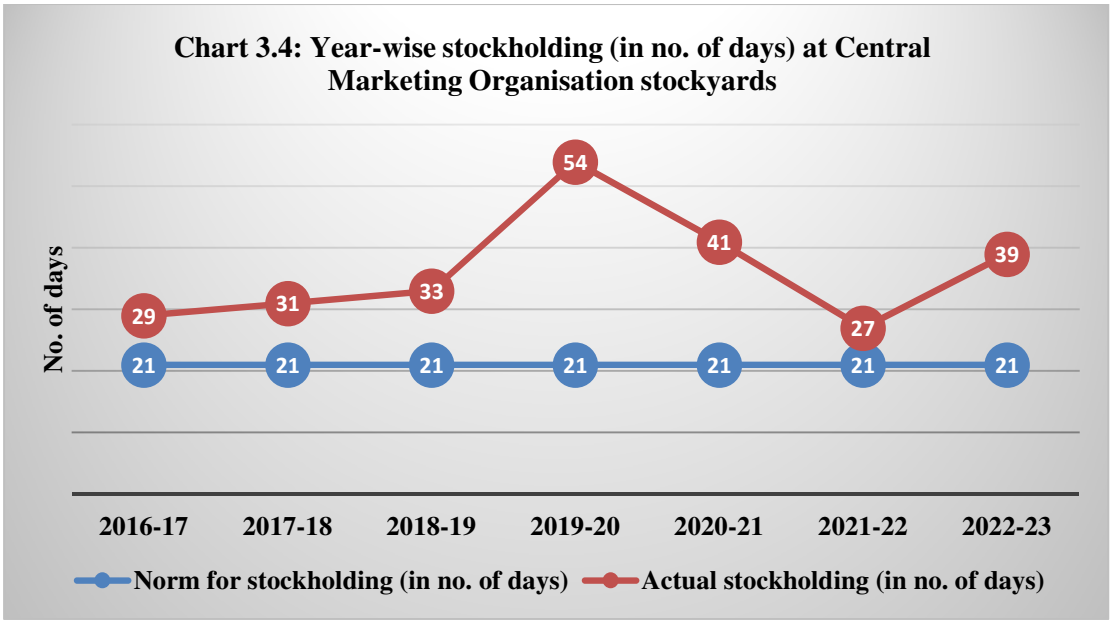
SAIL was to maintain stock of 21 days (approx.) of stockyard sales in the stockyards to achieve sustainable level of sales. Audit Committee of the Company also emphasised (August 2019) for early disposal of the old stock to avoid carrying costs, release the working capital blocked for operations and reduce stress on borrowings. The inventory holding and consequential inventory carrying cost depicted an increasing trend till

2019-20 and it decreased during 2020-22 and again increased in 2022-23 as shown below:

Source: Business Intelligence Report of Central Marketing Organisation and Annual Report of SAIL

In this regard, Audit noticed the following:

During the period 2016-17 to 2022-23, the closing stock at Central Marketing Organisation stockyards was between 27 and 54 days of stockyard sales of the respective year against the desired level of 21 days as depicted below:



Source: Business Intelligence Report of Central Marketing Organisation

- The inventory holding was higher than the target in 75 months out of 84 months during 2016-2023.
- Instead of maintaining the stock of 21 days sales in respect of each product, the stock level was maintained considering all products together. This resulted in possibility of accumulation of products with less demand and lesser stock of

products which were in greater demand by the customers. This is evident from the fact that, on the one hand while consistently excess stock of finished goods was being held by the Steel Plants, they were also unable to supply materials as per the orders booked by the Central Marketing Organisation (as discussed in para 6.2).

- Reasons for accumulation of stocks at branch level was attributed by the Management to the movement of materials against anticipated requirements of customers based on business scenario, production of products not covered by order/excess production, filler materials moved to facilitate despatch of rakes etc. The reasons cited by Management, however, were operational issues which could have been mitigated by better planning and despatch arrangements.
- Considering the amount blocked as a result of excess inventory holding, SAIL was burdened with additional inventory carrying cost of ₹ 584 crore[30].

Management replied (October 2022) that considering year-wise total sales during the period 2016-2021 and closing stock at the end of each financial year, the stock in number of days of total sales was 5 days at the end of 2020-21. It also stated that certain stock was consciously maintained at stockyards to service requirements of MSMEs and smaller consumers.

The reply may be viewed in the light of the fact that the norm of 21 days fixed by the Management was that of stockyard sales and not total sales[31]. Further, Chairman, SAIL had directed (April 2016) to bring down overall stock in stockyard system including stock in transit to 15 days sales. Also, the suggestion of Chairman (November 2018) to work out branch-wise and product-wise optimum stock levels for each location on a scientific basis was not adhered to, which could have helped in identifying service requirements of MSMEs and smaller consumers.

Ministry stated (December 2022) that in the event of orders released by customers not being adequate to ensure mill loading, stockyard orders were released to load mills to a reasonable extent, evacuation of which sometimes got delayed leading to inventory build up beyond planned thresholds.

Audit noted that the Board of Directors, while reviewing the financial statements for the year 2014-15, had desired that aggressive marketing efforts were required to reduce the inventory level. It was evident from the Action Taken Note submitted to the SAIL Board in this regard that target for inventory holding of finished steel at stockyards of Central Marketing Organisation was fixed with reference to stockyard sales and not total sales. Further, the reply may be seen in the light of fact that higher inventory buildup in CMO stockyards was noted in 55 out of 60 months covered in audit.

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[30] ***Considering average interest on the borrowings by SAIL for the respective years calculated in respect of excess stock holding beyond 21 days of stock.***

[31] ***Total sales by Central Marketing Organisation includes direct despatch and stockyard sales. In direct despatch, materials produced by the steel plants are despatched from the plant mainly by wagons to the nearest private/public booking point of the customers. In case of stockyard sales, materials produced by different steel plants are despatched from the plant to 49 stockyards of SAIL across the country from where sales take place.***

During the Exit conference (January 2023), SAIL further intimated that a Committee shall study and prepare the norms of optimum stock levels at Stockyards within a span of 6 months.

The Committee constituted (January 2023) to work out branch-wise and product-wise optimum stock level for each location on a scientific basis had recommended (June 2023) to revise the norm for stockholding at CMO stockyards from 21 to 33-35 days of stockyard sales. Ministry intimated (December 2023) that the Committee had submitted a report for the same and appropriate action was underway.

Some specific instances of non-moving stock of finished goods are cited below:

A. Blooming and Billet Mill of Bhilai Steel Plant is designed to roll Ingots into semis like Blooms, Billets, Slabs and Structural. The Mill has remained closed since April 2020. Audit noted that there was no sales of narrow slabs after 2015-16 and 38 tonnes of narrow slabs were produced during April 2016 to March 2020. 841 tonnes of narrow slab valuing ₹ 3.02 crore lay undisposed since 31 March 2016. Management replied (October 2022) that the material would be offered for sale as per procedure. Ministry added (December 2022) that chemical analysis of individual slabs had been completed. Audit further noted (June 2024) that material has been shifted to the Material Recovery Department for sale as rejected material/internal use as scrap.

B. Bokaro Steel Plant produces coils in Hot Rolled Coil Finishing shop on the basis of demand and production capacity of the Plant. Audit noted that 12,109 tonnes of coil valuing ₹ 35.07 crore produced during 2014-15 to 2020-21, was pending for disposal (as on 31 March 2021) due to lack of demand or materials produced not covered by orders. The deterioration in quality of the material cannot be ruled out with passage of time.

Management replied (October 2022) that after control over Corona pandemic and upsurge in market demand, all the above mentioned stock of coils had been despatched successfully. Reply of the Management may be seen in the light of the fact that as per SAP system the coils lay undisposed at Bokaro Steel Plant and Central Marketing Organisation. Ministry assured (December 2022) that entire Hot Rolled Coil produced and despatched during the period covered in Audit i.e., from 2015 to 2021 would be reconciled in next three months and necessary correction would be made in the SAP system.

Audit further noticed the quantity lying in stock over the years was dispatched to stockyards. During 2021-22 to 2023-24, 383 tonnes of coils were yet to be disposed of (July 2024).

3.5 Blocking up of funds due to improper assessment of requirement of rolls

(i) Bokaro Steel Plant procures different types of rolls as per requirement of the Rolling mills through Central Procurement Agency. As per Corporate Material Management Group Guidelines (Para 5.2), SAIL was to maintain a stock of rolls equivalent to nine months' consumption. Considering this norm, stock of 45 rolls (based on its annual average consumption i.e., 60/12*9 rolls) was to be maintained.

A task force was constituted for procurement of forged rolls through Central Procurement Agency for 2017-2020 cycle. The basis of procurement was average annual consumption of 60 rolls of the mill. Accordingly, for procurement period of 2017-18, 2018-19 and 2019-20, 180 rolls were required. However, task force proposed a requirement of 468 rolls for the 2017-2020 cycle and approved procurement of 152 rolls.

In this regard, Audit noted the following in respect of forged rolls:

- At the time of finalisation of order for 152 rolls (March 2017), 129 rolls were in stock and 116 rolls were pending for supply.
- 183 rolls were received (May 2015 to August 2018) against purchase order placed in June 2014. During 2018-19 to 2021-22, Bokaro Steel Plant consumed 156 rolls of these 183 rolls and 27 rolls were still available in stores. Another 152 rolls were purchased and received during October 2019 to March 2022. As on 31 March 2022, stock of 179 (152+27) rolls was accumulated instead of 45 rolls as per the prescribed norms.
- Improper assessment of requirement of rolls resulted in excess holding of 134 (179 - 45) rolls beyond the norms and blockage of funds amounting to ₹ 23.38 crore[32] on this account.
- Since the rolls could not be utilised within the guarantee period of three years from the date of Goods Receipt Note, further loss on account of deterioration of quality and expiry of guarantee cannot be ruled out.

Management/Ministry replied (October 2022/December 2022) that there was fire incident in Tandem Mill 2 and subsequent Corona pandemic induced market crash which led to complete stoppage of mill between November 2019 and October 2020. Production was also affected due to Corona pandemic in first six months of 2021. Rolls had long lead time of procurement.

The reply of Management/Ministry may be viewed in light of the fact that Audit has pointed out regarding improper assessment of only one type of roll i.e. the forged rolls and rolls used in the Tandem Mill are not related to the audit observation. Further, incorrect assessment was made by Management during 2017-18 to 2019-20, whereas impact of Covid pandemic started from March 2020. Also, as the order for rolls was placed for three years, it would have taken care of the long lead time in purchase of rolls.

Audit further noted that despite having the stock, Management procured 30 rolls in 2022-23 resulting in accumulation of stock to 206 rolls as on 31 March 2024.

3.6 Extra expenditure on procurement of Silico Manganese

Chandrapur Ferro Alloy Plant is a captive supplier of Ferro alloys to the Steel Plants of SAIL. The production of ferro alloys from Chandrapur Ferro Alloy Plant during

[32] ***Average cost per roll (₹ 17.45 lakh) * 134 being the number of rolls that remained blocked = ₹ 23.38 crore.***

2016-17 to 2020-21 was 1.53 lakh tonnes lower in comparison to the quantity as per Annual Business Plan (4.87 lakh tonnes) and 3.66 lakh tonnes lower than the rated capacity (7 lakh tonnes). Reasons for lower production was less availability of coke in 2017-18 to 2019-20, due to frequent interruptions in the supply of coke from SAIL Steel Plants and operation of the Submerged Arc Furnace at very low loads due to poor condition of Furnaces.

Audit noticed that due to less production, requirement of Silico Manganese of SAIL Plants could not be met by Chandrapur Ferro Alloy Plant and the Plants procured additional quantities from private parties by incurring extra expenditure. Audit noted that there had been a shortfall of 1.53 lakh tonnes in supply of Silico Manganese by Chandrapur Ferro Alloy Plant which led to extra expenditure on procurement of Silico Manganese by Bhilai and Rourkela Steel Plant amounting to ₹45.41 crore[33] during the years 2017-18, 2018-19 and 2020-21. During 2021-22 and 2022-23, landed cost price of Silico Manganese procured from private party was lower than the landed cost price of Chandrapur Ferro Alloy Plant.

Management/Ministry replied (October 2022/December 2022) that total load of Submerged Arc Furnace was maintained at 39 MW against 50 MW envisaged in the Annual Business Plan 2018-2019 due to various constraints like availability of coke, other raw materials etc. Delay in commissioning of Submerged Arc Furnace 3 led to lower production.

Thus, the inability of the Management to streamline the operations of Submerged Arc Furnaces at desired loads and ensure availability of coke led to lower production than the Annual Business Plan. Consequently, SAIL was unable to meet the Silico Manganese requirement of Steel Plants and extra expenditure was incurred by the Company.

3.7 Avoidable Procurement of Coal Bed Methane gas at Alloy Steels Plant

Coke Oven gas is a by-product generated during steel making. It has high calorific value and proper utilisation of the gas helps to minimise purchase of other costly gases. The Coke Oven gas generated by Durgapur Steel Plant is stored in Gas holders. The balance gas, after meeting requirement of Durgapur Steel Plant, is supplied to Alloy Steels Plant, Durgapur through a gas pipeline with the help of gas boosters to maintain the required pressure. The shortfall in availability of Coke Oven gas is met through procurement of Coal Bed Methane gas by the Alloy Steels Plant. On the other hand, when demand for Coke Oven gas is less than the availability, the excess gas is bled into air to reduce the gas pressure. Such bleeding of Coke Oven gas causes air pollution.

Audit noticed that during 2016-17 to 2022-23, Alloy Steels Plant procured 882.19 lakh standard cubic meter of Coal Bed Methane gas for ₹ 221.65 crore whereas, Durgapur

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[33] ***Calculated based on difference between Annual Business Plan and Actual production of Silico Manganese multiplied by cost difference (Average landed cost of Silico Manganese at Bhilai Steel Plant and Rourkela Steel Plant - Variable cost of Silico Manganese at Chandrapur Ferro Alloy Plant - Additional freight from Chandrapur Ferro Alloy Plant.***

Steel Plant bled 586.31 lakh Nm^3 of Coke Oven gas which could have replaced 295.58 lakh standard cubic meter of Coal Bed Methane gas. Thus, had the Coke Oven gas bled/wasted by Durgapur Steel Plant been utilised by Alloy Steels Plant, it could have avoided procurement of 295.58 lakh standard cubic meter of Coal Bed Methane gas and saved ₹ 59.19 crore[34]. Further, out of three existing gas boosters installed at Durgapur Steel Plant for supply of Coke Oven gas to Alloy Steels Plant, only one was in running condition which affected the supply of Coke Oven gas.

Management/Ministry replied (October 2022/ December 2022) that after replacement of the damaged gas pipeline, the Coke Oven gas flow had improved since October 2022. The 2nd Gas booster was commissioned (May 2023) and after its installation the Coke Oven gas supply from Durgapur Steel Plant to Alloy Steels Plant had improved.

Thus, had the Management supplied the Coke Oven gas which was bled into the air by Durgapur Steel Plant to Alloy Steels Plant, procurement of Coal Bed Methane gas by Alloy Steels Plant, could have been avoided.

3.8 Summing up:

The Corporate Material Management Group, SAIL had formulated (June 2017) Policy Guidelines on Inventory Management of stores and spares. However, there were no guidelines for inventory management of raw materials and work-in-progress, formulated either by SAIL Corporate Office or any of the Plants. SAIL, on an average, had an inventory of ₹ 21,698 crore during 2016-17 to 2022-23 which constituted about 67 *per cent* of its current assets. Despite this, Company had not fixed any benchmark for inventory carrying cost per tonne of raw material, semi-finished material and finished goods.

Audit noted instances relating to non-maintenance of stock levels, shortage of raw materials like coke, sinter due to which Blast Furnace was put under off-blast state resulting in inability to produce Hot Metal of 9.32 lakh tonnes and inability to earn potential revenue of ₹ 1,231.52 crore at Rourkela, Bokaro and Durgapur Steel Plants. Bhilai Steel Plant resorted to emergency procurement of iron ore which resulted in additional expenditure of ₹ 8.80 crore towards purchase of 12,023 tonnes of iron ore. Non-compliance of Corporate Material Management Group guidelines on Inventory Management of stores and spares and non-moving/surplus inventory and higher Inventory holding of Finished Products were also noted. This led to blocking up of funds and additional carrying cost of ₹ 912.78 crore.

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[34] ***Calculated based on equivalent replacement of Coke Oven Gas with Coal Bed Methane Gas multiplied by per unit price of Coal Bed Methane Gas. Price of Coke Oven gas has been taken as nil as the same was bled out.***

Chapter 4

Chapter 4 Procurement of Inventories

4.1 The Material Management Department in each of the steel plants is responsible for procurement of materials, inspection and their storage. The procurement of materials is governed by the Purchase Contract Procedure of the Company, which is revised from time to time. Corporate Material Management Group monitors material management activities in Plants; facilitates and coordinates centralised procurement of high value items and initiates long term tie-ups and Memoranda of Understanding for major raw materials and equipment. Import of coal is governed by SAIL's policy for Import of coal and coke.

Audit of procurement of inventories was conducted based on the sample drawn from the total purchase orders issued in each Plant/unit. Out of 1,43,947 purchase orders (excluding coking coal and refractories items) valuing ₹ 41,748 crore issued during 2016-17 to 2020-21, 1,147 purchase orders valuing ₹ 24,539.45 crore were selected for audit. The basis of selection of sample has been discussed in para 2.5 of Chapter-2.

Audit objective was to assess whether a consistent, uniform and well documented policy and guidelines for procurement of materials existed in the Company; requirements of materials were determined realistically and procurement process was fair, equitable, transparent and in line with the policies and guidelines, ensuring efficiency, economy and accountability.

Audit examined purchase requisitions, tender documents, price estimates, minutes of purchase/tender committee meetings, consumption patterns, Inventory Status Reports, Physical Verifications Reports etc., in the steel plants. Policy for coal import, Memoranda of Understanding with coal supply companies, tender related files, minutes of Empowered Joint Committees for coal import, Agreements for coal import, correspondence files etc., were also examined.

SAIL largely follows Purchase/Contract procedures of the Company. Some cases of non-adherence of Purchase Contract Procedure/guidelines in placement of Purchase Orders and improper price discovery in procurement of materials in SAIL Plants were noted. There was inconsistency in achieving the purchase order lead time target in all SAIL Plants. Memoranda of Understanding with coal supplier companies for purchase of indigenous coal were not finalised which led to non-recovery on account of grade slippage. SAIL incurred extra expenditure on demurrage paid to the vessel owner as well as higher storage cost at port on imported coal.

These issues have been further discussed in detail in the succeeding paragraphs.

4.2 Non-adherence of Purchase Contract Procedure/guidelines

SAIL prepares and follows the Purchase Contract Procedure which is modified from time to time. Different clauses in Purchase Contract Procedure have fixed the timelines for different activities involved in the issuance of purchase orders. Time allowed

between the raising of indent by the department concerned and placement of purchase order was around six months (186 days).

Audit reviewed the time taken in placement of purchase orders and noted delays. Audit noted that out of 1,55,087 purchase orders[35] issued during 2016-17 to 2022-23, the purchase orders were issued within the stipulated time in 90.29 *per cent* cases. However, in 15,087 cases (9.71 *per cent*) the Steel Plants of SAIL took more days than the stipulated time in issuance of purchase orders. The delay ranged between 187 to 365 days in 11,420 cases, 366 days to 1,000 days in 3,459 cases and more than 1,000 days in 178 cases. The year wise details are given in the table below:

Table 4.1: Delay in placement of Purchase Orders during 2016-17 to 2022-23

Year	Total Purchase Orders	Upto 186	No. of days taken in placement of Purchase Orders				Delayed Purchase Orders	
			187 to 365	366 to 500	501 to 1000	1001 and above	Numbers.	In *per cent*
2016-17	20406	18473	1390	305	208	30	1933	9.47
2017-18	19452	17033	1735	330	319	35	2419	12.44
2018-19	21323	18862	1817	371	248	25	2461	11.54
2019-20	20862	18696	1678	295	179	14	2166	10.38
2020-21	21502	19192	1789	294	211	16	2310	10.74
2021-22	25851	23779	1687	216	145	24	2072	8.02
2022-23	25691	23995	1324	206	132	34	1696	6.60
Total	**1,55,087**	**1,40,030**	**11,420**	**2,017**	**1442**	**178**	**15057**	**9.71**

Source: Data from SAP obtained from Management

As stated by the Management, the reasons for delay in issuance of purchase orders were delay in release of purchase requisitions, issue of tender enquiry, formation of Technical Committee, delay in evaluation of offers etc. Thus, the norms stipulated by Purchase Contract Procedure was not adhered to in about 10 *per cent* of the cases.

Apart from above, Steel Plants fixed the norm for lead time[36] for purchase orders ranging between 49 and 70 days. Audit reviewed the lead time taken by the Plants in respect of all the purchase orders and observed that the norm was not achieved in Bokaro Steel Plant and Bhilai Steel Plant in any of the years during 2016-17 to 2022-23 (except during 2016-17 and 2022-23 in Bhilai Steel Plant). Durgapur Steel Plant had achieved the norm in 2016-17, 2018-19, 2019-20 and 2022-23 whereas Rourkela Steel Plant had achieved the same in 2016-17, 2018-19 and 2022-23. In IISCO Steel Plant, the norm for lead time was achieved in 2021-22 and 2022-23. The details are given in the table below:

[35] ***As against 1,43,947 purchase orders placed during 2016-17 to 2020-21, for the purpose of delay in placement of orders, data in respect of only 1,03,545 purchase orders in respect of units where SAP was implemented could be analysed. At IISCO Steel Plant, SAP was implemented in July 2019. During 2021-22 and 2022-23, all Purchase orders (51,542), in respect of all five integrated steel plants were analysed.***

[36] ***Lead time means the time between the date of acceptance of purchase requisition to the date of placement of purchase order of a material by the Material Management Department.***

Table 4.2: Norms and Average actual lead time for purchase order for Steel Plants during 2016-17 to 2022-23

(Values in days)

Year	Bokaro		Durgapur		Bhilai		Rourkela		Burnpur[37]	
	Norm	Actual	Norm	Actual	Norm	Actual	Norm	Actual	Norm	Actual
2016-17	55	64	52	52	70	66	70	64.50	-	-
2017-18	55	93	58	60	55	84	70	73.38	-	-
2018-19	55	82	55	52	70	79	65	62	-	-
2019-20	55	84	55	50	65	78	55	61.92	-	-
2020-21	55	104	55	63	65	67	55	61.59	-	-
2021-22	55	106.52	49	53	62	65	55	67.02	55	49
2022-23	55	74.61	52	48	58	55	60	57.39	49	42

Source: Norm and actual lead time furnished by respective Plant Management

It was noted that actual lead time for purchase orders showed an increasing trend in case of Bokaro Steel Plant which was almost double of the norm in 2021-22. The lead time has however reduced to 74.61 days in 2022-23 compared to 106.52 days in 2021-22. It was also noted that in case of Durgapur Steel Plant actual days were within the norm mostly during 2016-17 to 2022-23 and could have been kept as benchmark by other Steel Plants.

Management/Ministry replied (October 2022/ December 2022) that in Bokaro Steel Plant, 50 *per cent* of purchase orders were placed within 50 days. Management is targeting to reduce the lead time to 55 days in the remaining cases. It further stated that continuous efforts were being made in Rourkela, Durgapur and Bhilai Steel Plants for system improvements to reduce the lead time and to adhere to the timelines stipulated in Purchase Contract Procedure. Audit noted that although norms were achieved in Rourkela, Durgapur and Bhilai during 2022-23, Bokaro Steel Plant could not achieve the norm in 2022-23.

Recommendation 4: Company may make effort for timely issuance of purchase requisition and tender enquiry etc., so that the timelines stipulated under Purchase Contract Procedure in respect of placement of purchase orders and the lead time in purchase orders is complied with. Higher management and Board may review the exception reports at regular intervals.

4.3 Procurement of Coal

Central Coal Supply Organisation of SAIL at Dhanbad procures indigenous coking coal and boiler coal of various grades for the steel plants from Central Coalfields Limited, Bharat Coking Coal Limited, Mahanadi Coalfields Limited, South Eastern Coalfields Limited and Western Coalfields Limited. Central Coal Supply Organisation of SAIL finalises Memorandum of Understanding (for coking coal)/Fuel Supply Agreements

[37] ***At IISCO Steel Plant, Burnpur SAP was implemented in July 2019 and Purchase Order lead time functionality was implemented in SAP in 2021-22. Hence, the data in respect of previous years was not available.***

(for boiler coal) with the coal companies to ensure continuous availability of coal to the Steel Plants. Among other details, the Memorandum of Understanding/Fuel Supply Agreements stipulate the annual contracted quantity, grade of coal required, performance incentive payable on achieving 90 *per cent* of annual contracted quantity, amount recoverable from the coal suppliers on grade slippage etc. Audit noted instances of avoidable expenditure incurred by SAIL on account of procurement of coal, grade slippage, loss in transit etc., and have been discussed in paras below.

The Coal Import Group at the Corporate Office, SAIL coordinates import of coking coal under long term agreements or global tender or Expression of Interest or spot purchase through online trading platforms. SAIL formulated a policy for import of coal and coke. Audit noted lapses on the part of SAIL in non-calling of global tenders and delays in finalising Expression of Interest leading to inability of SAIL to develop a new vendor base during the last seven years from 2016-17 to 2022-23 which are also discussed in paras below.

4.3.1 Extra expenditure on procurement of boiler coal beyond the Fuel Supply Agreement quantity

SAIL has Fuel Supply Agreement (FSA) with Bharat Coking Coal Limited (BCCL) for procurement of boiler coal for its captive power plants with annual contracted quantity of 0.31 million tonnes. As per clause 4.10.1 of the Fuel Supply Agreement, SAIL was to pay incentive, if the seller delivered more than 90 *per cent* of the annual contracted quantity of coal.[38] Audit noted that SAIL lifted 152.73 *per cent* of Fuel Supply Agreement quantity (0.48 million tonnes) from Bharat Coking Coal Limited in 2020-21, despite availability of coal from other suppliers under existing Fuel Supply Agreements. SAIL procured coal from Bharat Coking Coal Limited at ₹ 3,456 per tonne whereas coal procured from other suppliers (subsidiaries of Coal India Limited) was between ₹ 891 per tonne and ₹ 3,174 per tonne.

Audit noticed that SAIL lifted only 61.18 to 71.5 *per cent* of Fuel Supply Agreement quantity from other sources. Hence, quantity to be lifted from Bharat Coking Coal Limited could have been kept within Annual Contracted Quantity by increasing the quantity to be procured from other sources. Further, the Steel Plants were also regularly asking to stop supply of Bharat Coking Coal Limited coal due to sufficient availability of stock. Thus, excess procurement of 0.17 million tonnes of coal from Bharat Coking Coal Limited resulted in avoidable expenditure of ₹ 4.65 crore[39]. Further, excess procurement of coal has also made SAIL liable for avoidable payment of performance incentive of ₹ 19.57 crore to Bharat Coking Coal Limited. Audit further observed that during 2022-23, Boiler coal procured from Bharat Coking Coal Limited was more than 90 *per cent* of the annual contracted quantity. As such, Bharat Coking Coal Limited claimed Performance Incentive of ₹ 35.85 crore. Out of this, the claim of ₹ 33.85 crore

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[38] ***Performance Incentive is to be calculated on the basis of quantity supplied over and above 90 per cent.***

[39] ***It is excess coal purchased from Bharat Coking Coal Limited multiplied by difference between rate of coal from Bharat Coking Coal Limited and that from the next cheaper supplier with whom SAIL had a Fuel Supply Agreement.***

was dropped by Bharat Coking Coal Limited. The balance amount of rupees two crore was paid by SAIL to Bharat Coking Coal Limited.

Management replied (October 2022) that supply of boiler coal from Bharat Coking Coal Limited above Fuel Supply Agreement was taken only to meet the requirements of power Plants in the absence of coal availability from other subsidiaries as well as augmentation of washed coal for SAIL Plants. Ministry replied (December 2022) that higher quantity of boiler coal supplied by Bharat Coking Coal Limited during earlier years was primarily on account of supply of mix rakes since production of washed coking coal at Bharat Coking Coal Limited washeries was inadequate to form a full rake load.

Reply of the Management may be viewed in the light of the fact that Steel Plants had sufficient stock of indigenous coal and they regularly requested Central Coal Supply Organisation to stop the supply of coal from Bharat Coking Coal Limited. Reply of Ministry may be seen in the light of the fact that the extra coal procured from Bharat Coking Coal Limited was not required by Steel Plants. Moreover, as per the Fuel Supply Agreement, providing full rake of coal was responsibility of Bharat Coking Coal Limited.

Ministry further assured (December 2023) to ensure that neither Performance Incentive nor penalty is paid by SAIL. It further stated (December 2023) that Company has signed a Memorandum of Understanding with Bharat Coking Coal Limited for supply of washed coal from TSL washery and Bharat Coking Coal Limited has assured that performance incentive would not be levied for coal supplied under the Memorandum of Understanding. Further, supply of boiler coal from Mahanadi Coalfields Limited and South Eastern Coalfields Limited was only 15 *per cent* and 21 *per cent* in 2022-23 as such coal supplied by Bharat Coking Coal Limited during 2021-23 was within Fuel Supply Agreement.

Ministry has furnished the reply with reference to supply of Boiler coal from Bharat Coking Coal Limited for the year 2021-22 to 2023-24 (October 2023), however, Audit has commented upon performance incentive to be levied on excess coal procured during 2020-21 under Fuel Supply Agreement.

Recommendation 5: Company may monitor and regulate the quantity of coal supplied under Fuel Supply Agreements by different suppliers as per requirement of the Plants since, shortfall/ excess in lifting of coal results in either payment of penalty or performance incentive.

4.3.2 Non-recovery towards grade slippage due to non-finalisation of Memorandum of Understanding with Central Coalfields Limited

As per the Memorandum of Understanding signed between SAIL and Bharat Coking Coal Limited (2018-19) and Central Coalfields Limited (2017-18), price of coal would be adjusted based on ash percentage on the basis of third-party sampling. Memorandum of Understanding with Bharat Coking Coal Limited and Central Coalfields Limited was pending finalisation since 2018-19 and 2017-18 respectively. Pending the finalisation

of Memorandum of Understanding, SAIL had been paying an adhoc price for coal agreed by Central Coalfields Limited and Bharat Coking Coal Limited.

Audit noted that in case of Bharat Coking Coal Limited, sampling analysis and recovery due to grade slippage (adjusted from the bills) was carried out as per the provisions of last Memorandum of Understanding. However, no such deduction was made in case of Central Coalfields Limited because SAIL and Central Coalfields Limited did not depute any third party for sampling during 2017-18 to 2019-20. Third party was, however, deputed in November 2019 and although grade slippage was noticed (₹ 55.63 crore in 2020-21 and ₹ 37.28 crore in 2021-22), no adjustment for grade slippage was made. Management stated that deduction would be done after finalisation of Memorandum of Understanding.

Audit noticed that since third party analysis was not done up to November 2019 in case of Central Coalfields Limited, Management would not be able to deduct grade slippage for the said period. Since SAIL had been deducting grade slippage from Bharat Coking Coal Limited, the same should have been deducted from Central Coalfields Limited also. Non-deduction in grade slippage resulted in non-recovery of ₹ 349.28 crore up to 2021-22[40] from Central Coalfields Limited as computed by the Management based on the joint sampling carried out with Central Coalfields Limited. Thereafter no claim was outstanding against Central Coalfields Limited for the grade slippage in view of finalisation of Import Pricing Mechanism from 2022-23.

Management replied (October 2022) that a Joint Committee of SAIL and Central Coalfields Limited officials has been formed to discuss pricing and other modalities for supply of washed coking coal from Central Coalfields Limited to SAIL Plants. Needful action would be taken based on recommendation of the Joint Committee. Management however, did not furnish reasons for non-recovery of grade slippage from Central Coalfields Limited in the reply.

Ministry stated (December 2022) that modalities for finalisation of washed coal price from Central Coalfields Limited was under process and necessary action would be initiated based on mutual agreement between SAIL and Central Coalfields Limited.

Reply of the Ministry may be viewed in the light of the fact that modalities for finalisation of washed coal price with Bharat Coking Coal Limited was also pending but necessary deduction was being made for deficiency in quality. However, in case of Central Coalfields Limited, no deduction was being done by the Management. However, the fact remained that as on 31 March 2022, ₹ 349.28 crore was recoverable from Central Coalfields Limited on account of grade slippage.

Audit further noted that the amount of grade slippage due to non-finalization of MoU upto the year 2021-22 has not been received. However, after finalisation of price based on Import Parity Mechanism (March 2024), the reconciliation is going on and there were no disputes.

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[40] ***2018-19: ₹ 127.08 crore, 2019-20: ₹ 129.93 crore, 2020-21: ₹ 55.63 crore, 2021-22: ₹ 36.64 crore.***

4.3.3 Loss of coal in transit

Indigenous coal procured through the Central Coal Supply Organisation of SAIL is despatched from the collieries through rail. As per the agreements, payment for the coal is made on the basis of weighment by the Railway owned weighbridges. Thus, loss of material during transit is borne by SAIL. To control the transit loss, SAIL Board fixed (March 2004) norm for transit loss of coal at 4 *per cent*. However, shortage between the loading end and unloading end was up to 34.95 *per cent*. SAIL might have suffered a loss of ₹ 41.96 crore due to shortage of 61,193 tonnes of coal in transit beyond the norm during 2016-17 to 2020-21. However, during 2021-22 to 2022-23, the transit loss in both coking coal and boiler coal was less than two *per cent* which was within the prescribed norm of four *per cent*.

Management replied (October 2022) that certain loss took place enroute due to jerks at the time of movement of coal rakes, wind factor etc. Besides, there was normal moisture drop in washed coal by the time the rake was weighed at the Plant end. In some cases, difference in loading end and Plant end reports also occurred due to erroneous functioning of weighbridge at either end. Corrective actions, if any required, based on high transit loss observed from any particular source/at any particular steel plant was being taken.

Reply of the Management may be viewed in light of the fact that the reasons for loss highlighted by Management were of normal nature and would have been considered while finalising norm for transit loss.

Ministry replied (December 2022) that reasonable steps had been taken to minimise the transit loss and avoid occurrence of any instance of abnormal losses in this regard.

4.3.4 Non-development of vendor for import of coal and coke

Coal Import Group of SAIL deals with procurement of metallurgical coking coal, like hard coking coal, soft coking coal and coal dust injection/ pulverised coal injection under long term agreement or global tender or Expression of Interest or spot purchase through online trading platforms. SAIL formulated a policy for import of coal and coke which is revised from time to time. The main objectives of the policy are to reduce risk of non-availability of the required quantity of desired quality of imported metallurgical coal and coke for uninterrupted operation of Steel Plants, controlling the cost of procurement and broadening the long term supplier's base. However, in this regard, Audit noted the following:

A. Non-Calling of Global Tender

As per SAIL Policy for Import of coal and coke, at least 90 *per cent* of the total annual requirement of imported metallurgical coal may be tied up through long term agreement including quantities which are procured through Expression of Interest. The remaining quantity not covered under long term agreement/Expression of Interest would be procured through global tender/spot purchase through online trading platform.

During 2016-17 to 2022-23, total requirement of imported coal in SAIL was 110.77 million tonnes, of which SAIL imported 104.10 million tonnes (94 *per cent*) coal through long term agreement suppliers. Audit noticed that SAIL had not invited any global tender for procurement of imported coal during the period 2016-17 to 2022-23.

Management replied (October 2022) that global tenders were not issued during the said years as required quantity of imported coal was met through suppliers under long term agreements. Ministry replied (December 2022) that the suggestion of Audit was noted for future procurements.

Audit noted that Management has taken initiative and issued Global Tender during 2023-24. Three global tenders were issued, two were cancelled due to non-fulfillment of commercial conditions and in one case, Contract was awarded in July 2023 for the supply of 1,50,000 MT of coal for pulverised coal injection.

B. Delay in processing of Expression of Interest

To broaden the suppliers base for imported coal, SAIL issues Expression of Interest[41] from overseas producers/suppliers which remains open throughout the year. As per the invitation for Expression of Interest, the bidders were to be intimated regarding their acceptability or otherwise of the bid within six months (during 2016-17 to 2019-20), which was revised to five months (since 2020-21), subject to receipt of necessary clarifications/documents as per the timelines indicated by SAIL. The overall timeframe for completion of finalisation of Expression of Interest was 10 months (during 2016-17 to 2019-20) and seven months (since 2020-21) from the submission of sample. A large vendor base increases competition and leads to more competitive prices for the Company. During 2016-17 to 2021-22 (January 2022), 39 Expressions of Interest were received out of which 36 were closed due to non-fulfilment of eligibility criteria and three were under scrutiny.

Audit noted the following:

- A vendor from Switzerland submitted (September 2019) his Expression of Interest bid and cleared its Pilot Oven test in February 2020. The Draft Trial agreement was signed in January 2022 after a lapse of more than two years since submission of bid.
- A vendor from Mongolia submitted (December 2020) Expression of Interest bid. Pilot Oven test was carried out in April 2021 and technical evaluation was under process (as on November 2022).

[41] ***SAIL issues open invitation for Expression of Interest from overseas producers/suppliers of coal. Bidders are required to submit sample of coal. On successful testing of sample (Pilot Oven test), the technical bid is evaluated by Coke Ovens Experts Committee and bid is evaluated by Tender Evaluation Committee. On recommendation by these Committees for acceptance of bid, price is negotiated. The Trial shipment is obtained and tested for technical suitability at SAIL Plants. The supplier is then asked to supply certain quantity within 12 month period or any other period stipulated by SAIL. After successful completion of such supply, the supplier may be considered eligible for entering in Long Term agreement with SAIL.***

- A vendor from Australia, submitted (August 2021) his Expression of Interest bid which was under review of Coke Oven Expert Committee (as on November 2022).

As stated by the Management, the main reasons for the delay in processing the Expression of Interest were delays in obtaining necessary clarifications and submission of relevant information/documents sought in the Expression of Interest document from the bidders and due to several negotiation meetings to settle the price for the industrial trial shipment etc.

Management/Ministry replied (October 2022/ December 2022) that in case of vendor from Switzerland, agreement had been signed for industrial trial shipment and the trial shipment was discharged at Vizag port on 27 October 2022. In case of the vendor from Mongolia, industrial trial agreement was yet to be finalised and certain clarifications were being obtained. The vendor from Australia was not meeting the stipulated technical specifications.

Audit noticed that the long-term agreement was signed (August 2023) with the vendor from Switzerland after four years from the EOI bid received in September 2019. In case of the vendor from Mongolia, even after lapse of 39 months (as of July 2024) from successful completion of Pilot Oven test, SAIL was yet to complete the Industrial trial. Thus, the fact remains that Management could sign only one new long-term agreement during the last eight years 2016-17 to 2023-24.

4.3.5 Extra expenditure of ₹ 54.27 crore on demurrage

SAIL entered into long term agreements with coal suppliers for import of coal. As per the long term agreements entered into between SAIL and coal suppliers, the seller would be responsible for any demurrage, port rent etc., which purchaser may become liable to pay at the load port. The final settlement of demurrage in respect of each vessel would be effected within 90 days from the date of receipt of claim with supporting documents. Out of 12 operational Long Term Agreements of SAIL for supply of coal, in agreements with nine suppliers, demurrage was to be as per the Charter Party[42] relating to the vessel (except one where the amount was capped at USD 20,000). In one agreement, demurrage calculation was based on index based formula and in two agreements demurrage rate was fixed.

Audit noticed that the rate of demurrage agreed between the seller (coal supplier) and the purchaser (SAIL) and between SAIL and vessel owner was different. During 2017-18 to 2021-22 (October 2021), there were 58 cases (out of 374 cases in all), where demurrage paid to the vessel owner was higher than the amount collected from the supplier. Thus, due to different rates of demurrage, additional demurrage was borne by

[42] ***Charter Party agreement means an agreement between SAIL and Vessel owner for chartering the vessel for shipment of coal from load port as declared by overseas suppliers to discharge port in India.***

SAIL on account of differential demurrage. This resulted in extra expenditure of ₹ 24.06 crore incurred by SAIL during 2017-18 to 2021-22 (October 2021).

Management/Ministry replied (October 2022/ December 2022) that different demurrage rates have been agreed with different long term suppliers. Efforts were being made to persuade all suppliers whose demurrage rates were not as per Charter Party to agree to either Charter Party demurrage rate or Index based formula. During February/March 2022, the supplier with whom agreement was for fixed rate has agreed to change to Index based formula from April 2022. With this change, there would be no difference between demurrage rate agreed between coal supplier and SAIL and that of SAIL and vessel owner. Matter regarding existing capping of the demurrage rate was also being followed up with the other supplier whose demurrage rates were not as per Charter Party Agreement or Index based.

Thus, due to the difference in demurrage rates between coal supplier and vessel owner, SAIL incurred extra expenditure in the form of differential demurrage.

Audit further noticed that there were 35 cases (out of 54 cases), two cases (out of 101 cases) and one case (out of 100 cases) during 2021-22 (November 2021 to March 2022), 2022-23 and 2023-24, where demurrage paid to the vessel owner was higher by ₹ 28.51 crore, ₹ 1.67 crore and ₹ 0.03 crore respectively, than the amount collected from the suppliers, thereby showing an improving trend.

4.4 Procurement of inventory items other than coal

4.4.1 Extra expenditure of ₹ 14.69 crore due to improper price discovery in procurement of High Carbon Ferro Chrome

High Carbon Ferro Chrome is used in casting Stainless Steel Slab in Steel Melting Shop at Salem Steel Plant. As per terms of Global Tender Enquiry, the price discovery was to be done once in two months by online Reverse Auction through M/s Mjunction for staggered delivery. The tender terms also provided that in case Reverse Auction failed or was not conducted, the online sealed bid submitted by the parties would be opened for placement of order. Based on enquiry proposal dated 28 November 2019, Salem Steel Plant issued Global Tender Enquiry on 6 December 2019 for requirement of 38,400 tonnes of High Carbon Ferro Chrome for the period February 2020 to January 2021.

Against requirement of 6,000 tonnes in respect of 1st price discovery (July 2020) full quantity was supplied at the rate of ₹ 71,460 per tonne (suppliers were M/s Tata Steel Ltd. and M/s Shyam Metalics and Energy Limited). Whereas in respect of 6,000 tonnes for 2nd price discovery (October 2020), offer/supply was received for only 4,000 tonnes from M/s Ferro Alloys Corporation Limited at the rate of ₹ 77,390 per tonne. Thereafter, Salem Steel Plant deviated from the requirement of discovery of price being done once in two months and conducted 3rd and 4th price discoveries together in December 2020 for balance quantity of 2,000 tonnes in 3rd price discovery on 3 December 2020 and fresh quantity of 6,000 tonnes in 4th price discovery on 29 December 2020 respectively.

Complete supply was made against 3rd price discovery at the rate of ₹ 82,350 per tonne by M/s Shyam Metalics and Energy Limited, whereas no Reverse Auction bid was received in respect of 4th price discovery. On evaluation of online sealed bid, single L-1 bid (L-1 bid was ₹ 82,350 per tonne) was received from M/s Ferro Alloys Corporation Limited who however, refused to supply citing pending overdue amounts against supplies of previous orders.

Thereafter, based on urgent requirement (20 January 2021) of Steel Melting Shop, 4th price discovery was re-done on 27 January 2021 and after recommendation of Tender Committee (2 February 2021), purchase order for 6,000 tonnes was placed on L-1 party i.e., M/s Shyam Metalics and Energy Ltd (quoted price of ₹ 1,15,000 per tonne) who had completed supply with respect to 3rd price discovery. The supply against 4th discovery was finally closed (5 April 2021) and 4,498 tonnes was supplied.

Audit noticed that the assessment of annual requirement for this vital raw material was not done correctly as Plant did not include 6,000 tonnes at the time of 3rd price discovery and went for another price discovery in the same month in deviation of tender terms. Also, the Company failed to purchase at lower price due to its failure in releasing payments for earlier supplies. This resulted in extra expenditure of ₹ 14.69 crore[43] during the procurement[44] period February 2020 to January 2021.

Management/Ministry replied (October 2022/December 2022) that, requirement as per Annual Business Plan for 2020-21 was first fixed as 1,72,000 tonnes but subsequently revised to 1,14,250 tonnes due to outbreak of Covid-19. As per production requirement, 3rd price discovery for the balance quantity of 2,000 tonnes was done in December 2020. Based on the downward trend in price, the order quantity was reduced from 6,000 tonnes to 4,498 tonnes and subsequent order was placed on lower price.

Reply of the Management may be viewed in the light of the fact that price discovery was attempted twice in December 2020 which was not as per the Global Tender Enquiry terms of price discovery. 4th price discovery held on 30 December 2020 could have been avoided, if quantities were merged during the third price discovery process. 4th price discovery attempted in December 2020 did not materialise despite lower price due to failure in releasing payment for earlier supplies. Further, the order was short closed after supply of 4,498 tonnes of material due to failure of the supplier to complete the supply within the scheduled delivery period.

4.4.2 Extra expenditure due to change of siding for despatch of limestone

SAIL entered into a Memorandum of Understanding with M/s Rajasthan State Mines and Minerals Limited (A PSU under Government of Rajasthan) in May 2008 for supply of Low Silica Limestone to the integrated steel plants of the Company for a period of 10 years. The current Memorandum of Understanding renewed/revised on 5 October 2018 is valid till 30 June 2028.

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[43] ***4,498 tonnes * (₹ 1,15,000 - ₹ 82,350).***

[44] ***The total quantity procured was as under: 1st price discovery =6,000 tonnes, 2nd price discovery =4,000 tonnes, 3rd price discovery = 2,000 tonnes, 4th price discovery = 4,498 tonnes.***

M/s Rajasthan State Mines and Minerals Limited was supplying limestone through Jaisalmer siding at the time of entering into Memorandum of Understanding in 2008. It was, however, known to the Management that the supplies from M/s Rajasthan State Mines and Minerals Limited would be shifted to Sonu Railway siding once it became operational. Sonu Railway siding was closer to the mines and as a result M/s Rajasthan State Mines and Minerals Limited would have to bear less transportation cost than that from Jaisalmer siding. To and fro distance between the mining area and railway siding at Jaisalmer was about 126 kms whereas to and fro distance of Sonu siding from the mines was only 26 kms. As a result, the supplier would save transportation charges for 100 kms. However, freight from Sonu siding to the Steel Plants was more by ₹ 78.80 per tonne than the freight from Jaisalmer.

As per Para 9.15 of Memorandum of Understanding, when supplies were to be commenced from Sonu Railway siding, the seller and purchaser were to arrive at a mutually acceptable price through discussions, within two months. Despatch from the Sonu siding was started from 26 August 2020.

M/s Rajasthan State Mines and Minerals Limited agreed (5 July 2021) to bear ₹ 52.53 per tonne of the additional cost of ₹ 78.80 per tonne during 26 August 2020 and 31 March 2021 due to the shifting of the railway siding. Consequently, additional expenditure of ₹ 26.27 per tonne[45] was incurred by SAIL on this account.

Audit noticed that Management was aware of the fact that after operation of Sonu siding, freight for the Steel Plants would increase and at the same time transportation cost for M/s Rajasthan State Mines and Minerals Limited would be lower. SAIL should have protected its financial interest by ensuring the inclusion of a suitable clause in the agreement whereby the benefit of reduction in cost of Rajasthan State Mines and Minerals Limited would be shared with SAIL also. However, the applicable price was not determined in clear terms and was to be decided based on discussion between the seller and purchaser. In the absence of clear terms on bifurcation of benefit between SAIL and M/s RSMML in the MOU, the discount of ₹ 52.53 per tonne provided by M/s RSMML to SAIL remained valid only between 26 August 2020 and 31 March 2021 and thereafter, no discount was given. Due to change in siding, SAIL incurred an extra expenditure of ₹ 30.91 crore for supplies made in 2021-24.

Management replied (October 2022) that efforts were made and discussions were held with M/s Rajasthan State Mines and Minerals Limited for negotiating a rebate on the agreed price of the material. However, settlement could be reached at rebate of ₹ 52.53 per tonne only. Ministry stated (December 2022) that despite SAIL's request M/s Rajasthan State Mines and Minerals Limited did not agree to absorb the total impact of increased freight, as they had invested in the Railway line and hence there was an element of increased cost on that account for them.

Reply may be viewed in light of the fact that terms for transportation cost due to change in the railway siding were not determined in clear terms and allowed M/s Rajasthan

[45] ***₹ 78.80 per tonne less ₹ 52.53 per tonne***

State Mines and Minerals Limited to deny SAIL the entire benefit. Reasons for non-inclusion of such terms were not stated.

Thus, due to change in siding, SAIL incurred an extra expenditure of ₹ 30.91 crore for supplies made in 2021-2024. The extra expenditure would continue to increase with the passage of time.

4.5 Summing up:

Audit noted that SAIL largely follows Purchase/Contract procedures of the Company. Cases of non-adherence of Purchase Contract Procedure/guidelines in placement of Purchase Order and improper price discovery in procurement of material in SAIL Plants were observed. There was inconsistency in achieving the purchase order lead time target in all SAIL Plants. There were delays in finalisation of Memorandum of Understanding with coal supplier companies Central Coalfields Limited and Bharat Coking Coal Limited for purchase of indigenous coal which led to non-recovery of ₹ 349.28 crore on account of grade slippage penalty. SAIL incurred extra expenditure of ₹ 54.27 crore on demurrage charges paid to the vessel owner. Salem Steel Plant incurred extra expenditure of ₹ 14.69 crore due to improper price discovery in procurement of High Carbon Ferro Chrome. SAIL also incurred extra expenditure of ₹ 30.91 crore on supply of Low Silica Limestone to its integrated steel plants under the Memorandum of Understanding with M/s Rajasthan State Mines and Minerals Limited.

Chapter 5

Chapter 5 Consumption of raw materials

5.1 SAIL prepares an Annual Business Plan before commencement of every financial year in a meeting headed by Chairman, SAIL with Directors and other senior level executives of SAIL. The Annual Business Plan is approved by the Board of Directors. Besides production target of each Plant, the Annual Business Plan includes the specific consumption rates of all major raw materials based on the process requirement, technology, consumption pattern during previous years and quality of product as well as raw materials.

SAIL consumes mainly iron ore, coal, limestone, dolomite and other materials like Ferro Manganese, Silico Manganese, Quartzite, Coke and Coke Breeze etc. Audit noted that the percentage of raw materials consumed (₹ 2,37,321.02 crore) in SAIL to the total expenditure (₹ 4,92,492.81 crore) during 2016-2023 was 48 *per cent*. Cost of raw materials consumed in SAIL per million tonne of Crude Steel ranged between ₹ 1,457 crore per million tonne and ₹ 3,199 crore per million tonne during 2016-17 and 2022-23.

Audit was conducted with an objective to assess whether consumption of raw materials was within the norms fixed by the Company. Audit collected data relating to norms for consumption of raw materials fixed by the Company along with the actual consumption in all the steel plants.

Audit noted consumption of costlier imported coal beyond the norm stipulated in the Annual Business Plan, in all the five integrated steel plants. Consumption of limestone, dolomite and iron ore fines in sinter Plants of Bhilai and Rourkela Steel Plants over the norms fixed in Annual Business Plan of respective Plants of SAIL was also noted. In Visvesvaraya Iron and Steel Plant and Salem Steel Plant, Light Diesel Oil, Furnace oil and LPG were consumed beyond the norms fixed by the Company.

These issues have been further discussed in detail in the succeeding paragraphs.

5.2 Consumption of imported coal leading to potential extra expenditure

Indigenous coking coal is not appropriate for steel making process as it has a higher ash percentage. Coke of desired quality is, therefore, prepared by blending the indigenous coal with imported coal due to quality considerations. Norms for the same are being fixed annually by Management. Audit noted that the steel plants consumed more imported coal than the norms during 2016-17 to 2022-23. The rates of imported coal were higher than the indigenous coal by ₹ 1,030 to ₹ 19,827 per tonne.

The Annual Production Plan norms for percentage of imported coal in the coal blend, actual percentage of imported coal in the coal blend, consumption of imported coal beyond the norms and expenditure due to such consumption of imported coal are given in the table below-

Table 5.1: Potential Additional Expenditure due to consumption of imported coal beyond norms during 2016-17 to 2022-23

Name of Steel Plant	Norms for percentage of imported coal in the coal blend	Actual percentage of imported coal in the coal blend	Consumption of imported coal over the norms (in tonnes)	Potential Additional Expenditure due to consumption of imported coal beyond norms[46] (₹ in crore)
Bhilai	79 to 87	77.30 to 93.73	17,48,084	1,360.35
Bokaro	78 to 82	76.94 to 86.13	5,47,380.52	341.86
Rourkela	81.50 to 90.00	85.75 to 92.02	7,25,579	448.44
IISCO	80 to 95	83.6 to 95	3,08,036	200.63
Durgapur	78 to 84	77.9 to 85.60	2,89,178	188.40
Total				**2,539.68**

Source: Norms and actual percentage of imported coal in the coal blend, consumption of imported coal and indigenous coal blended furnished by the Management.

The Management attributed the consumption of imported coal beyond norms to reasons like limited availability of indigenous coking coal and actual coal supply, available stock of coking coal and the quality requirement of coke for blast furnace. Higher use of imported coal was also stated to be required to maintain continuity of production as required quality of indigenous coal was not available sustainably and also for improvement in coke quality.

Audit noticed that the Annual Business Plan should have been prepared by SAIL after considering availability and quality of coal. Moreover, coal was one of the major raw materials in steel making process and the steel plants majorly depended on procurement of imported coal. Such import of coal entailed significant cash outflow and had significant potential impact on the financial health of the Company. Hence, Management should have adhered to the ratio of blend mixing as decided in Annual Business Plan so that the financial outflow could be optimised, in the light of the fact that Coal Import Group in Corporate office and Central Coal Supply Organisation, Dhanbad had been designated as nodal agencies to ensure availability of imported coal and indigenous coal respectively.

Higher consumption of imported coal in the Steel Plants during 2016-17 to 2022-23 resulted in potential cost burden to the extent of ₹ 2,539.68 crore ***(Annexure-I)***.

Management replied (October 2022) that average ash content (as expressed in *per cent)* of indigenous coking coal in Bokaro Steel Plant was high and to improve production and productivity of blast furnaces, blending of imported coal was done. Major cause of higher utilisation of imported coking coal in Rourkela, Durgapur and IISCO, Burnpur was less availability and lower quality of indigenous coal. In Bhilai Steel Plant, usage of coal blend was regulated as advised by the Corporate Office based on availability.

[46] ***To arrive at the expenditure on consumption of imported coal beyond the norms, the norm (in per cent) stipulated for blending of imported coal as per the Annual Business Plan was compared with the actual blending (in per cent) during each year for each steel Plant. Accordingly, the consumption of imported coal beyond the norms was calculated in tonnes and then multiplied with the differential rate per tonne of imported coal and indigenous coal for each year for each steel Plant.***

Reply of Management may be seen in the light of the fact that estimated ash *per cent* of indigenous coal should have been considered while preparing Annual Business Plan for blending of coal. Availability and quality of the indigenous coal to be received during a year was also known to Management and therefore, should have been duly considered. Moreover, Memoranda of Understanding with Bharat Coking Coal Limited and Central Coalfields Limited for supply of indigenous coal could also not be finalised by SAIL timely which could have given assurance about quantity and quality of indigenous coal supplied during a year.

Ministry stated (December 2022) that coal blend is decided based on availability of different types of coking coal including indigenous coking coal keeping in view the quality of Blast Furnace coke. However, required quantity of indigenous coking coal as per Annual Business Plan was not available as M/s Coal India Limited could not offer the desired quantity and quality of indigenous coking coal. This has resulted in higher consumption of imported coal. To address this issue, SAIL has now entered into an agreement with M/s. Tata Steel for improving indigenous coking coal supply apart from normal supply of coking coal at present.

Audit noticed that the consumption of imported coal was within the norm after the arrangement for washing of coal from BCCL colliery at the washery of M/s TATA steel began, in 2023-24.

Recommendation 6: Company may work towards achieving continuous availability of indigenous coal as per the norms to enable its blending with the imported coal in line with the Annual Business Plan and thereby optimise the cost incurred on production.

5.3 Consumption of dolomite, limestone and iron ore fines at Sinter Plant of Bhilai Steel Plant and Rourkela Steel Plant

The iron ore fines, coke breeze, limestone, dolomite are used to make sinter which is charged into the Blast Furnace. Iron ore fines cannot be charged into blast furnaces directly and are therefore compacted and made into lumps through sintering process. Rourkela Steel Plant has three sinter Plants (Sinter Plant-I, II and III) all in running condition. Bhilai Steel Plant has two running sinter Plants (Sinter Plant-II and III).
Audit noted that the consumption of dolomite, limestone and iron ore fines at sinter plants of Bhilai and Rourkela Steel Plants during the period 2016-2023 was more than the norms (except that of iron ore fines at Bhilai Steel Plant) stipulated thereto in the Annual Business Plans in the respective years. The total quantity consumed in excess of the norms was 6,50,884 tonnes and the potential additional expenditure on this account was ₹ 349.39 crore as seen in table below:

Table 5.3: Potential Additional Expenditure due to consumption of Dolomite, Limestone and Iron Ore fines beyond the norms during 2016-17 to 2022-23

Raw Materials	Name of Steel Plants of SAIL	Range of Norms (Kg/tonne)	Range of Actual Consumption (Kg/tonne)	Quantity consumed beyond norms	Potential Additional Expenditure on consumption beyond norms (₹ in crore)
Dolomite	Bhilai	75-138	63-124	2,59,244	39.21
	Rourkela	56-163	64-144	2,38,812	22.67
Limestone	Bhilai	88-172	70-171	4,28,330	46.51
	Rourkela	47-164	51-153	2,95,572	131.01
Iron ore fines	Bhilai [@]	NA	NA	NA	0
	Rourkela	679-905	683-923	6,50,884	109.99
Total					349.39

Source: Data furnished by the Management.

[@] *Consumption of iron ore fines in sinter plants at Bhilai were within the norms during 2016-2023*

The detailed breakup of the figures is given in ***Annexure II***.

Management replied (October 2022) that in Rourkela Steel Plant, addition of dolomite fines and limestone fines was done at Sinter Plant as per the requirement of Magnesium Oxide and lime in Blast Furnace respectively. In respect of Bhilai Steel Plant, norms for consumption of different raw materials at Sintering Plants were fixed at the beginning of the year based on various assumptions. Due to depleting reserves in existing captive iron ore mines, the availability of iron ore and its quality was also deteriorating and fluctuating. Ministry added (December 2022) that norms for consumption of different raw materials is decided based upon average silica content and available lime requirement of blast furnace in the previous year.

The reply may be viewed in light of the fact that the Annual Business Plan should be prepared considering the factors cited by the Management.

5.4 Consumption of Light Diesel Oil and Furnace Oil in Visvesvaraya Iron and Steel Plant

In Primary Mill, Bar Mill, Long Forging Machine and Forge Press, rolling of blooms/billets is done for further processing. In these Mills, Light Diesel Oil and Furnace Oil are used as fuels. The norm for consumption of Light Diesel Oil and Furnace Oil in these mills ranged between 70 litre per tonne to 250 litre per tonne during 2016-17 to 2022-23.

Details are shown in the table below-

Table 5.4: Extra expenditure due to consumption of Light Diesel Oil and Furnace Oil in Visvesvaraya Iron and Steel Plant during 2016-17 to 2022-23

Type of Mills/ Machine	Norm (Litre/ Tonne)	Range of Actual Consumption (Litre/Tonne)	Range of Excess Consumption (Litre/Tonne)	Excess Consumption (Kilo Litre)	Extra expenditure due to excess consumption (₹ in crore)
Forge Press	250	267-593	17-343	2198.366	7.64
Long Forging Machine	150	163-322	13-172	696.44	2.55
Bar Mill	70	73-101	3-31	750.581	2.53
Primary Mill	75	52-141	11-66	453	1.46
Total					**14.18**

Source: Data furnished by the Management.

During the period 2016-17 to 2022-23, Audit noted that the consumption of Light Diesel Oil and Furnace Oil was more than the norms as per the Annual Business Plan which ranged between 17 litres per tonne to 343 litres per tonne in Forge Press and between 13 litres per tonne to 172 litres per tonne in Long Forging Machine. Similarly, consumption of Light Diesel Oil and Furnace Oil was more than the norms stipulated in Annual Business Plan in Primary Mill ranging between 11 litres per tonne to 66 litres per tonne. Norms stipulated as per the Annual Business Plan were however, achieved during 2020-21 to 2022-23. In Bar mill, consumption of Light Diesel Oil and Furnace Oil was more than the Annual Business Plan norms and ranged between 3 litres per tonne to 31 litres per tonne. The consumption of Light Diesel Oil and Furnace Oil beyond the norms has resulted in potential extra expenditure of ₹ 14.18 crore during the period 2016-17 to 2022-23.

Audit noticed that consumption beyond the norms was attributed to inadequate process controls like non-continuous operation, production delays, soaking of blooms up to 12 hours, manual feeding, mechanical and electrical issues, non-availability of blast furnace gas due to shut down of Blast Furnace and cold charging of ingots in Forge Press. These factors highlight lapses in planning and monitoring.

Management stated (October 2022) that consumption of light diesel oil and furnace oil at the Forge Plant depends on heating cycle, grade of steel, size of input, charging of cold ingots, delays due to machinery faults etc. Annual Business Plan was prepared considering continuous operation of Forge Plant, full time availability of Blast Furnace gas for pre heating, hot ingots from melting shop, forging of high alloy steel grades.

The reply of Management may be viewed in light of the fact that the Annual Business Plan norms should have been fixed considering the non-operation of the Blast Furnace since February 2017 and the resultant non-availability of Blast Furnace gas and hot ingots from melting shop. Consistent efforts should have been made to achieve the Annual Business Plan norms in order to control the cost by avoiding/ minimising the consumption of fuel oils over and above the Annual Production Plan norms.

While reiterating the views of the Management, the Ministry stated (December 2022) that efforts were being made to accurately forecast the order quantity at the beginning of the year to arrive at the realistic Annual Production Plan norms.

5.5 Consumption of LPG in Hot Rolling Mill and Cold Rolling Mill (AP lines) at Salem Steel Plant

LPG is consumed in Hot Rolling Mill and Cold Rolling Mill as primary fuel in re-heating of slab/stainless steel for further production process in Salem Steel Plant. Norms for LPG consumption in Hot Rolling Mill and Cold Rolling Mill for the period 2016-17 to 2022-23 were 37 kg per tonne and 31.4 kg per tonne respectively.

Table: 5.5 Extra expenditure due to consumption of LPG in Hot Roling Mill and Cold Rolling Mill at SSP during 2016-17 to 2022-23

Type of Mills	Norms (Kg/Tonne)	Range of Actual Consumption (Kg/Tonne)	Range of Excess Consumption (Kg/Tonne)	Excess Consumption of LPG (Kgs)	Extra expenditure due to excess consumption (₹ in crore)
Hot Rolling Mill	37	38-48.3	1-11.3	6752382.3	36.67
Cold Rolling Mill	31.4	33.51-35.7	2.2-4.3	3541998.4	15.61
Total					**52.28**

Source: Data furnished by the Management.

Audit noted that consumption of LPG was more than the Annual Business Plan norms (Hot Rolling Mill-37 kg/tonne and Cold Rolling Mill -31.4 kg/tonne) ranging between one kg/tonne to 11.3 kg/tonne in Hot Rolling Mill and between 2.2 kg/tonne to 4.3 kg/tonne in Cold Rolling Mill during last seven years. Consumption beyond the norms peaked during 2017-18 in Cold Rolling Mill and 2022-23 in Hot Rolling Mill. The Annual Business Plan norms were not achieved by Hot Rolling Mill and Cold Rolling Mill at Salem Steel Plant in any of the seven years period during 2016-17 to 2022-23. This resulted in expenditure of ₹ 52.28 crore which could potentially have been avoided had the norms stipulated in the Annual Business Plan been achieved.

Management attributed the reasons for excess consumption of LPG in Hot Rolling Mill to rolling of more quantity of harder materials like Low Nickel Stainless Steel slabs, processing of both harder and soft grade materials in quick succession, not envisaging product mix exactly before finalising Annual Business Plan target etc.

Audit noted that the Annual Business Plan had remained static for five years and should have been finalised considering the above factors.

Management replied (October 2022) that the best achieved figure since inception was fixed as Annual Business Plan norm which needed revision considering that LPG consumption at Hot Rolling Mill depended on grade mix, frequency of grade changes, low nickel and thinner gauge rolled, Saleable Steel and Crude Steel production ratio, availability and mill capacity utilisation. In respect of Cold Rolling Mill, best specific LPG consumption achieved in 2015-16 was fixed as Annual Business Plan norm, though low nickel series require unique furnace regime and pickling process. LPG

consumption depended on grade mix, grade changes, volume of Low Nickel and reliability of annealing and pickling lines.

Ministry stated (December 2022) the matter would be discussed with Operation Directorate for fixing the Annual Business Plan norms based on realistic annual production targets as per Grade mix, number of grade change in a month owing to market demand etc. Further, sustained efforts would also be made to achieve the same in order to reduce the production cost at Hot Rolling Mill and Cold Rolling Mill.

Reply of the Management/Ministry may be viewed in light of the fact that the Annual Business Plan norms should have been fixed based on realistic annual production targets and efforts should have been made to achieve the same in order to improve the processing cost at Hot Rolling Mill and Cold Rolling Mill.

5.6 Loss of Hot Metal in transit due to absence of Torpedo Ladle Car in Bokaro Steel Plant

As stated by the Management, in steel making process, Hot Metal produced in Blast Furnace is the primary input material which is transferred to the Steel Melting and Continuous Casting Shop for further processing. Bokaro Steel Plant has been using Open Ladle Car having capacity of 100-110 tonnes for transportation of Hot Metal from Blast Furnace to the Steel Melting Shop. Torpedo Ladles[47] are an upgraded version of ladles for transportation of Hot Metal to converter. Management also noted that use of Torpedo Ladles to transport molten iron from Blast Furnace to Steel Melting Shop was beneficial in view of better receiving temperature, prevents heat loss, low cost of maintenance, holds metal for one heat equivalent to three blast furnace Hot Metal ladles, easy casting at blast furnace cast house and to reduce the loss of Hot Metal. Opening for filling and off-loading Torpedo Ladle is very small in comparison to Open Top Ladle which results in lesser metal loss. Due to its higher capacity (350 tonnes) and design, the heat loss is also less.

Figure 5.1: Open Top Ladles

Figure 5.2 Torpedo Ladles

[47] ***It is big pot for transporting Hot Metal from Blast furnace to Steel Melting Shop.***

As per Management's estimate (as informed to the Audit Committee), loss of Hot Metal in case of use of Torpedo Ladle Car would be between two to three *per cent*. Transit loss was between 3.03 and 4.54 *per cent* at Bokaro Steel Plant.

Audit noted that Bokaro Steel Plant awarded a contract in September 2008 for replacement of Open Ladles with eight Torpedo Ladle Cars. The work was to be completed by October 2010. However, even after 13 years of scheduled completion, only six Torpedo Ladle Cars were operational (December 2023) of which four were made operational by August 2018. The work could not be completed as required front was not given by the Management and also because other simultaneous/parallel projects were not completed which thereby delayed this project.

It is pertinent to note that in case of IISCO Steel Plant where Torpedo Ladle Cars are used, transit loss during the last seven years from 2016-2023 was between 0 *per cent* and two *per cent* only which was in line with the Management's expected calculation of two to three *per cent*. Further, at Bhilai and Rourkela Steel Plants, transit loss was within the norms at Steel Melting Shops where Torpedo Ladles were used[48].

Audit noticed that non-adoption of Torpedo Ladle Cars in place of conventional ladles to transfer the Hot Metal, at Bokaro Steel Plant, resulted in inability to obtain the expected benefit of 2,32,067 tonnes of Hot Metal valuing ₹ 400.76 crore[49] during 2016-17 to 2022-23, which would continue till the replacement of conventional ladles with Torpedo Ladle Cars.

Management replied (October 2022) that Hot Metal loss due to use of Torpedo Ladle cars was between two to three *per cent* in all the SAIL Plants. Bokaro Steel Plant was in the direction of planning strategically to phase out Open Top Ladles by Torpedo Ladle Cars in near future to reduce transit loss. It was expected that the transit loss of Hot Metal would come down significantly in subsequent financial years. Ministry stated (December 2022) that two Torpedo Ladle Cars were likely to get ready for operation by September 2023. With addition of two more Torpedo Ladle Cars in operation, Bokaro Steel Plant would further increase the Hot Metal transfer through Torpedo Ladle Cars. Ministry further stated (December 2023) that Torpedo Ladle Car No. 1 and 2 were undergoing revival.

Audit noted that Torpedo Ladle Car No. 1,3,4,5 and 6 were under circulation whereas Torpedo Ladle Car No. 2 was under revival (July 2024). Replies were silent on the reasons for delay of more than 13 years in completion of the project.

Transportation of Hot Metal through conventional ladles rather than Torpedo Ladles at Bokaro Steel Plant led to inability to obtain the expected benefit of reduction in loss of

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[48] ***Steel Melting Shops I and II of Bhilai Steel Plant and Steel Melting Shop I of Rourkela were not equipped to receive Hot Metal through torpedos.***

[49] ***Calculated on the basis of loss of Hot Metal in excess of three per cent (in tonnes) multiplied by variable cost per tonne. Difference between distribution of Hot Metal from Blast Furnace and consumption of Hot Metal in Steel Melting Shop has been considered as loss of Hot Metal.***

Hot Metal during transit from Blast Furnace to Steel Melting Shop beyond the norms fixed by the Management.

Recommendation 7: Bokaro Steel Plant may expedite completion of the project so that Torpedo Ladle Cars are used in place of conventional mode of Ladles to minimise loss of Hot Metal.

Summing up:

Annual Business Plan specifies the specific consumption rates of all major raw materials based on the process requirement, technology, consumption pattern during previous years and quality of product as well as raw materials. Consumption of costlier imported coal beyond the norm fixed in the Annual Business Plan was noted at all five integrated steel plants which resulted in potential extra expenditure to the extent of ₹ 2,539.68 crore during 2016-2023. Consumption of limestone, dolomite and iron ore fines beyond norms, valuing ₹ 349.39 crore was noted in sinter Plants of Bhilai and Rourkela Steel Plants. In Visvesvaraya Iron and Steel Plant and Salem Steel Plant, light diesel oil, furnace oil and LPG valuing ₹ 66.46 crore were consumed beyond the norms fixed by the Company. Audit noted that non-adoption of Torpedo Ladle Car in place of conventional Ladle Car in Bokaro Steel Plant inability to obtain the expected benefit of reduction in transit loss of Hot Metal valuing ₹ 400.76 crore.

Chapter 6

Chapter 6 Sale and Disposal of Inventories

6.1 Prime products of the SAIL Plants like hot rolled coil, cold rolled coil, cold rolled sheets, structural, thermo mechanically treated bars, rails, wheel and axle etc., are sold through Central Marketing Organisation and all other products are sold by the Marketing Department of the steel plants. The product range dealt by Marketing Department includes defectives, coil/sheet cuttings, rejected pipes, granulated slag, coke fractions, Ammonium Sulphate, sub-grade iron ore fines, limestone, dolomite and various waste products like Linz-Donawitz Slag, Ferrous Sulphate etc. Marketing Department also looks after disposal of idle asset, old/used machinery, conveyor belts, drums, electrical spares and unused/surplus obsolete spares.

Audit was conducted with an objective to assess whether timely and adequate action for sale of Saleable Steel, secondary and by-products, slag, slime and sub-grade iron ore fines was taken. The audit was conducted in all the SAIL Plants, captive mines and Central Marketing Organisation of the SAIL. Records relating to policy/guidelines, issued by the Corporate Material Management Group on disposal of materials, Monthly Information Statement of Marketing Department, Material Recovery Department, Mines; feedback reports of M-junction[50] with respect to current market conditions including expected rates etc., operational statistics, minutes of various Committee meetings for sale/disposal of material, joint physical verification of stockyards were examined.

Audit noted instances where huge quantity of inventory like sub-grade iron ore fines, tailings, limestone etc., was lying undisposed at mines pit head leading to blocking up of funds. In the steel plants, disposal of embedded scrap in slag and secondary products like defectives/rejected materials was very slow. Saleable Steel and Semi-Saleable Steel were lying undisposed at Alloy Steels Plant, Visvesvaraya Iron and Steel Plant, Bhadravati and Salem Steel Plant. Also, a part of the commercial rails produced at Bhilai Steel Plant were used as Steel Scrap.

As regards finished steel products, delay in disposal of materials was noted leading to additional inventory carrying cost. Deficiencies were noted in storage of steel materials and in settlement of quality complaints at Central Marketing Organisation warehouses. Additional expenditure was incurred towards handling of converted finished products by the Central Marketing Organisation.

The issues have been further discussed in detail in the succeeding paragraphs.

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[50] ***MJunction provides e-auction platform for buyer and seller through digital platform. It is promoted jointly by SAIL and M/s Tata Steel.***

6.2 Non-synchronisation of production with market demand and Annual Business Plan

SAIL Board expressed (May 2015) the need for proper coordination between Operations and Marketing departments to produce whatever is required by the market and to reduce inventory levels at Plants and stockyards, while reviewing the production performance of the Company. Boston Consulting Group[51], a Consultant also pointed out (October 2017) lack of a robust Sales and Operation Planning organisation in SAIL leading to gaps between the availability and delivery of items i.e., production was not always in line with market demand and Central Marketing Organisation was not equipped with adequate information on production schedules (future availability) of Plants. The guidelines (October 2017) on Implementation of Order Management System in Central Marketing Organisation stipulated that performance would be monitored rigorously with regard to conformance of orders with plan and despatches with orders. Audit reviewed the total production planned and achieved and the total sales planned and achieved vis-à-vis the orders despatched to Central Marketing Organisation in each year during 2016-2023 and also for certain specific products during this period which is shown in Table 6.1 and 6.2 below.

The production plan as per Annual Business Plan *vis-à-vis* actual production and sales target as per Annual Business Plan *vis-à-vis* actual sales during 2016-17 to 2022-23 is shown in the table below:

Table 6.1: Comparison of Production plan and Sales target as per Annual Business Plan with actual production and sales during 2016-17 to 2022-23

(in thousand tonnes)

Year	Production		Sales Target		Order booked by Central Marketing Organisation and passed to Steel Plants	Despatch by Plants
	Planned	Actual	Planned	Actual		
2016-17	15,289	12,842	15,943	12,382	13,118	10,591
2017-18	17,313	13,520	16,134	13,354	16,887	12,991
2018-19	18,332	16,528	16,992	13,393	17,517	13,304
2019-20	18,032	15,324	16,968	13,459	16,699	13,651
2020-21	15,765	14,915	14,613	13,942	17,371	12,848
2021-22	17,390	16,124	16,966	15,101	19,755	14,650
2022-23	17,540	16,899	16,947	15,563	20,516	15,711
Total	119,661	106,152	114,563	97,194	121,863	93,746

Source: Production plan, actual production, sales target, actual sales, orders booked by Central Marketing Organisation and dispatch by Plants furnished by the Management

[51] ***Boston Consulting Group was engaged by SAIL to prepare a comprehensive turnaround roadmap for SAIL. The report was submitted in October 2017.***

The sales planned as per Annual Business Plan *vis-à-vis* actual sales, production and despatch to CMO for certain specific products during 2016-17 to 2022-23 is shown in the table below:

Table 6.2: Comparison of Sales target as per Annual Business Plan with actual sales, production and despatch to CMO for certain specific products during 2016-2023

(Quantity in thousand tonnes)

Product	Sales Plan during 2016-23	Actual sales during 2016-23	Deficit	Deficit (in *per cent*)	Production by SAIL Plants	Despatch to CMO
Hot Rolled Sheets	869	747	122	14	762	715
Cold Rolled Coil/Sheet	9132	5840	3292	36	8119	5735
Galvanised Plain/ Corrugated Sheets	3172	1266	1906	60	1485	1244
Pipes	527	374	153	29	400	370
Structural	7861	6826	1035	13	6910	6847

It is evident that:

- Against production target of 119.66 million tonnes of Saleable Steel envisaged in the Annual Business Plan for the period 2016-17 to 2022-23, actual production by the five integrated steel plants of the Company was 106.15 million tonnes (89 *per cent*). The capacity utilisation by SAIL Plants was between 77 *per cent* (2020-21) and 89 *per cent* (2022-23) as compared to 89 *per cent* to 96 *per cent* and 78 *per cent* to 99 *per cent* by its two competitors. Audit noticed that production was adversely affected due to breakdown in production process, issues related to ramping-up of production from newly commissioned units, health of machines, technical constraints of mills, coking coal supply constraints etc.

- Further, against sales plan (including export sales) for 114.56 million tonnes during 2016-23, actual sales was only 97.19 million tonnes (85 *per cent*). There were shortfalls[52] in sale of Hot Rolled sheet (0.12 million tonnes, 14 *per cent*), Cold Rolled Coil/Sheet (3.29 million tonnes, 36 *per cent*), Galvanised Plain/corrugated Sheets (1.91 million tonnes, 60 *per cent*), Pipes (0.15 million tonnes, 29 *per cent*) and Structural (1.04 million tonnes, 13 *per cent*) etc. The Company could not achieve its Sales plan due to its failure to achieve planned production which is evident from the fact that on the one hand SAIL was unable to supply materials as per orders booked by Central Marketing Organisation and on the other hand it maintained excess stock of finished goods over and above the norms as discussed in para 3.4.3.

[52] ***Calculated on the basis of difference between sales plan and actual sales.***

- The guidelines (October 2017) on Implementation of Order Management System in Central Marketing Organisation provide for monitoring of Order Conformance Index for Central Marketing Organisation and Plants. The Order Conformance Index for Central Marketing Organisation[53] was to measure quantity of orders booked against production. Actual quantity booked in the range of 90-110 *per cent* of the availability would be considered acceptable for the Central Marketing Organisation. For the steel plants, order conformance[54] would be tracked on the orders placed and the actual despatches made. The Order Management System stipulated that an Order Conformance Index of 90 *per cent* would be considered acceptable for Plants. Though Central Marketing Organisation achieved higher Order Conformance Index at 115 *per cent* of production, the Order Conformance Index for Plants was only 77 *per cent* during 2016-2023. Thus, despite having demand in the market, shortfall in production by 13.51 million tonnes (119.66 million tonnes – 106.15 million tonnes) was one of the main factors towards non-achievement of Sales plan of the Central Marketing Organisation. Lower order conformance of Plants was attributable to technical constraints of Mills, non-availability of rakes, overbooking of orders against the availability given, insufficient order balance to form rake etc.

Management attributed (October 2022) factors like subdued demand of steel for certain periods, coking coal supply constraints from time to time, issues related to ramping-up of production from newly commissioned units, Covid-19 pandemic, technological constraints of mill, non-availability of rakes, over-booking of orders against the availability given, insufficient order balance to form a rake etc. for production below Annual Business Plan and market demands.

Ministry stated (December 2022) that appropriate measures were being taken to attain the production levels envisaged in the Annual Business Plan. In 2021-22, Annual Business Plan was achieved. Ministry further stated (December 2023) that production performance was reviewed every month by Chairman and Functional Directors to discuss the reasons as well as mitigation plan for shortfall against Annual Business Plan. Further, the same was also reviewed quarterly at Board Level.

The reply of the Management may be seen in view of the fact that Annual Business Plan should have been prepared considering all constraints like supply of coking coal, ramping up of production from the newly constructed units at different Plants, technical constraints of Mills etc. Lower production was observed in years other than those affected by Covid-19. Non-availability of rakes, overbooking of orders against the availability given, insufficient order balance to form rake did not justify lower production than Annual Business Plan and market demand. Reply of Ministry may be seen in the light of the fact that even during 2021-23, except Bhilai Steel Plant, no integrated steel plant of SAIL achieved the production target as per Annual Business Plan.

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[53] ***Total orders booked by Central Marketing Organisation/Actual production by plants* 100.***

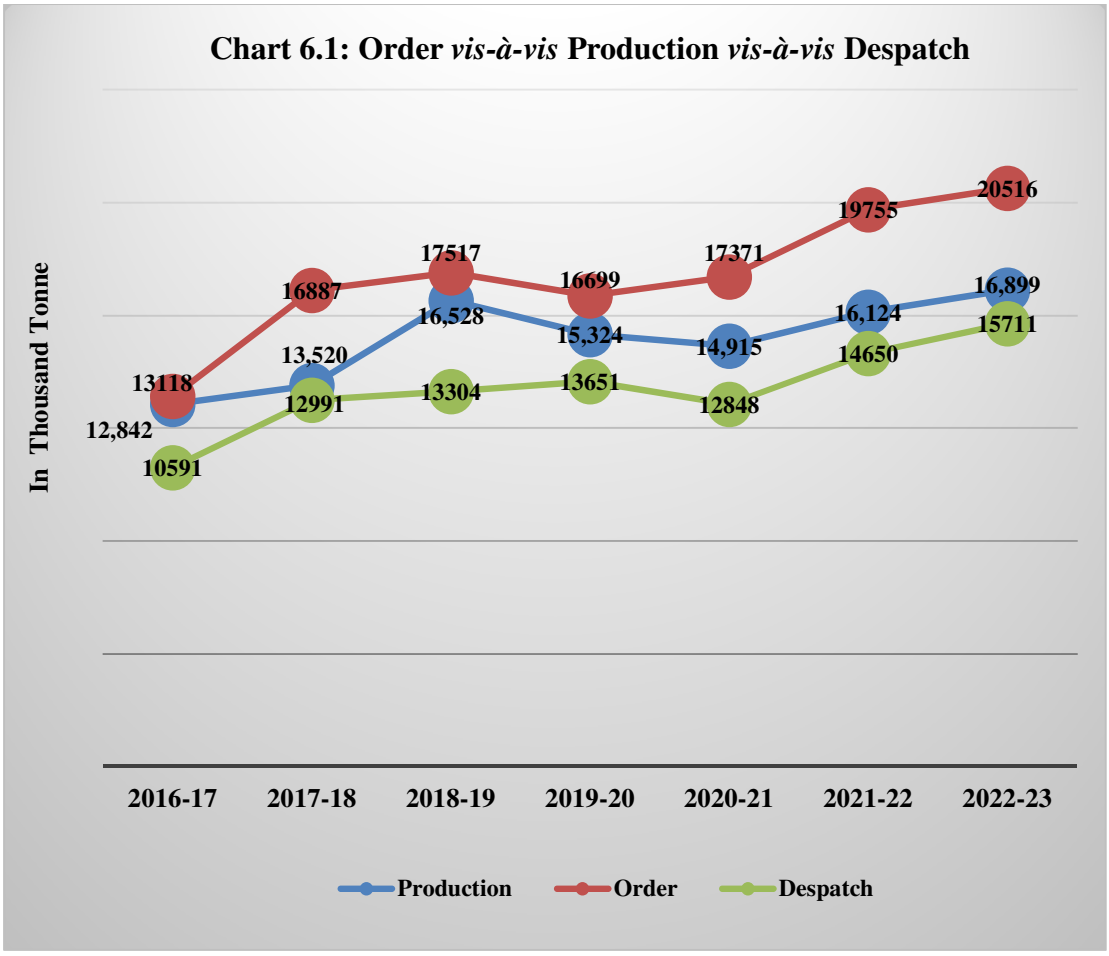
[54] ***Total despatch from plants to Central Marketing Organisation/Total orders received by Central Marketing Organisation* 100.***

Recommendation 8: The Company may take measures to attain the production levels envisaged in Annual Business Plan by ensuring optimum capacity utilisation of steel plants.

6.3 Lower despatch than production/availability

Central Marketing Organisation forecasts product-wise demand on a monthly basis and intimates the same to Plants for production planning. Based on availability indicated by Plants, Central Marketing Organisation books orders from different customers and passes on the same to each Plant. After production, Central Marketing Organisation coordinates with Plants for despatch to the required locations/customers. Production and despatch by Plants against orders for steel materials booked by Central Marketing Organisation and passed on to Steel Plants during 2016-17 to 2022-23 was as under:

Chart 6.1: Order *vis-à-vis* Production *vis-à-vis* Despatch



Source: Actual production, orders booked by Central Marketing Organisation and dispatch by Plants furnished by the Management

- It is seen from the above chart that, production by Plants was less by 0.28 million tonnes to 3.63 million tonnes than the orders booked by Central Marketing Organisation and passed on to Steel Plants during 2016-17 to 2022-23.
- Further, despite production being made, despatches from Plants were less by 0.53 million tonnes to 3.22 million tonnes than production by Plants during 2016-23.

- As against total production of 106.15 million tonnes of Saleable Steel and orders booked by Central Marketing Organisation and passed on to Steel Plants for 121.86 million tonnes, despatches from Plants were 93.75 million tonnes i.e., only 77 *per cent* of orders booked.
- Management attributed reasons for lower despatch to non-availability of railway rakes and route restrictions imposed by Railways.

In this regard, Audit noticed the following:

(i) SAIL Board, after considering increase in Saleable Steel stock at Plants and rake restrictions by Railways, had advised/recommended in its various meetings held between February 2017 and November 2018 for improvement in road despatches and finding alternative solutions to resolve the constraints in despatch areas.

(ii) Though various key areas for improving road despatches such as separate bays at Plants, loading facilities were identified to be created at Plants, the same had not fructified yet.

(iii) Chairman, SAIL also directed (May 2019) to chalk-out action plan to augment road despatches from each Plant to a level of minimum 30 *per cent* to reduce the dependence on Railways for logistic operations.

(iv) Audit noted that road transport of finished steel by SAIL remained low at 10 *per cent* during 2016-2023.

(v) Further, the closing stock at Plants showed an increasing trend during 2016-17 to 2022-23 except during 2020-21 and 2021-22. Thus, lower despatch of materials than the requirement of customers led to delay in liquidation of stock and increase in inventory carrying cost on the stock lying at steel plants.

Management replied (October 2022) that increasing road despatches from Plants to augment material evacuation remained a focus area. However, given the constraints in shipping area at Plants, size/quality-wise stacking constraints in mills due to space limitations, increase in volume of production/despatch, type of product mix, large customer base, economics of transportation, customer preference for mode of despatch etc., the progress has been gradual. It further stated that road despatches had improved from 9 *per cent* in 2017-18 to 15 *per cent* in 2020-21. Ministry, while stating various constraints, added (December 2022) that the economics of road transportation over rail route and location were dependent upon the customer's preference.

The reply of Management may be viewed in the light of the fact that though the constraints referred to in the reply were discussed in the Board meetings held between December 2017 and April 2019, the improvement in augmentation of road despatch was at a slow pace. The reply of the Ministry may be viewed in the light of the fact that customer's preference was applicable only for direct despatch of materials from Plant to the point nearest to the customer based on his confirmed order. Ministry further stated (December 2023) that based on the report and recommendation of the Committee (formed in January 2023) to study and prepare norms for road dispatches for each plant,

Cross Functional Teams had been formed at each integrated steel plant for augmentation of road dispatch.

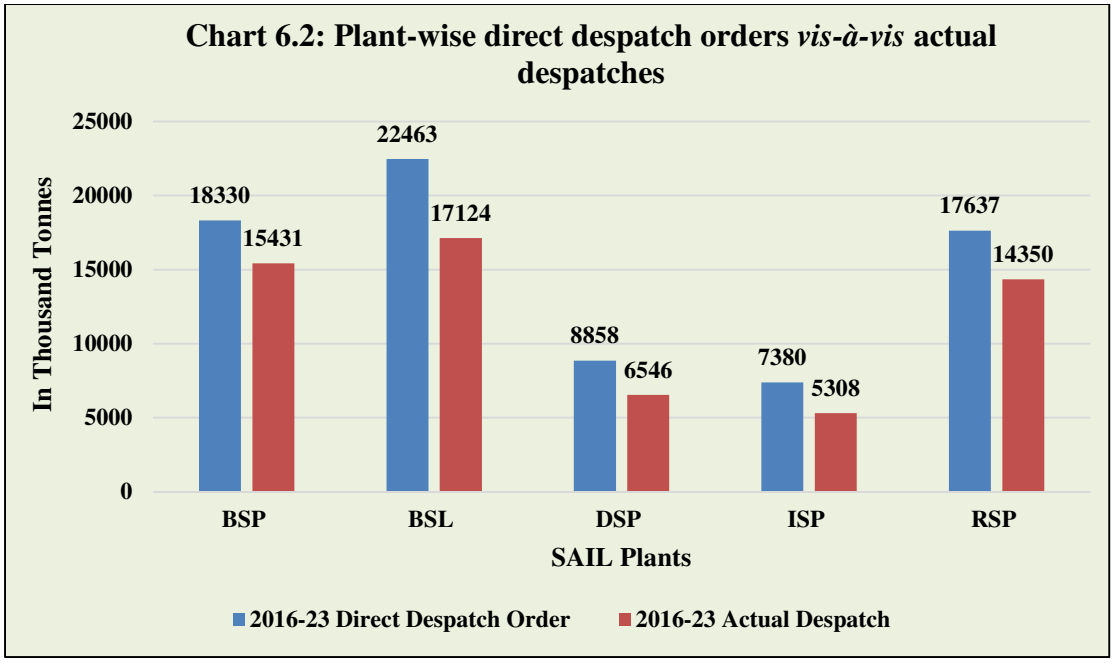
The committee constituted for augmentation of road despatch had recommended (May 2023) Plant-wise road despatch norms[55]. The actual achievement was, however, less than the recommended norm.

Recommendation 9: The Company may adhere to the norms fixed by the Management to optimise the despatch of steel materials through road transport and increase the use of road transport by removing bottlenecks in infrastructure and also regularly pursue with railway administration, to achieve maximum despatch of material in a timely and cost effective manner.

(vi) With its network of 37 Branch Sales Offices and 49 warehouses all over India, SAIL delivers its finished steel to its different segments of customers mainly through direct despatch and stockyard delivery. In case of direct despatch, materials produced by different steel plants are despatched from the Plant mainly by wagons to the nearest private/public booking point of the customers. After the materials are loaded into the wagons at the Plant, relevant documents like Railway Receipts, Consignment Advice Notes, Test Certificates etc., are sent to the concerned Branch Sales Offices. Customer arranges to collect the documents from the Branch Sales Offices, either by payment or by making financial arrangement to take the delivery of the products.

Direct despatch orders being confirmed orders from customers are preferable over stockyard sales because handling expenses, stock piling at yards, inventory carrying cost and risk of non-disposal can be avoided by opting for direct despatch from Plants. In compliance with directions (May 2015) of the SAIL Board to reduce inventory in stockyards and to improve market share, it was submitted (March 2016) by Central Marketing Organisation that efforts were being made to ensure that 95 *per cent* of direct despatch orders were fulfilled. However, none of the steel plants could achieve the target of 95 *per cent* of direct despatch orders during 2016-2023. Steel Plant wise fulfilment of direct despatch orders during 2016-2023 was as given in Chart 6.2:

[55] ***Bhilai Steel Plant : 12 per cent, Durgapur Steel Plant : 25 per cent, Rourkela Steel Plant : 17 per cent, Bokaro Steel Plant : 4 per cent, IISCO Steel Plant : 16 per cent and 13-14 per cent as a whole for SAIL.***



Source: Plant-wise direct dispatch order vs dispatch furnished by the Management

It is evident from the above chart that as against orders for direct despatch of 74.67 million tonnes, actual direct despatch was 58.76 million tonnes only during 2016-17 to 2022-23, which was 79 *per cent* of the direct despatch orders. Bhilai Steel Plant achieved highest direct despatch at 84 *per cent* whereas IISCO Steel Plant, Burnpur was lowest with 72 *per cent*. Audit noticed that the failure of the Company to fulfil the 95 *per cent* norm of direct despatch orders was either due to non-production by Plant or having produced being unable to despatch.

It was noted that despite availability of materials at Plant, direct despatch of materials was less than the orders due to non-availability of railway rakes and route restriction by Railways. Delivery through direct despatch would have saved cost on multiple handling of materials, inventory carrying cost and customer dissatisfaction on account of lower direct despatch of orders.

In reply (October 2022), the Management of Steel Plants stated that fulfilment of supply against direct despatch orders was affected mainly due to issue of piecemeal orders, late receipt of orders, imbalances between orders procured for different mills, orders not as per availability, bunching of orders in particular width segment, excess orders more than rake load, insufficient orders to form the rake and issues of road/rake availability. Central Marketing Organisation attributed (October 2022) shortfall in direct despatch fulfilment to uncertainty in rake availability especially towards month end and peak-season, route restrictions, siding suspension, non-availability of production/simultaneous material readiness from all the individual mills of the Plant in combination of rake formation for a particular location, shortage of specific type of wagons required to load a particular product etc.

Ministry stated (December 2022) that offices of Sales Resident Managers at all Plant locations regularly coordinate with the steel plant for issues relating to order booking, production and despatch. Ministry further stated (December 2023) that the fulfilment

of direct dispatches was being reviewed and there was growth in the fulfilment of direct dispatches in first half year of 2023-24 as compared to previous year.

The replies corroborate the fact of inadequate coordination between marketing and production units. The fact remains that direct despatch of materials was less than the target of 95 *per cent* of the ordered quantity and there was shortfall of 15.91 million tonnes during 2016-2023. Direct despatch orders being confirmed orders from customers should have been prioritised and fulfilled to the maximum level as it did not require holding of inventory of finished goods.

6.4 Sale of semis without value addition and higher export of semis beyond the Annual Business Plan

(i) Crude Steel is further processed to produce finished steel or sold as semi-finished (semis) steel called Billets, Blooms and Slabs. Entire quantity of semis produced by the SAIL steel plants are not consumed by the Company. The excess semis produced are used for conversion to thermo mechanically treated bar and structurals like angles, channels, joist etc., through conversion agents and sold in Transmission Line Tower segment and domestic/export market. Conversion is preferred than sale of semis in market because it is more profitable.

Figure 6.1: Thermo Mechanically Treated Bar

Figure 6.2: Angle

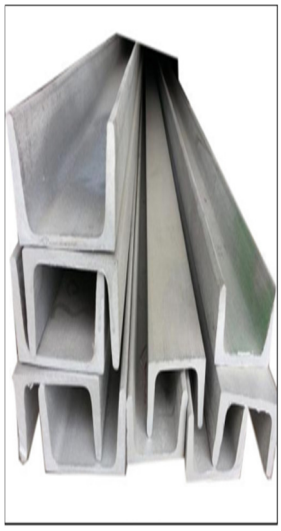


Figure 6.3: Channel

Figure 6.4: Joist

SAIL Board emphasised (December 2018) the need for increase in value added production to improve Net Sales Realisation. Central Marketing Organisation got the semis (Blooms and Billets) converted into finished products like thermo mechanically treated bars, structurals etc., through conversion agents. The 'Conversion Policy and Guidelines on Appointment of Conversion Agents' of Central Marketing Organisation envisaged that conversion would be carried out only by ensuring minimum positive margin of ₹ 200 per tonne.

The year-wise availability of semis to Central Marketing Organisation *vis-à-vis* sale of semis in domestic market and conversion of semis during 2016-17 to 2022-23 was as shown in Table 6.3.

Table 6.3: Year-wise availability of semis to Central Marketing Organisation *vis-à-vis* sale of semis in domestic market and conversion of semis during 2016-17 to 2022-23

(Quantity in thousand tonnes)

Year	Total semis availability as per Annual Business Plan	Semis actually available	Semis earmarked for conversion as per Annual Business Plan	Semis converted into finished products	Semis earmarked for sale as per Annual Business Plan	Actual Sale of semis
2016-17	1,742	2,099	943	889	799	1,211
2017-18	1,712	1,910	1,159	814	553	1,096
2018-19	1,961	1,893	1,324	771	670	1,122
2019-20	1,763	1,688	1,120	562	643	1,126
2020-21	1,269	1,515	640	356	629	1,159
2021-22	1,690	1,503	676	263	1,014	1,240
2022-23	1,118	1,508	481	386	637	1,122
Total	**11,255**	**12,116**	**6,343**	**4041**	**4,945**	**8,076**

Source: Annual Business Plan for respective years, figures furnished by Management

It is evident from the above table that as against the availability of 11.26 million tonnes semis envisaged in Annual Business Plan during 2016-2023, 12.12 million tonnes of semis were available to Central Marketing Organisation. Central Marketing Organisation converted 4.04 million tonnes (64 *per cent* of earmarked quantity) of semis into thermo mechanically treated bars and structurals against 6.34 million tonnes semis earmarked for conversion in Annual Business Plan. Due to non-conversion of semis into finished steel, Central Marketing Organisation failed to achieve targeted sales forfinished steel as referred in Para 6.2. Net Sales Realisation[56] from sale of finished products was higher than the Net Sales Realisation from sale of semis by ₹ 3,983 to ₹ 15,805 per tonne[57] during 2016-2023. As per the Comprehensive Turnaround Report (October 2017) for SAIL by Boston Consulting Group, by utilising the services of external conversion agents to convert the semis into finished goods, the contribution[58] realised increased by at least ₹ 1,000 per tonne more than that realised through direct sale of semis.

By not adhering to the target fixed in Annual Business Plan for conversion of semis into finished steel, the Company lost the potential opportunity to earn margin of atleast ₹ 230 crore[59] during 2016-2023. The reason for lower conversion was lower utilisation of capacity for conversion available with the wet leasing agents and conversion agents engaged by the Company. Moreover, the Company also runs the risk of competition

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[56] ***Gross sales value – Rebates – Other benefits allowed to the buyers like turnover discounts, incentives etc.***

[57] ***By comparing the Net Sales Realisation of semis vis-à-vis thermo mechanically treated bars and structurals.***

[58] ***Sales price/tonne – Total variable cost/tonne.***

[59] ***(6.34 million tonnes – 4.04 million tonnes) * ₹ 1,000 per tonne considering additional contribution from sale of finished products based on recommendation of Boston Consulting Group.***

from secondary producers who produced finished products out of SAIL semis available in market. This was further evident from the fact that the market share of SAIL[60] in sale of thermo mechanically treated bars decreased from eight *per cent* in 2016-17 to five *per cent* in 2022-23 against an overall 50 *per cent* increase in demand for thermo mechanically treated bars.

Management replied (October 2022) that with ramping up of production from Bar mills of IISCO Steel Plant, Burnpur and Bhilai Steel Plant and Structural Mill and Universal Section Mill, the sizes which were earlier rolled through conversion were now available from the Plant based mills, as a result of which demand from conversion had shrunk to few sizes which are either not produced by steel plants or not produced in adequate quantities. Ministry stated (December 2022) that ramp up of production from new mills in Long Products Plants was expected to bring down the availability of semis for domestic sales in future.

Reply of the Management may be seen in the light of fact that the Annual Business Plan quantity for conversion should have been fixed considering status of ramping up of the mills at various steel plants of the Company. Further, despite ramping up of Universal Section Mill and Structural Mill, there was shortfall in sale of thermo mechanically treated bars and structurals and surplus semis were available with Central Marketing Organisation which could have been converted to thermo mechanically treated bars and structurals. During 2022-24, against orders for 6.09 million tonne TMT and structural booked by Central Marketing Organisation, production by the referred mills was 4.51 million tonne.

(ii) The Annual Business Plans of SAIL over the years while emphasising on tactical export of semis, stipulated that after meeting requirement of own steel plants, steel processing units and conversion arrangements in India, some surplus semis would be targeted for exports to avoid competition in India with own finished products.

Year wise export of semis and finished steel from India *vis-à-vis* export by SAIL during 2016-17 to 2022-23 was as shown in Table 6.4.

[60] ***Source of total sales of TMT is the data published by Joint Plant Committee, under the aegis of Ministry of Steel, Government of India to collect data on the Indian iron and steel industry.***

Table 6.4: Year wise export of semis and finished steel from India *vis-à-vis* export by SAIL during 2016-17 to 2022-23

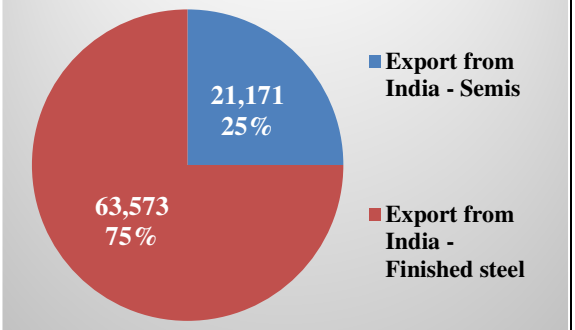
(Quantity in thousand tonnes)

Year	Export from India				Export of SAIL				% of SAIL market share in total export	% of SAIL market share in export of semis
	Semis	Finished steel	Total	% of semis	Semis	Finished steel	Total	% of semis		
2016-17	1,192	8,243	9,435	13	462	211	673	69	7	39
2017-18	1,994	9,620	11,614	17	336	364	700	48	6	17
2018-19	2,150	6,361	8,511	25	476	284	760	63	9	22
2019-20	2,819	8,355	11,174	25	801	377	1,178	68	11	28
2020-21	6,553	10,784	17,337	38	1,485	439	1,924	77	11	23
2021-22	4,866	13,494	18,360	26	821	530	1,351	61	7	17
2022-23	1,597	6,716	8,313	19	151	273	424	36	5	9
Total	**21,171**	**63,573**	**84,744**	**25**	**4,532**	**2478**	**7,010**	**65**	**8**	**21**

Source: Figures of Export from India have been obtained from the data published by Joint Plant Committee under the aegis of Ministry of Steel.

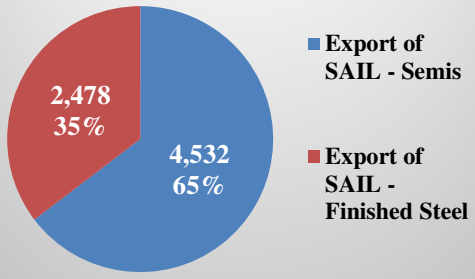
(Quantity in thousand tonnes)

Chart 6.3: Export by India during 2016-17 to 2022-23



Source: Export of semis and finished steel from India- Reports of Joint Plan Committee

Chart 6.4: Export by SAIL during 2016-17 to 2022-23



Source: Data furnished by Management

It is evident from the Table 6.4 that, out of total export by SAIL, export of semis was 65 *per cent* whereas the total export from India during 2016-2023 included 25 *per cent* of semis. Market share of SAIL in export of semis was 21 *per cent* against its market share of eight *per cent* in total export. Further, export of finished steel fetched higher contribution (₹ 599 per tonne to ₹ 11,792 per tonne) than that of semis during 2016-23.

SAIL exported 0.50 million tonnes more semis than envisaged in the Annual Business Plan during 2016-17, 2017-18, 2019-20 and 2021-22[61] which resulted in potential loss of opportunity to earn revenue of ₹176.99 crore[62].

[61] ***During 2018-19, 2020-21 and 2022-23, export of semis was within the quantity envisaged in the Annual Business Plan***

[62] ***Calculated considering export of semis in excess over the target for export multiplied by the differential contribution on export of finished steel and semis.***

Management replied (October 2022) that availability of semis depended on performance of finishing mills and sometimes it exceeded the envisaged quantity in Annual Business Plan. Efforts were made to export such surplus semis to avoid competition with own finished products in the domestic market.

The reply may be viewed in light of the fact that the performance of finishing mills was an operational issue which should have been resolved by the Management. Further, there was a potential to convert semis and export as finished products because contribution margin on export of finished products was always more than that earned on export of semis.

Ministry added (December 2022) that export potential of thermo mechanically treated bars and structurals which were produced through conversion route was limited. Availability of semis is gradually coming down with stabilisation of new mills at Durgapur Steel Plant, IISCO Steel Plant and Bhilai Steel Plant leading to higher capacity utilisation of finishing mills at these Plants with consequential lower export of semis.

Ministry reply may be seen in the light of the fact that steel plants were not able to produce as per orders fed by the Central Marketing Organisation *(as referred in para 6.2)* which could have been produced through conversion route and sold in domestic market. Though availability of semis gradually came down during 2016-23, the available semis could have been converted and sold as finished goods with higher Net Sales Realisation.

SAIL further stated (January 2023) that continuous efforts were being made to minimise exports of semis and increase conversion of billets to finished products. The reply may be seen in light of the fact that during 2023-24, against 0.71 million tonne semis earmarked for conversion, 0.40 million tonne semis were converted to finished steel and 1.29 million tonne semis were sold in domestic (1.17 million tonne) and international market (0.12 million tonne) without value addition.

Recommendation 10: The Company may undertake efforts to improve conversion of semis to finished products and minimise export of semis and increase export of finished products to improve Net Sales Realisation.

6.5 Loss of potential revenue due to production of Pig Iron instead of Saleable Steel

In a steel plant, Blast Furnace produces Hot Metal which is raw material to produce crude steel (Steel Melting Shop) from which the finished steel is produced. If Steel Melting Shop is unable to accept Hot Metal, the same is poured into Pig Casting Machines and made into solid iron called Pigs. Pig Iron has economic value and is utilised internally and also sold in open market. Details of Annual Business Plan quantity, production and potential loss of revenue due to excess production of Pig Iron by the steel plants during 2016- 2023 is given in the Table 6.5.

Table 6.5: Loss of potential revenue due to excess production of Pig Iron during 2016-23

Name of Steel Plant	Period	Annual Business Plan quantity for Pig Iron (in lakh tonnes)	Production of Pig Iron (in lakh tonnes)	Difference (in lakh tonnes)	Difference (in *per cent*)	Potential revenue loss due to excess production of Pig Iron *(Amount - ₹ in crore)*
Bhilai	2018- 2023*	0.34	4.02	3.68	1082.35	266.59
Bokaro	2016- 2023	3.44	7.83	4.39	127.62	275.93
Rourkela	2016- 2023	2.90	6.69	3.79	130.69	307.68
IISCO	2016- 2023@	2.07	7.25	5.18	250.24	107.00
Durgapur	2016- 2023#	0.99	3.26	2.27	229.29	64.95
Total		**9.74**	**29.05**	**19.31**		**1,022.15**

Source: Data furnished by Management

Bhilai Steel Plant did not produce Pig Iron till 2017-18. There was no production plan for Pig Iron in 2018-19 and 2019-20. In 2021-22 and 2022-23, production of Pig Iron at Bhilai Steel Plant was less than the plan.

#In Durgapur Steel Plant, production of Pig Iron was less than the Annual Business Plan in 2020-21 and 2021-22.

@In IISCO Steel Plant production of Pig Iron was less than the Annual Business plan in 2021-22 to 2022-23.

In Rourkela Steel Plant, excess production of pig iron was due to non-upgradation of Caster-1 and 2 of Steel Melting Shop-II, as envisaged in the Modernisation and expansion plan (2008) of Rourkela Steel Plant. Later on, Rourkela Steel plant proposed (February 2016) to meet the capacity enhancement of Steel Melting Shops by installing a new 4th Slab Caster of 1 mtpa capacity which would increase the crude steel production. Though the contract for installation of 4th Slab caster was awarded in February 2022, the same was yet to be installed (November 2024). In Bhilai Steel Plant, additional Hot Metal was diverted for production of Pig Iron. Contribution and net margin from Pig Iron was higher than the semis like bloom, billet and slab etc., in the years 2018-19, 2019-20 and 2020-21. In Bokaro Steel Plant, Pig Iron was produced when there was excess of Hot Metal with respect to requirement of Steel Melting Shop at that point of time. In IISCO Steel Plant, Pig Iron was produced more than planned quantity as downstream facilities were not stabilised in 2016-17 and 2017-18.

Audit noted that at Durgapur Steel Plant, there was lesser production of Pig Iron than the Plan in 2020-21 because the production of Hot Metal and crude steel was 100 *per cent* and 101 *per cent* of the Annual Production Plan respectively.

Audit noticed that Pig Iron was produced more than the plan whenever there was excess of Hot Metal with respect to Steel Melting Shop requirement at that point of time due to limitations in the Steel Melting Shop to consume total Hot Metal produced. Had the steel plants timely increased their capacity to convert Hot Metal into Saleable Steel, and converted Hot Metal into Saleable Steel, instead of making Pig Iron, they could

have potentially generated more revenue because contribution of Saleable Steel was more as compared to Pig Iron. Excess production of Pig Iron beyond the target during 2016-17 to 2022-23 resulted in inability to earn potential revenue of ₹ 1022.15 crore[63] (***Annexure-III***).

Management replied (October 2022) that production of Pig Iron at Bokaro Steel Plant was a stop gap arrangement to prevent Blast Furnace from any catastrophic failure due to excess Hot Metal production *vis-à-vis* consumption of Hot Metal at Steel Melting Shop at any particular time of operation due to unforeseen technical reasons. Throttling production of Blast Furnaces of Rourkela Steel Plant by reducing pressure and volume had many repercussions on the Blast Furnace as well as on the Plant at large. In IISCO Steel Plant, as downstream facility was not stabilised in 2016-17 and 2017-18, Pig casting machine pouring happened more than Annual Business Plan. Steel Melting Shop-III of Bhilai Steel Plant was under stabilisation and Steel Melting Shop-I was being phased out. This led to some imbalances in the Hot Metal production and its consumption at Steel Melting Shops which resulted in diversion of Hot Metal for making Pig Iron. There was no loss on account of excess production of Pig Iron in comparison to the Annual Business Plan as contribution of Pig Iron was more than contribution of semis in Durgapur Steel Plant in all four years. The production of Pigs had been less than that envisaged in Annual Business Plan in 2020-21.

Ministry stated (December 2022) that it would be ensured that pigging would be done only if there was positive contribution from the sale of Pig Iron. It further stated (December 2023) that the norm and actual production of Pig Iron in 2022-23 was 3.86 lakh tonnes and 3.68 lakh tonnes respectively.

Replies may be seen in view of the fact that Annual Business Plan is prepared considering the capacity of upstream and downstream facilities and operational bottlenecks and therefore, production of Pig Iron should have been within the Annual Business Plan quantity. Audit observation does not aim towards throttling the production of Blast Furnaces by reducing pressure and volume. Management is silent about non-upgradation of Caster-1 and 2 at Steel Melting Shop-II at Rourkela Steel Plant. Had the Management taken timely action towards installation of 4th slab caster, excess production of Pig Iron could have been avoided. The Net Sales Realisation of Saleable Steel was higher than Pig Iron during 2016-17 to 2022-23. In Bhilai Steel Plant, Audit noted that even after stabilisation of Steel Melting Shop-III, production of Pig Iron was 1.63 lakh tonnes against a plan of 0.34 lakh tonnes in 2020-21. However, the production of Pig Iron was less than the Annual Business Plan quantity during 2021-22 and 2022-23. In Durgapur Steel Plant, production of Pig Iron was within the Annual Business Plan in 2020-21 and 2021-22. Thus, it is evident that the Pig Iron production could have been minimised. Audit noted that the Company had fixed considerably high norms for production of Pig Iron in 2021-22 and 2022-23 as compared to the norms fixed during the audit period. Norm during 2016-21 was

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[63] ***Calculated considering excess production of Pig Iron over the target fixed as per Annual Business Plan multiplied with differential contribution margin on Pig Iron and finished steel.***

between 0.84 lakh tonnes and 2.5 lakh tonnes, whereas during 2021-2023 it was as high as 6.39 lakh tonnes and 3.86 lakh tonnes respectively. The production during 2016-2021was between 2.71 lakh tonne and 5.85 lakh tonnes which slightly reduced to 5.63 lakh tonnes in 2021-22 and to 3.68 lakh tonnes in 2022-23. Further, in Durgapur Steel Plant and Bokaro Steel Plant, production of Pig Iron was more than the norms in 2022-23.

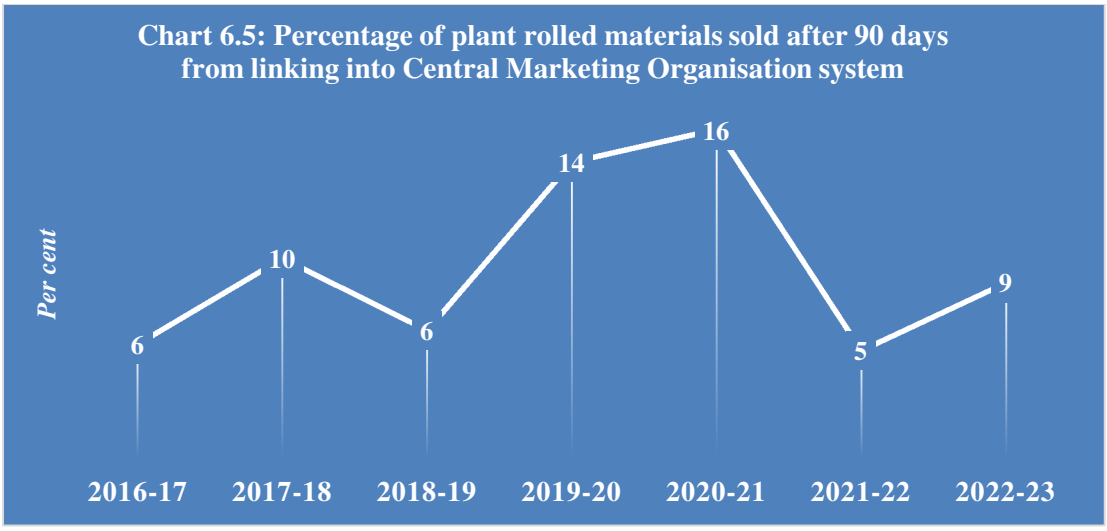
Recommendation 11: The Company may keep the downstream facilities ready to complete the steel making process after production of Hot Metal to minimise the production of Pig Iron beyond the targets fixed in the Annual Business Plan.

6.6 Delay in disposal of stock resulting in avoidable inventory carrying cost

Chairman, SAIL had directed (March 2016) to put a policy in place for disposal of more than three months old stocks so that at any given point of time such stocks were not there in the system. The Company framed (November 2017) a policy on "Mechanism for sale and auction guideline for inventory liquidation for Central Marketing Organisation stockyards (including export yards)" which stipulated that the steel materials ageing for more than three months are allowed for sales through online auction and may be sold below variable cost, if not sold within six months of age. However, the policy did not mention any measures to ensure that stock of Saleable Steel (including finished steel and semis) ageing for more than three months were not there in the stockyard at any point of time.

Audit analysed all 14.66 lakh invoices for the period 2016-17 to 2022-23 out of which in 1.56 lakh invoices (10.6 *per cent*), materials were sold beyond 90 days. Audit noted that out of 26.63 million tonnes Plant rolled materials sold by Central Marketing Organisation through stockyard during 2016-2023, 2.51 million tonnes materials valuing ₹ 12,939 crore were sold after three months period for which Central Marketing Organisation incurred additional inventory carrying cost of ₹ 202.65 crore[64] calculated considering minimum cost of finance (@ 7.31 *per cent)* apart from deterioration in quality of materials.

[64] ***Calculated based on Invoice value * Number of days for which stock was kept in stockyard beyond 90 days * (minimum cost of borrowing during 2016-2023) /100/365.***



Source: Data from SAP obtained from the Management

It is evident from the above chart that, percentage of Plant rolled material sold after 90 days from linking into Central Marketing Organisation system was on increasing trend in comparison to the preceeding year during 2016-2023 except in 2018-19 and 2021-22.

Management attributed several reasons for stock piling beyond 90 days such as despatch of higher quantity of materials not covered by orders to stockyards, requirement of rake formation and consequent despatch of higher quantity than order, production and logistic constraints, campaign items[65] produced once in three to four months and hence to be kept in stock etc.

Audit noticed that the reasons attributed by the Management were controllable by ensuring direct despatch of materials not covered by orders, improvement of road despatch to reduce dependence on the railways and better synchronisation between marketing and production units etc. Further, the Company did not frame any policy indicating periodicity for disposal of stock as desired by the Chairman.

Management/Ministry replied (October 2022/ December 2022) that certain stocks including special quality was consciously maintained at stockyards for servicing requirement of customers who had smaller requirements. The position of inventory more than three months old had improved from 28 *per cent* as on 1 April 2016 to 13 *per cent* as on 1 April 2021. Ministry further stated (December 2023) that quarterly Board note on Sales and Marketing performance containing performance on sales and inventory holding was submitted for review by the SAIL Board.

Management reply may be viewed in light of the fact that special quality materials are customised items made against specific demand from customers. Further, fresh stock was normally available to meet the demand of smaller customers. Though stocks ageing for more than three months had reduced as on 31 March 2023, it was still higher than the stipulation of Chairman, SAIL to keep such stock at 'nil'.

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[65] ***These are items which are not regularly produced by steel Plants but are demanded by certain customers throughout the year in little quantities.***

6.7 Delay in disposal of converted materials and consequent avoidable carrying cost

Central Marketing Organisation of the Company had been carrying out conversion of re-rollable/semis/billets by appointing conversion agents and the procedures followed in conversion were guided by 'Conversion Policy and Guidelines on Appointment of Conversion Agents'.

As per the extant policy, input materials would be allotted to the conversion agent for conversion when firm orders/market potential for finished products are available. The conversion agent shall supply the finished products to the customers and other branches based on the Sales Orders. The range of days taken for the disposal of such converted material during the period 2016-2023 is shown in table below:

Table 6.6: Range of days taken for disposal of converted material

Year	Total sales (tonnes)	Range of days taken for disposal	Sales beyond 90 days from link date (tonnes)
2016-17	8,76,415	0-1623	14,637
2017-18	8,07,673	0-2439	26,089
2018-19	7,67,370	0-2639	27,323
2019-20	5,42,229	0-2323	40,950
2020-21	4,09,579	0-2803	36,769
2021-22	3,05,621	0-1999	10258
2022-23	4,13,269	0-1668	11,487
Total	**41,22,156**		**1,67,513**

Source: Data from SAP obtained from the Management

Audit reviewed the days taken for the disposal of converted material and noted that significant time was taken as seen in table above. The maximum days taken for disposal of such converted material ranged between 1623 days and 2803 days during the years 2016-2023. Longer time being taken in the disposal of material would also lead to incurring of avoidable inventory carrying cost by the Company.

The Management/Ministry stated (October 2022/December 2022) that with concerted planning, sales efforts and monitoring, it would be endeavor of SAIL to dispose off converted stocks at the earliest. Ministry further stated (December 2023) that action for relevant changes in conversion policy had been initiated.

Audit noted that the Management has constituted (August 2024) a committee for comprehensive review of conversion policy including disposal of converted products. The report is awaited.

6.8 Disposal of Saleable Steel by special steel plants

Alloy Steels Plant is a special steel plant of SAIL catering to tailor-made customised products. It has a diverse product portfolio of over 400 grades catering to critical end-use by strategic sectors like Defence, Railways, Automobiles, Power Plants, Heavy Engineering and Manufacturing Industries, including other steel plants. Audit noted

that 23,446 tonnes of Saleable Steel and ingots[66] were lying undisposed for more than two years at Alloy Steels Plant valuing ₹ 172.08 crore as of March 2023. Out of above, 14,192 tonnes of materials valuing ₹ 77.07 crore were lying for more than five years and 7,073 tonnes material valuing ₹ 68.88 crore were lying for a period of two to five years. This has resulted in avoidable carrying cost of ₹ 59.14 crore[67] during 2018-19 to 2022-23.

In Visvesvaraya Iron and Steel Plant, Bhadravati, 10,026 tonnes of special steel valuing ₹ 55.27 crore was lying undisposed out of which stock of 5,032 tonnes valuing ₹ 25.20 crore was unmoved for more than five years and balance materials were ageing for one to five years. The carrying cost of the inventory worked out to ₹ 17.31 crore.

In Salem Steel Plant, saleable and semi-saleable stock of 7,238 tonnes valuing ₹ 102.89 crore was lying undisposed. Out of which 61.38 tonnes worth ₹ 1.50 crore was lying for more than 10 years, 782 tonnes worth ₹ 15.49 crore was lying for five to 10 years and 3,083.61 tonnes worth ₹ 44.71 crore was lying for a period of two to five years. The carrying cost of the inventory worked out to ₹ 18.96 crore.

Audit noticed that Saleable Steel is produced as per specifications of customers. Production of materials without linkage to any order/excess production resulted in blocking-up of inventory worth ₹ 119.26 crore for more than five years.

Management replied (October 2022) that in Alloy Steels Plant, 1,854 tonnes of material was despatched to Central Marketing Organisation and Bokaro Steel Plant. A Plant level Committee in Visvesvaraya Iron and Steel Plant was formed in August 2022 to assess the stock and ways to liquidate the stock. In case of Salem Steel Plant, disposal of old stocks by way of e-auction was started from September 2021 and five e-auctions conducted so far resulted in lifting of 774.03 tonnes. The above action resulted in reduced loss towards carrying cost and realisation of revenue. Continuous efforts would be made to liquidate the stocks through direct sales/ e-auction to the maximum extent possible. The Ministry stated (December 2022) that efforts for liquidation of finished stock are being made either through internal consumption, follow-up with Central Marketing Organisation, inter-plant transfer sale or e-auction.

Management reply may be seen in view of the fact that out of 23,594 tonnes, 1,854 tonnes had been transferred to Central Marketing Organisation and Bokaro Steel Plant. Therefore, although the stock had been transferred from one location to another within the Company, it was yet to be disposed off. Visvesvaraya Iron and Steel Plant Management formed a Committee to assess the stock and ways to liquidate the stock on 27 August 2022 after the matter was brought to the notice of the Management on 12 August 2022. Despite the efforts of the Management, as of March 2023, 20,067

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[66] ***When liquid steel is cast into a shapes like bloom or rounds which is suitable for storing, carrying and further processing in steel making, it is called Ingot.***

[67] ***The inventory carrying cost in the para has been calculated by considering the value of inventory (Saleable Steel and semis) that remained blocked for one to two years, two to five years and more than five years respectively * Finance cost.***

tonnes of Saleable Steel valuing ₹ 119.26 crore was lying at Alloy Steels Plant, Visvesvaraya Iron and Steel Plant and Salem Steel Plant for more than five years.

Recommendation 12: Management may take timely and adequate action to sell the finished stock to avoid loss towards carrying cost and realise the revenue.

6.9 Inability to earn revenue of ₹ 69.23 crore due to use of Commercial Rails as Steel Scrap

In the Rail and Structural Mill and Universal Rail Mill of Bhilai Steel Plant, along with the prime rails, there had also been regular generation of defective/rejected rails. Some of these rails, which were not fit for use in passenger and goods traffic lines of Indian Railways but of prime quality, were sold through Central Marketing Organisation as commercial rails. With increase in production of rails, the generation of commercial rails also increased substantially but its off-take was less. Considering huge stock of 1.13 lakh tonnes of commercial rails valued at ₹ 311.66 crore lying with the Company at the end of 2019-20 and consequent difficulty in storage and annual inventory carrying cost, the Revenue Maximisation Team of SAIL allowed Bhilai Steel Plant (December 2020) to auction commercial rails from the Plant.

In between, due to huge accumulation of commercial rails at Plant premises, Bhilai Steel Plant sent (2018-19 to 2022-23) 1.35 lakh tonnes of commercial rails to Salem Steel Plant and Alloy Steels Plant for use as scrap after cutting them into small pieces and then re-melting them in their Electric Arc Furnaces to produce various finished steel products. Resultantly, the Company failed to earn revenue of ₹ 69.23 crore[68] on account of lower realisation due to such inter- plant transfer of commercial rails as scrap.

Management replied (October 2022) that inter-plant transfer of commercial rails had helped in reducing cash outflow of SAIL to purchase input material for Salem Steel Plant and Alloy Steels Plant. The Net Sales Realisation from sale of commercial rails in past by Central Marketing Organisation/Bhilai Steel Plant was equivalent to scrap. Also, quantity sold as scrap was miniscule resulting in huge accumulation of inventory and blockage of working capital resulting in interest loss and increase in borrowings. The finished goods manufactured from above input material had fetched higher realisation.

Ministry stated (December 2022) that R-60 commercial rail had been supplied to Alloy Steels Plant and Salem Steel Plant. The Net Sales Realisation of commercial rails in this category was almost equal to the Net Sales Realisation of scrap during 2018-19 to 2020-21. As can be seen after conversion at Alloy Steels Plant and Salem Steel Plant, the Net Sales Realisation from the finished goods had increased and there was no loss of contribution at SAIL level.

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[68] ***Calculated by considering quantity of commercial rail that was sent to other steel plants on Inter Plant Transfer (IPT) basis multiplied by differential of Net Sales Realisation of Commercial rail and IPT price per tonne of rail for different category of rails.***

The reply of Management/Ministry may be viewed in light of the fact that during the years 2018-19 to 2022-23 , the Net Sales Realisation from commercial rail was higher than the defective/rejected rails by ₹ 9,064 per tonne to ₹18,895 per tonne. Ministry has compared the Net Sales Realisation from Commercial Rail on inter-plant transfer basis with Net Sales Realisation from finished goods at Alloy Steels Plant and Salem Steel Plant rather than comparing the same with the Net Sales Realisation from commercial rail. Audit noted that the actual Net Sales Realisation from commercial rail (₹ 41,500 per tonne for 52 kilograms and ₹36,000 per tonne for 60 kilograms rails) was more than the Net Sales Realisation from commercial rail on inter-plant transfer basis. During 2020-21,2021-22 and 2022-23, Bhilai Steel Plant could sell the commercial rails at ₹ 30,533 per tonne, ₹ 39,931 per tonne and ₹ 46,106.56 per tonne respectively. Therefore, decision of Bhilai Steel Plant to send commercial rails to sister unit for using it as scrap was not prudent which resulted in inability to earn revenue of ₹ 69.23 crore.

6.10 Deficiencies noticed in storage of steel materials at Central Marketing Organisation warehouses

Joint Inspection was carried out by the Audit team along with Central Marketing Organisation Management to check the storage facilities at 14 warehouses[69] out of 49 stockyards from where delivery was effected during 2016-2020 and record notes of joint verification were drawn. Following deficiencies were noted in audit:

i. As per Warehouse Manual 2009, the dunnage[70] wherever placed would be in a perpendicular position to the materials stacked. The warehouse inspection checklist also included verification of stacking on proper dunnage. Audit, however, noticed inadequate/improper dunnage at six stockyards namely Patna, Kolkata, Chennai, Bhilai, Chandigarh and Nagpur. Inadequate/improper dunnage could lead to early deterioration of steel material besides bending of long products like thermo mechanically treated bars and structurals.

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[69] ***Eastern Region (Kolkata, Patna & Durgapur); Northern Region (Faridabad, Ghaziabad, Kanpur and Chandigarh), Western Region (Mumbai, Nagpur, Bhilai and Gwalior) and Southern Region (Chennai, Hyderabad and Vishakhapatnam).***

[70] ***Dunnage are rails arranged systematically to keep steel materials over it so that the materials don't touch ground.***

Figure 6.5: Dunnage Bed at Bhilai

Figure 6.6: Material without dunnage at Chandigarh

ii. Audit noticed that unlinked materials were lying inside bushes/long grown grass in Kanpur, Vizag, Chennai, Chandigarh and Bhilai stockyards. This may lead to delay in disposal of such products besides providing scope for pilferage.

Figure 6.7: Steel material inside the long-grown grass at Chennai Warehouse

Figure 6.8: Steel material inside the bushes at Vizag Warehouse

iii. As per handling contract, the contractor should collect and deposit the packing strips and bailing hoops[71] on daily basis. Audit noticed that bailing hoops lay scattered inside the warehouses at Durgapur, Kolkata, Hyderabad, Chennai, Bhilai, Faridabad and Nagpur. Consequently, there was delay in disposal of packing strip/ bailing hoops beside improper housekeeping of stockyards.

[71] ***Packing strips are used to pack cold rolled coil/sheets, galvanised plate/coil. Bailing hoops are used to strap thermo mechanically treated bar of different diameter. These are sold as scrap by the stockyards.***

	
Figure 6.9: Bailing hoops lying inside a drain at Durgapur Warehouse	**Figure 6.10: Bailing hoops lying scattered at Kolkata Warehouse**

iv. Chairman, SAIL directed (March 2016) to display value of inventory stored inside warehouse and inventory carrying cost on daily basis to sensitise the employees to arrange for its early disposal. The same was, however, not adhered to in any of the stockyards except Nagpur.

v. In absence of any covered shed at three stockyards (Patna, Durgapur, Vizag), valuable steel materials like galvanised plain sheets/galvanised corrugated sheets and cold rolled materials which should have been stored under shed, were lying in open area exposed to sun and rain which could lead to early decay of quality of materials.

	
Figure 6.11: Cold Rolled Coils lay in open area at Patna Stockyard	**Figure 6.12: Cold Rolled Coils lay in open area at Durgapur Stockyard**

Management, while appreciating the views of Audit, stated (October 2022) that attempts would be made to improve the storage position. Management also stated that covered shed had been developed at Bhilai and the same would be taken up for other yards. Ministry did not offer any comments.

Audit further noted (August 2023) that covered sheds at Patna, Durgapur and Vizag had not been developed.

6.11 Deficiency in settlement of Quality Complaints

Procedure for settlement of complaints on quality stipulated the time limit for settlement of quality complaint in respect of visual defects within seven working days and non-visual defects within nine/nineteen[72] working days. The policy also provided for refund to be made within three working days from the date of receipt of such materials.

During 2016-17 to 2022-23, Central Marketing Organisation received 33,653 quality complaints in respect of 3.19 lakh tonnes of steel materials, out of which it accepted 24,500 cases involving 2.27 lakh tonnes of material for which credit note/financial instrument documents were issued for ₹ 976.55 crore. In this regard, Audit noticed the following:

i. Against the stipulation for settlement of Quality Complaints within nine/nineteen days, in 2,371 cases (10 *per cent* of accepted cases) involving 20,363 tonnes (9 *per cent* of accepted quantity) under quality complaint, inspection by Management was carried out after maximum days allowed. The delay, however, was showing a downward trend during 2016-17 to 2022-23 except in 2018-19 2019-20 and 2022-23.

ii. Against the provision for refund within three working days from the date of return, in 6,571 cases, credit notes of ₹ 221.12 crore were issued belatedly for 50,900 tonnes of material returned due to quality complaints. As a result, there was also a risk that it would have adversely affected subsequent lifting by the customer. The delay in issue of credit notes were noticed in 47.47 *per cent* cases during 2016-23.

Quality Procedure (which is a part of ISO certification) of Central Marketing Organisation stipulates that, the materials are delivered to customers after carrying out pre-delivery inspection. Damaged/deteriorated material in the warehouse are segregated and duly identified to ensure that the same is not wrongly delivered to customers. Audit, however, noted that the handling and delivery of materials in all stockyards of Central Marketing Organisation was done by handling contractors and materials with visual defects were sometimes delivered to customers and later returned by them under quality complaints. Boston Consulting Group recommended (October 2017) to strengthen the pre-despatch inspection at warehouses to avoid quality complaints on account of visual defects. In this regard, Audit noticed that the 13,515 complaints (1.19 lakh tonne) were on account of visual defects which could have been detected before despatch.

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[72] ***The policy was revised in November 2020 where in settlement period of non-visual defects was increased to 19 days.***

Management replied (October 2022) that:

- Quality Complaints settlement was done within seven days for visual defects and 19 days (with effect from 20 November 2020) for non-visual defects. The delay in settlement was due to referral of some cases to the Plant for joint inspection and unavoidable pre-occupation of the Plant and customer's representatives.
- Delay in adjustment beyond three days happened due to holidays and request of customer for adjusting the amount in next order booked by them.

Reply of the Management may be viewed in the light of the fact that reasons cited by Management are exceptional circumstances and do not explain the delays noted in issuance of credit notes in 47.47 *per cent* of cases.

Ministry stated (December 2022) that in most of the cases though the inspection was undertaken within seven days but decision taking or approvals in case of time barred cases needed additional days. It also stated that the refund was processed in three working days for one-time customers. However, in case of regular customers, the refund is either adjusted in book balance or adjustment in the next delivery order as per the requirement of customer.

The reply may be seen in the light of the fact that Audit has pointed out delay in inspection beyond seven days or nine days as applicable only. In case of regular customers, credit notes should be issued and posted in customer ledger within the specified time period rather than waiting for next lifting.

6.12 Disposal of Slag/Waste Products/Defectives

(A) Non-disposal of limestone and crushing plant at closed Bhawanathpur mines

Production and despatch from Bhawanathpur limestone mines was stopped from April 2013. SAIL decided (May 2017) to close the mines since the quality of limestone was not as per requirement of the steel plants and there was no environmental clearance for the project. The surrender of mines was still in progress. Audit noted that at the time of stoppage of mining operation, 2.14 lakh tonnes of limestone was lying in lease area and railway siding since 1994-95 and April 2013 respectively. Out of 2.14 lakh tonnes of limestone, 0.37 lakh tonnes lump was lying at Bhawanathpur Railway Siding (Consent to Operate of the siding expired on 30 June 2021). Audit noticed that action was not taken by the Management to utilise or sell the material. Therefore, limestone valuing ₹ 14.49 crore remained unutilised. In case the mining lease is surrendered which is in final stage, the materials present in the lease area cannot be taken out.

Audit further noted that Screening and Crushing plant installed at Bhawanathpur mines in 1987-88 at a cost of ₹ 12.79 crore was closed in 1994-95. However, Management did not take any action either to operate or dispose the structure/plant and machinery which was lying idle.

Management replied (October 2022) that:

- Effort was made to sell out the 1.77 lakh tonnes of material lying in the lease area to cement industries prior to 2008, but none had shown interest to purchase the material due to high Magnesia content.
- Due to restriction of transportation of mineral by Government of Jharkhand (online challan, GPS and lessee and dealer license), disposal of these materials was not possible.
- A Committee had been constituted for physical verification/assessment of Screening and Crushing Plant items etc., of Bhawanathpur Group of Mines in March 2022. Action for disposal shall be taken based on recommendation of the Committee as per procedure.

Ministry stated (December 2022) that all efforts were being made at Mines end to dispose off the idle assets, stores and spares etc., of Bhawanathpur Mines. It further stated (December 2023) that an order for valuation of old assets, stores and spares lying at Bhawanathpur Group of Mines had been placed (October 2023) on M/s Metal Junction.

Reply of Management/Ministry may be viewed in the light of the fact that:

- Out of 2.14 lakh tonnes of material, in respect of 0.37 lakh tonnes royalty also had been paid for despatch to steel plant. Steel plants could have used it by mixing with better quality limestone as was done earlier. The company could also have explored alternative uses as limestone is used in many industries like Cement, Glass, Ceramic, Paper, Textile and Tanning Industries; for manufacture of calcium carbide, alkali and bleaching powder etc.-or sold at a lower rate as it was processed material (limestone that had been crushed in crushing Plant). Steps were not taken to sell them after 2008.
- Restriction of transportation of mineral by Government of Jharkhand was due to lapse of Environment and Forest clearance which happened due to passage of time.
- The mines had been closed since 2013. Necessary clearance lapsed in 2013 and steps for disposal could have been taken earlier. As the mine was in final stage of surrender[73], disposal of assets from surrendered lease would not be possible subsequently.

Neither disposal of limestone nor disposal of crushing plant at closed Bhawnathpur mines was done (March 2023).

[73] ***For surrender of mines, lessee has to comply with number of conditions. SAIL had complied with all conditions, except it had not been able to complete fencing in one area. Thus, this has been referred to as final stage of surrender.***

(B) Non-disposal of sub-grade iron ore fines and tailing fines

(i) During production of iron ore lump and fines, sub-grade minerals (byproducts with lesser *Fe* content and undersize/oversize) were also produced. These were not suitable for use in steel plants and had accumulated in captive mines of SAIL over a long period of time (50-60 years). Owing to lack of sintering facility with SAIL in the past, these low-grade iron ore fines were not utilised internally and were dumped at mine heads. SAIL also did not have enough beneficiation capacity and pelletisation Plant as a result of which it was not possible for SAIL to consume these dumped fines for its steel plants.

In order to maintain availability of iron ore in market and considering the economic rationale for realisation of full value of mineral extracted from captive mines, Government of India allowed (September 2019) SAIL to sell sub-grade minerals lying at the mines pit head, subject to requisite permission from State Governments concerned. Whereas State Governments of Odisha and Chhattisgarh had accorded permission for sale, Government of Jharkhand had not permitted the same till date (March 2024).

Figure 6.13: Sub grade iron ore fines at Gua mines

Table 6.7: Quantum of sub-grade iron ore fines available, quantity disposed of and quantity remaining undisposed as of March 2023

Name of the mine	Location (State)	Quantity available prior to getting permission (in lakh tonnes)	Quantity disposed off (in lakh tonnes)	Quantity remaining undisposed (in lakh tonnes)	Value of undisposed minerals (₹ in crore)
Rajhara mines	Chhattisgarh	18.80	1.50	17.30	202.11
Gua ore mines	Jharkhand	330.00	0.20	329.80	3195.11
Taldih iron mines	Odisha	5.05	2.05	3.00	13.99
Kalta iron mines	Odisha	5.08	0	5.08	41.81
Bolani ore mines	Odisha	72.73	12.46	60.27	542.73
Total		**431.66**	**16.21**	**415.45**	**3,995.75**

*Valuation was not done.

Source: Data furnished by Management

It was seen that out of 43.17 million tonnes sub-grade iron ore fines available, SAIL disposed only 1.62 million tonnes (about four *per cent*) till March 2023 leaving 41.55 million tonnes of sub-grade iron ore fines valuing ₹ 3,995.75 crore remaining undisposed. Audit noted that earlier, sub grade fines were not treated as inventory, therefore valuation was not done. However, with effect from 2019-20, the same is being treated as inventory and valuation is being done. The accounting of such sub-grade iron ore fines has resulted in increase in profit of the Company. The value of inventory of such sub-grade iron ore fines constitutes 12.35 *per cent* of the total inventory (₹ 3,995.75/ ₹ 32,352*100) of SAIL as on 31 March 2023.

Audit noticed that the Management could not sell 8.63 million tonnes of sub-grade fines for which permission of State Governments was available with the Company. Further, clearance to sell 32.98 million tonnes of the material in the mines located in Jharkhand was not available.

(ii) Iron ore extracted from mines are cleaned/washed with water to reduce presence of silica and alumina to desired level for use in steel plants. The impurities removed from ore are sent to tailing dam and are known as tailing fines. These fines have *Fe* content in the range of 55 to 62 *per cent*.

Table 6.8: Quantum of tailing fines and value as of March 2023

Name of the mines	Location (State)	Quantity of tailing fines/slime (lakh tonnes)	Value as on 31 March 2023 (₹ in crore)
Dalli mines	Chhattisgarh	72.94	305.75
Barsua mines	Odisha	29.78	186.25
Total		**102.72**	**492.00**

Source: Data furnished by Management

The table above indicates the mine-wise details of quantity of tailing fines/slime amounting to 102.72 lakh tonnes valuing ₹ 492 crore. Apart from above, 116.85 lakh tonnes of tailing fines/slime was accumulated and lying undisposed at Bolani, Kiriburu and Meghahataburu Iron Ore Mines for which valuation was not done. Further, in the absence of permission from Government of Jharkhand, these materials were not disposed.

Audit noticed that Barsua mines could sell only 9.43 lakh tonnes of tailings (from December 2020 to March 2023). Tailings at Bolani ore mines was lying undisposed for want of statutory clearance.

Management replied (October 2022) that:

- Non disposal of fines from mines located in Jharkhand was due to absence of consent from Government of Jharkhand mandating issue of transit challan. The estimated use of sub-grade fines from Duarguiburu (lease under Gua mines) is around one million tonnes per annum and it is expected to commence by first quarter of 2023-24. Bokaro Steel Plant had undertaken plan for setting up Pellet Plant of capacity 4 million tonnes per annum along with 10 million tonnes beneficiation plant and 12.5 million tonnes crushing plant.

- In respect of Odisha Group of Mines, Management stated that the sale of dump fines was affected due to delay in obtaining various clearances, restriction in excavation and despatch of sub-grade fines. On liquidation of the entire quantity of tailings from tailings pond in Barsua mines, action for sale of the sub-grade dump fines would be initiated. All out efforts for liquidation of dump fines/tailings through selling in open market as allowed by the Ministry of Mines, Government of India and Government of Odisha within the ambit of the statutory permissions granted had been taken.
- In case of Bhilai group of mines (Rajhara), sale of dump fines from its storage location had been affected to some extent due to limitation of Environmental Clearance. The beneficiated iron ore slimes (-1mm) obtained after beneficiation of tailings would also be utilised as input for Pellet Manufacturing through upcoming 1 million tonnes per annum Pellet Plant at Dalli Mechanised Mine.

Ministry intimated (December 2022) that the project to install Beneficiation and Pelletisation Plant at Gua Ore Mines had been approved in-principle in October 2022.

Reply of the Management/Ministry may be viewed in the light of the following facts:

- Management had not been able to obtain consent (March 2024) to issue transit challan from Government of Jharkhand for sale of fines which was a condition for sale of fines/tailing fines to outside party. The project to install beneficiation and pelletisation Plant had been approved in principle in October 2022 and it would be followed up by firming up of cost and final approval and the completion would take around three years.
- In Bolani, only three *per cent* of available quantity of sub-grade fines was sold. The process of selling of tailings in Barsua was very slow and it was likely that the sub-grade fines would remain undisposed for long time. In case of Taldih and Kalta (Odisha Group of Mines), contention of Management may be viewed in the light of the fact that in the meeting held between Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar and SAIL, it was decided by Director of Mines, Odisha that these quantities of dump-fines/slimes so sold would not count towards the approved limit of production under Environment Clearance.
- Audit noted that the tailing pond located in the 6.9 square miles of mining lease area was not operated for want of statutory clearance. Unless the statutory clearance was received, it would be difficult for Bolani to dispose off the tailings.
- In case of Bhilai mines, Management accepted that sales of dump fines from its storage location was affected to some extent due to limitation of Environment Clearance.

Ministry further stated (December 2023) that no disposal/utilisation had been done.

Recommendation 13: The Company may take necessary steps to utilise the sub-grade iron ore fines and tailing fines and ensure the security of the material. Company may also take necessary steps to sell the inventory to unlock the commercial value remaining blocked in such inventory.

(C) Non-liquidation of embedded scrap in Linz-Donawitz and Blast Furnace Slag at Rourkela Steel Plant and Bhilai Steel Plant

Rourkela Steel Plant dumps Blast Furnace Slag (which could not be granulated) and Linz-Donawitz slag[74] at Slag Dump area of the Plant. Linz-Donawitz Slag contains some element of Steel Scrap. Nominal quantities of these scraps are routinely extracted and consumed in the Plant or sold. However, due to very little utilisation of Linz-Donawitz slag at steel plants, the slag had accumulated in large quantity which gradually had taken the shape of hills. Rourkela Steel Plant did not take initiative to recover these inventories and liquidate it.

Figure 6.14: Linz-Donawitz Slag at Rourkela

Rourkela Steel Plant assessed the volume of Linz-Donawitz slag (24.57 lakh tonnes) and steel scrap embedded in Linz-Donawitz slag (0.52 lakh tonnes) valued at ₹ 51.67 crore (@ ₹ 9,964/tonne) as part of inventory in its books for the year 2019-20. Audit noted that Rourkela Steel Plant could not dispose Linz-Donawitz slag or the embedded iron and steel scrap in 2020-21. Total unprocessed Linz-Donawitz slag as on 31 March 2023 increased to 29.64 lakh tonnes The inventory of extractable iron and steel scrap embedded in Linz Donawitz slag was 0.56 lakh tonnes valuing ₹ 56.14 crore as on March 2023.

Similarly, Bhilai Steel Plant assessed 4.14 lakh tonnes of iron scrap valued at ₹ 326.59 crore embedded in 202.60 lakh tonnes of Blast Furnace Slag as of March 2021. During 2020-21, Bhilai Steel Plant offered 7.10 lakh tonnes Blast Furnace Slag for sale. Bhilai Steel Plant never took such initiative before 2020-21 to liquidate the inventory of iron scrap in a commercial manner. The undisposed quantity as on 31 March 2023 was 4.08 lakh tonne valuing ₹ 404.21 crore resulting in blocking up of funds.

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[74] ***Blast furnace slag generated from blast furnace and contains some element of iron. Linz-Donawitz slag generated from Linz-Donawitz convertor (Steel Melting Shop) and contains some element of steel.***

Management/Ministry replied (October 2022/December 2022) that continuous efforts were being made by Rourkela Steel Plant for liquidation of these inventories in a commercial manner. Efforts were also being made to maximise the use of 0-5 mm fraction of Linz-Donawitz slag in Raw Material Handling Plant and selling steel melting shop slag at Rourkela Steel Plant to external agencies. In respect of Bhilai Steel Plant, Management stated that all steps were taken for liquidation of Blast Furnace dump Slag embedded with iron scrap from Blast Furnace Slag dump area (4A-4B area) for which a contract was being awarded to Ferro Scrap Nigam Limited. SAIL stated (January 2023) that entire stock at Rourkela Steel Plant would be liquidated within the next six to seven years.

Figure 6.15: Blast Furnace Slag at Bhilai

The reply of the Management may be seen in the light of the fact that in the absence of time bound action plan to liquidate the stock, despite the efforts cited in the reply, there was minimal sale/utilisation of the Linz-Donawitz slag over the years and the stock was mounting up year after year.

Recommendation 14: Management may initiate time bound action plan to liquidate the stock of Linz-Donawitz Slag and Blast Furnace Slag at the earliest to minimise the blocking of its funds.

(D) Infructuous expenditure on transportation and processing of Linz-Donawitz Slag at Bhilai Steel Plant

Bhilai Steel Plant had been segregating Linz-Donawitz Slag into 0-5 mm size to be used in sintering Plants and into 16-45 mm size to be used in Blast Furnace and Steel Melting Shop. The remaining 5-15 mm size material, however, was being disposed of in other non-commercial ways (like filling low lying areas, pot holes, road repair and levelling inside the Plant etc). Audit noticed that use of 0-5 mm and 16-45 mm Linz-Donawitz slag in Sinter Plants and Blast Furnace/Steel Melting Shops had been decreasing over the years during 2016-2023. As a result, considerable quantity of Linz-Donawitz Slag remained unused. Audit noticed that ₹ 9.94 crore spent on transportation and processing of the Linz-Donawitz Slag (loading into dumpers/tippers/wagons and unloading at various points, processing into various fractions etc.) not utilised so far, remained unfruitful.

Management/Ministry replied (October 2022/December 2022) that efforts were being made to consume the Linz-Donawitz Slag. Negotiations were on with different agencies

like National Highway Authority, Rural Road Development etc., for the utilisation of steel slag.

The fact, however, remained that Linz-Donawitz slag continued to remain unutilised and the expenditure incurred on its processing and transportation became infructuous.

(E) Non-recovery of scrap from slag dumps of Alloy Steels Plant

Different types of scrap generated during steel making in the steel plants are stored in slag dumps for recovery of useful scrap through extensive digging, excavation and magnetic separation and unusable arising i.e., work-through slag is removed and dumped. In Alloy Steels Plant, huge quantity of scrap was lying at slag dumps at different locations. Alloy Steels Plant estimated annual extractable scrap quantity of 23,500 tonnes.

Audit noticed that due to lack of initiative by Alloy Steels Plant, it could not utilise the scrap lying in its slag dumps, which would have resulted in an annual saving of ₹ 32.49 crore[75]. However, no Expert/Consultant was appointed by Alloy Steels Plant for assessment of exact quantity of scrap lying in such dumps.

Management/Ministry replied (October 2022/December 2022) that it was in discussion with Ferro Scrap Nigam Limited for segregation of metallic value from slag debris. Ministry stated (December 2022) that Alloy Steels Plant was in the process of finalisation of the scope of work and contract proposal to award the work to Ferro Scrap Nigam Limited. Audit further noted that around 1,668 tonnes of scrap valuing ₹ 7 crore was despatched to Durgapur Steel Plant during June - July 2024.

(F) Inability to earn revenue of ₹ 441.40 crore in sale of slag due to faulty clause in the agreement

A long term slag sale agreement for 30 years was entered into with Bokaro Jaypee Cement Limited[76] (BoJCL) in July 2008 for sale of Blast Furnace slag which was to be provided by Bokaro Steel Plant. Accordingly, a tripartite agreement was signed between SAIL, Jaiprakash Associates Limited and Bokaro Jaypee Cement Limited. As per the terms of agreement, Bokaro Steel Plant was to supply one million tonnes of slag per year. Further, as per clause 5.2.1 of the tripartite agreement between Jaiprakash Associates Limited, SAIL and Bokaro Jaypee Cement Limited, base price of slag was fixed at ₹ 312 per tonne (July 2009). The price was to be revised annually based on cement index published by RBI and in its absence based on net ex-factory sales realisation of the joint venture company. The base price was to be reviewed every five years based on the weighted average price offered by successful third parties in the immediate preceding year under tendering process wherein minimum 0.7 million tonnes per annum slag was to be sold. In the event, quantity available for third party off

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[75] ***Rate of scrap charged at Durgapur Steel Plant in 2020-21 was ₹ 15,232.00 per tonne (a). Annual extractable quantity of scrap was 23,500 tonnes (b). Cost of recovery of scrap was ₹ 3.31 crore. Total saving = (a*b)-c = ₹ 32.49 crore.***

[76] ***Joint Venture between SAIL and Jaiprakash Associates Limited, wherein SAIL's stake was 26 per cent. SAIL sold its stake in November 2014.***

take was less than 0.7 million tonnes per annum of slag then the base price would not be reviewed till such time that a minimum of 0.7 million tonnes per annum of slag was available.

Audit noted that during 2009-2014, market price of slag was between ₹ 500 and ₹ 1,220 per tonne whereas rate provided to Bokaro Jaypee Cement Limited was between ₹ 336.65 and ₹444.24 per tonne. This was due to faulty price fixation clause (5.2.1) adopted in the agreement which favoured the buyer and resulted in loss to SAIL in sale of slag to Bokaro Jaypee Cement Limited during the above period. This fact was reported in the Para 5.1 of CAG Audit Report (Union Government-Commercial) No. 21 of 2015.

Audit noted that SAIL sold its stake in Bokaro Jaypee Cement Limited to M/s Dalmia Bharat Company Holding Limited (DBCHL) in November 2014 and a new Slag Sale and Supply Agreement was signed (November 2014) between M/s Dalmia Bharat Company Holding Limited and SAIL. SAIL continued with the previous price fixation formula in this agreement. Since, M/s Dalmia Bharat Company Holding Limited was an independent entity and SAIL did not have any stake in it, supply of slag at the same rate as per previous contract clause should have been revised. Sale price of slag to M/s Dalmia Bharat Company Holding Limited during 2015-2023 was between ₹ 383 and ₹ 742.11 per tonne against the market rate of ₹ 440 and ₹ 1,602 per tonne.

Audit noticed that SAIL, while entering into new agreement with M/s Dalmia Bharat Company Holding Limited, did not apply due diligence and continued with the existing pricing formula ignoring the market conditions. This was detrimental to the financial interest of the Company. Sale of slag at a lower rate to M/s Dalmia Bharat Company Holding Limited under long term agreement resulted in inability to earn revenue of ₹ 441.40 crore[77] during 2015 to 2023.

Management replied (October 2022) that Bokaro Steel Plant had offered 0.7 million tonnes per annum of Blast Furnace slag to third parties during 2021-22. Management was in the process of reviewing the price and the base price was expected to be revised substantially. Ministry stated (December 2022) that Bokaro Steel Plant managed to sell the required slag during April 2022-October 2022 and accordingly the base price was revised resulting in extra revenue of ₹ 14.22 crore from M/s Dalmia Bharat Company Holding Limited. The contracted price with M/s Dalmia Bharat Company Holding Limited was based on fair market value and during the validity of such contract the same cannot be modified unilaterally.

Replies may be seen in the light of the fact that fixing of pricing formula ignoring the market conditions was detrimental to the financial interest of the Company due to which the Company was deprived from gaining from higher market demand of Blast Furnace slag in the region. At the time of amendment of agreement, Management was aware of

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[77] ***Difference between the rate realised by Bokaro Steel Plant from the open market and the MoU rate at which slag was sold to M/s Dalmia Bharat Company Holding Limited.***

the fact that price fixation formula was not in the interest of Company. However, SAIL agreed to continue with the same clause resulting in loss to the Company. The price would be reviewed from 2022-23 onwards and therefore loss incurred during earlier years cannot be set off. The contracted price was not based on fair market value during the period 2015-2023 and has been highlighted in the para.

Recommendation 15: Management may ensure that sale price of slag in the agreement is fixed based on the market/fair price to avoid sale of slag at lower rate.

(G) Loss due to wastage of ferrous fraction at Durgapur Steel Plant

Slag at Durgapur Steel Plant can be categorised into three classes (i) Unprocessed iron scrap[78] and 0-20 mm size ferrous fractions i.e., usable scrap which is sold to the contractor, (ii) 20-150 mm size Blast Furnace grade scrap and +150 mm steel scrap i.e., usable scrap which is returned by the contractor and (iii) unusable work-through slag[79].

Durgapur Steel Plant engaged (May 2016) a contractor for the recovery and sale of the scrap from its slag bank. Durgapur Steel Plant awarded a sale contract on the basis of open tender for sale of Unprocessed iron scrap and 0-20 mm size ferrous fractions, to be recovered from slag bank through the process of extensive digging, excavation and magnetic separation. Larger size scraps were to be segregated into various size ranges to suit the requirement of Blast Furnace and Steel Melting Shop and work-through slag was to be removed and dumped by the contractor against payment of service charges, through an internal work order. The details of category-wise estimated quantity *vis-à-vis* actual recovery of scrap by the contractor are given in the following table.

Table 6.9: Details of scrap recovered from slag bank

Item Recovered from Slag Bank	Purpose of Recovery	Rate (₹/tonne)	Estimated Quantity	Actual Quantity	Percentage of recovery
Unprocessed iron scrap	To be sold to the Contractor	11,500.00	45,000	40,222	89.38
Ferrous fractions (0-20 mm)		555.00	6,25,000	32,859	5.26
Blast Furnace grade Scrap (20-150 mm)	To be returned to Durgapur Steel Plant	1396.50	3,00,000	1,43,863	47.95
Steel Scrap (+150 mm)		934.50	1,00,000	57,884	57.88
Work through Slag	To be dumped at another location	84.00	76,00,000	35,74,044	47.03

Source: Records of the Management

Audit noted that against the target of 6.25 lakh tonnes of ferrous fractions, the contractor recovered only 32,859 tonnes during June 2017 to March 2020. Recovery of ferrous fractions was proportionately linked with the recovery of unprocessed iron scrap. Though 89 *per cent* of the estimated quantity of unprocessed iron scrap was recovered,

[78] ***Unprocessed iron scrap is the unprocessed iron scrap recovered from the Slag Bank through the process of extensive digging, excavation and magnetic separation and sold to the Contractor.***

[79] ***Work-through slag is the unusable waste, slag and debris etc., removed and dumped by the contractor at another location.***

only 5 *per cent* of ferrous fractions was recovered by the Contractor. In this regard, Audit noticed that performance of the magnetic separator installed by the Contractor was unsatisfactory and contractor had not engaged sufficient number of equipment for deep digging. However, action was not taken by Durgapur Steel Plant for its improvement. Further, there was no clause in the agreement to fix responsibility on the Contractor for the shortfall in the recovery of 0-20 mm ferrous fractions from its slag bank.

During the contract period, 5.26 lakh tonnes[80] of 0-20 mm ferrous fractions could not be recovered through magnetic separation and could have been dumped as work-through slag. Moreover, Durgapur Steel Plant paid avoidable service charge of ₹ 84 per tonne for transportation of the ferrous fraction for its dumping.

Management replied (October 2022) that the quantity mentioned in tender for recovery of scrap was on estimation basis. The contractor installed Magnetic Separators, whose performance was found satisfactory. In line with tender terms, service charge of ₹ 84 per tonne was paid for transportation of unusable wastes which did not constitute any 0-20 mm ferrous fractions.

Ministry stated that (December 2022) proportionate calculation of ferrous fractions with respect to unprocessed iron scrap was merely on estimation basis and this tender was for last layer of the dump. Therefore, nature and quantity of scrap, debris etc., in first layer of dump may not have fixed proportion. It further stated that the creation of different sizes of ferrous fraction is random and does not follow any pattern.

Reply of the Management may be viewed in light of the fact that recovery of ferrous fraction was proportionately linked with the recovery of unprocessed iron scrap. While 89 *per cent* of the estimated quantity of unprocessed iron scrap was recovered, proportionately 5 *per cent* of ferrous fraction should also have been recovered. Target fixed by Durgapur Steel Plant was reasonable and was not disputed by the contractor. Besides, in November 2017, Durgapur Steel Plant had observed that the contractor was mixing 0-20 mm ferrous scrap with unusable waste. Reply of the Ministry may be viewed in light of the fact that the target was fixed by the Management considering the depleting trend, actual recovery of scrap from the past contract and the fact that recovery of ferrous fraction was linked with the recovery of unprocessed iron scrap proportionately.

(H) Non disposal of sinter valuing ₹ 15.30 crore by IISCO Steel Plant

The undersize fractions of sinter generated in the process of screening are returned to Raw Material Handling Plant. These undersize fractions are generally recycled back for further process of sinter making. Audit noted that after commissioning of the Blast Furnace in IISCO Steel Plant, Burnpur, more than 30 *per cent* of the sinter received was discarded as undersize. As the Raw Material Handling Plant was not designed to handle

[80] ***89.38 per cent of 6.25 lakh tonnes i.e., 5,58,625 less 32,859 tonnes.***

such huge quantity of small sinter, the undersize sinter was shifted to the Joraburi area where huge stock was piled up.

A Committee constituted (March 2017) to assess feasibility of usage of above material at IISCO Steel Plant and disposal methodology of the same recommended for disposal of the material through sale. IISCO Steel Plant sold 30,701.54 tonnes of sinter fines during 2017-18 and 2018-19. However, 1,02,331 tonnes of sinter fines valuing ₹ 15.30 crore was lying (March 2019) at Joraburi site. Due to acute shortage of storage space to store surplus coke, the Joraburi area was crushed/levelled and new space was developed to store Blast Furnace coke without removing/disposing the stored sinters. Subsequently, a Committee evaluating (August 2021) the Expression of Interest floated to explore buyers for solid waste materials located at Joraburi site, in its report did not include undersized sinter fines amongst the list of quantities of mixed solid waste materials available for sale there. Thus, undersize sinters valuing ₹ 15.30 crore were lost due to mixing up of the same with other wastes after crushing/levelling.

Figure 6.16 Sinter fines mixed with other wastes after crushing/leveling at ISP, Burnpur

Management replied (October 2022) that the material which was in usable condition was being used by Steel Melting Shops and remaining material as of now was being disposed.

Ministry stated (December 2022) that after inspection by a Committee, it was found that the sinter material lying at Joraburi could not be reused. Now the Joraburi area was auctioned and around 1500 tonnes of mixed material has been sold to the external party.

The reply may be viewed in the light of the fact that, although as per the physical verification report of 31 March 2019, 1,02,331 tonnes sinter fines dumped at Joraburi were available till September 2018, but the material was not available as per the Committee formed to evaluate the expression of interest for sale of solid materials in August 2021. Thus, undersize sinter valuing ₹15.30 crore at IISCO Steel Plant, Burnpur was lost due to mixing up of the same with other wastes after crushing/levelling which should have been disposed through sale.

At present, if there is any sinter diverted due to process requirements, it is immediately sent back to sinter plant or for consumption in Basic Oxygen Furnace. Further, the

undersized return fines are utilized in the preparation of base mix which is again utilized in sinter making.

Summing up:

Prime Products of SAIL Plants are sold through Central Marketing Organisation and other products are sold by Marketing Department. Timely sale and disposal of inventory is key to prevent blockage of funds and maintaining adequate liquidity. Audit noted instances where significant quantity of inventory like sub-grade iron ore fines, tailings, limestone etc., was lying undisposed at mines pithead leading to blocking up of funds. It was seen that out of 43.17 million tonnes of sub-grade iron ore fines available, SAIL disposed only 1.62 million tonnes (about four *per cent*) till March 2023 leaving 41.55 million tonnes of sub-grade iron ore fines valuing ₹ 3995.75 crore remaining undisposed.

In the steel plants, disposal of embedded scrap in slag and secondary products like defectives/rejected materials was very slow. Rourkela Steel Plant and Bhilai Steel Plant could not dispose Linz-Donawitz slag or the embedded iron and steel scrap in 2020-23. Total unprocessed Linz-Donawitz slag as on 31 March 2023 increased to 29.64 lakh tonnes and assessed embedded scrap also increased to 0.56 lakh tonnes valued at ₹ 56.14 crore. Similarly, Bhilai Steel Plant assessed 4.08 lakh tonnes of iron scrap valued at ₹ 404.21 crore embedded in 202.60 lakh tonnes of Blast Furnace Slag as of March 2023. Saleable Steel and Semi-Saleable Steel valuing ₹ 330.24 crore were lying undisposed as on 31 March 2023 at Alloy Steels Plant, Visvesvaraya Iron and Steel Plant, Bhadravati and Salem Steel Plant leading to avoidable inventory carrying cost of ₹ 95.41 crore. Commercial rails produced at Bhilai Steel Plant were used as steel scrap resulting in inability to earn revenue of ₹ 69.23 crore.

As regards finished steel products, delay in disposal of materials leading to additional inventory carrying cost of ₹ 202.65 crore were noted. Deficiencies were noted in storage of steel materials and in settlement of Quality Complaints at Central Marketing Organisation warehouses.

Chapter 7

Chapter 7 IT systems and Internal Control Mechanism

7.1 All the five integrated steel plants of SAIL have implemented Systems Applications and Products-Enterprise Resource Planning (SAP-ERP) system which includes Materials Management Module. Other Plants and units have implemented legacy IT systems based on their requirements. The Corporate Material Management Group of SAIL formulated policy guidelines on Inventory Management of Stores and Spares in 2017. The audit was conducted with an objective to assess whether robust IT system for Inventory Management existed in SAIL, whether control mechanisms existed and were effective and adhered to.

Audit reviewed the data and reports available on the intranet portal of the steel plants, integration issues of SAP-ERP system along with its implementation, review of legacy system of inventory management (in absence of SAP-ERP), 'Customer Relationship Management Module'. Audit also reviewed the guidelines/policy framed by the Corporate Material Management Group on inventory management and its implementation by the steel plants, inspection clause of purchase orders, data related to inspection of materials, physical verification reports etc.

Audit noted that SAP-ERP system was yet to be implemented in all units/offices of SAIL. Besides, the IT systems in each Plant were running in isolation which led to various control issues like non-availability of real time data on stock of raw materials, absence of centralised vendor database and manual intervention in SAP-ERP system etc. Audit also noted non-compliance of guidelines of Inventory Management of stores and spares circulated by Corporate office, SAIL for implementation by steel plants. There was inadequate monitoring of inventory management by Corporate Material Management Group, delay in inspection of stores and spares and physical verification. Audit also noted deficient physical verification of stocks, inappropriate methodology adopted for calculating age of stock, non-implementation of bar-coding system and other deficiencies in IT systems in Central Marketing Organisation of SAIL.

These issues have been further discussed in detail in the succeeding paragraphs.

7.1.1 IT systems relating to Inventory Management in SAIL

SAIL implemented SAP-ERP to cover the entire spectrum of business operations. SAP-ERP has been implemented phase-wise in four integrated steel plants of SAIL located at Bhilai, Durgapur, Rourkela and Bokaro and at Central Marketing Organisation between April 2009 and April 2012 at a total cost of around ₹ 204.74 crore. SAP-ERP went live in IISCO Steel Plant, Burnpur and Corporate Office in July 2019 but was yet (March 2023) to be implemented in the three special steel plants at Salem, Bhadravati and Durgapur, Ferro Alloy Plant at Chandrapur, SAIL offices at Ranchi, Central Coal Supply Organisation, Mines, Collieries and SAIL Refractory Unit.

(a) Non- integration of SAP-ERP

Six modules of SAP-ERP have been implemented by SAIL. Procurement and sales were being done through Material Management module, Sales and Distribution module and Finance and Control Module. Audit noted that implementation of SAP-ERP system in SAIL was on Plant basis and there was no integration among the SAP-ERP systems operating in different steel plants[81].

Since SAP ERP system in Plants are presently operating on standalone basis, SAIL had a plan for ERP integration amongst all Plants/units including Corporate Office.

Effect of non-integration of SAP-ERP in SAIL on inventory management was as follows:

- Corporate Office of SAIL does not have real time access to raw material/stores and spares data of SAIL as a whole at any point of time. Plants/units merely intimate the data to Corporate Office through periodical returns.
- Due to non-integration of SAP-ERP systems, data of one Plant could not be directly accessed by the other sister Plants. Consequently, real time information regarding status of stock of various inventory items at different Plants could not be known instantly. This could lead to potential situations wherein an inventory item could be available in surplus quantity with one unit whereas another unit may not be able to meet its production targets due to non-availability of that item.
- Due to absence of centralised vendor database, Plant/unit must empanel its own vendor resulting in duplicity of data. In case a vendor is banned for poor/non-performance in any of the Plants, respective Plant had to intimate other Plants through email/letter for effecting ban in other sister units.

Management replied (October 2022) that SAP-ERP data of one Plant could be accessed by other Plant/unit by logging to the SAP-ERP system of the concerned Plant as well as by deploying data exchange mechanism using process integration layer of ERP. Further, integration of various modules across SAIL Plants/units had been planned in future.

Reply may be seen in the light of the fact that integration of SAP-ERP system implied seamless access to comprehensive data in respect of SAIL as a whole. Accessing data relating to other steel plants in a need based manner only by logging into the other Plant's SAP-ERP system could not serve the purpose of control and monitoring. Such integration was not done even after more than 10 years since introduction of SAP-ERP systems in SAIL. Also, SAP-ERP was yet to be implemented in the three special steel plants and many other critical units/offices of SAIL.

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[81] ***The present Version of SAP ERP being used in SAIL plants are: Rourkela Steel Plant, Durgapur Steel Plant: SAP ERP 6.0 EHP8; Bhilai Steel Plant, Bokaro Steel Plant & Central Marketing Organisation: SAP ERP 6.0 EHP7.***

Ministry accepted the fact that there was no integration among the SAP-ERP systems operating in different steel plants and stated (December 2022) that the project for implementation of Centralised S/4 HANA in SAIL had been initiated which would result in accessing other Plant data with single login. Ministry intimated (December 2023) that web based portal had been developed and information was now available to all heads of Material Management and officials of Material Management Department and Corporate Material Management Group.

Audit further noted that SAIL has initiated the process of implementing Centralized SAP-S/4 HANA (Project Vihaan) across SAIL. For this purpose, M/s PWC has been appointed as the Consultant to facilitate and guide SAIL through entire journey of implementation. The Consultant is in the process of firming up new solutions and budget estimates for approval of SAIL Board.

The project timeline is envisaged in four phases wherein the main business modules shall be implemented in the first to third phase across SAIL and additional modules shall be taken up in the fourth phase. The total timelines of implementation of all four phases of Project Vihaan is 33 months from the date of placement of order.

(b) Inadequate IT system in Central Coal Supply Organisation for maintenance of coal procurement data

Central Coal Supply Organisation has been entrusted with the work of supply of coking and non-coking coal to steel plants of SAIL and carries out financial transactions ranging from ₹ 2,000 to ₹ 2,500 crore annually. Audit noted that SAP-ERP system was yet to be implemented in Central Coal Supply Organisation. It also did not have any functional IT system as detailed below:

- Operation department of Central Coal Supply Organisation did not have any IT system and data like rake details and quantity despatched was being maintained either in hard copy or in MS excel sheets.
- Finance department had developed an in-house Oracle-based application software for its day to day work. Audit noticed that the software had become obsolete and the staff posted at Central Coal Supply Organisation lacked requisite expertise to extract data from the software as the persons who developed the software have either retired or got transferred.
- There was no integration of data between Finance and Operation departments of Central Coal Supply Organisation or data being captured by steel plants. Invoices were being cleared by Central Coal Supply Organisation physically based on communication, if any, made by the Plants.
- Personal emails instead of departmental mail/Government mail/SAIL mail were being used and no copy/files in hard copy was maintained by some departments. In case of transfer of the official, any correspondence made during the tenure of the officer concerned may not be available and important issues may not be highlighted.

Audit noted that although SAP-ERP system had been implemented in most of the Plants progressively since 2010, there was no road map for implementation of the same in the Central Coal Supply Organisation. Since Central Coal Supply Organisation maintained detailed data of indigenous coal procured over the year, in absence of integration with SAIL Plants, sharing of timely information may not be possible.

Management accepted and stated (October 2022) that tenders had been floated for maintaining finance software. Further, there was a provision in the tender, for integration of existing operation and personnel and finance function with Bokaro Steel Plant, IT department through SAIL intranet. Further all executives of SAIL/Central Coal Supply Organisation have been advised to make official communication through official mail of all the departments instead of using personal mail id.

Ministry accepted the observation and stated (December 2022) that necessary action was being taken in this regard.

Audit noted that Management has awarded the contract (16 Jan 2023) for operation and maintenance of finance data with effect from April 2023. The fact remains that upgradation of the existing IT systems and its integration with Bokaro Steel Plant through its intranet was yet to be implemented in Central Coal Supply Organisation (July 2024).

Recommendation 16: Management may ensure early implementation of ERP systems in all its units and integration of the same across all units to ensure that the potential benefits of having a organization wide integrated ERP system was achieved which include having a comprehensive inventory management system for SAIL as a whole.

(c) Recording Manual weighment in warehouse module in SAP-ERP system

The warehouse module in SAP-ERP system provided for selection recording weighment at the time of delivery of finished steel either through automatic entry or manual entry. Whereas the automatic weighbridge entry was the ideal arrangement, the Warehouse Manager could also manually enter weight in SAP-ERP system. Inspector from Legal Metrology Department (State Government of Telangana State) observed (February 2017) that the manual options should not be allowed as per rule and the same should be removed from the system.

Audit noticed that manual option of entering weight was still (March 2023) operational in Central Marketing Organisation. During 2016-17 to 2022-23, in 44.57 lakh cases, 34.68 million tonnes of steel materials were delivered from different SAIL stockyards. In connection with manual entry of weight, Audit noticed the following:

(i) Tare weight of vehicles was taken manually in 2.59 lakh out of 44.57 lakh cases. This created a vulnerability in the process where there is risk of recording more weight than the actual weight of vehicles. In such a case, there was a possibility of delivery of excess material due to recording of lower weight in invoice.

(ii) Weighbridge at conversion agent, wet-leasing agent and steel processing units were not integrated with SAP-ERP system and weight was recorded through

manual entry at the time of delivery of materials. During 2016-17 to 2022-23, 2.61 million tonnes of steel materials was delivered from these locations by recording weight through manual option.

Management stated (October 2022) that manual entry of weight of vehicles in SAP-ERP system was resorted to in cases of delivery on Plant weight basis[82] and in cases where an invoice was to be cancelled and regenerated. Management also stated that weighbridge integration at conversion agent premise had not been considered in the design.

The reply of Management may be seen in the light of the fact that delivery on Plant weight basis was made only in 7,411 cases and only 3,482 invoices were cancelled during 2016-17 to 2020-21, whereas manual weighment was done in 2.71 lakh cases. The fact also remained that non-consideration of weighbridge integration at conversion agent and steel processing unit premises left scope for manipulation in recording weight.

In addition to factors cited by the Management for resorting to manual weighment by the Company, Ministry attributed (December 2022) other reasons like issues in batch adjustments, technical glitches in SAP, GSTN related mismatches and network issues etc. Further, the Ministry assured to share the concerns of Audit with all concerned.

The reply of the Ministry may be viewed in the light of the fact that the possibility of fraud in manual weighment could not be ruled out.

Recommendation 17: Management may consider to disallow manual options in the Warehouse module to ensure a foolproof system of recording of weight without manual intervention.

7.1.3 Non-adherence of policy relating to maintenance of data on department's portal

As per Para 1.4 of the Policy for Inventory Management of Stores and Spares as circulated by Corporate Office, SAIL in June 2017, all items like rate contract items, Vendor Management Inventory items, Make Items[83], Proprietary items (along with material description, details like OEM, stock value, last five years consumption, normal lead time of supply), reconditioned items, de-proprietarised items, Insurance items, Initial items and Surplus, Obsolete and Redundant items procured on emergency basis, unused/undrawn receipts of previous quarter, non-moving items generated in last twenty quarters and department-wise list of emerging new non-moving items should be published and maintained on intranet portals of Plants. Audit noticed that these data were not maintained in the portals of any of the Plants.

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[82] ***Plant weight means sectional weight of a particular product based on the standard length-width-dimensions.***

[83] ***Make item are items which can be produced in-house or in sister Plant.***

Further, as per Para 6.6 of the policy, non-moving items of certain age may be automatically declared as Surplus, Obsolete and Redundant items without any further reference/circulation to any other Plant/unit e.g., materials like general stores, electrical, instrumentation, refractories, after seven years and for mechanical spares after ten years. The same has not been complied with in any of the Plants.

Policy also provided that code for the material, material description and order details like price, validity, normal lead time of supply etc., should be updated every month/quarter in the portal. The information sent to headquarter/Corporate office should also be placed on the site so that the same may be extracted by the concerned department. Audit, however, noted that none of the Plants had uploaded the same on the portal.

Management replied (October 2022) that separate designated portal for listing of different types of inventories/data/information was not there and that such information was available in SAP-ERP system.

Audit noted that policy objectives of Inventory Management of Stores and Spares was circulated by Corporate Office, SAIL in June 2017, i.e., after implementation of SAP-ERP system in most of the Plants/units of SAIL. Moreover, the intention behind publication of data in the intranet portals was to develop awareness among users and to reduce non-moving items of SAIL.

Ministry replied (December 2022) that all relevant data shall be uploaded on the designated portal.

Audit further noted that the relevant data has not yet (March 2023) been uploaded on the designated portal of any steel plant, except IISCO Steel Plant, where data related to rate contract items, de-proprietized items, non-moving items, SOR items, items procured on emergency basis, Insurance items, etc are being uploaded on portal.

7.1.4 Abnormal delay in inspection of stores and spares

SAIL procures different types of material through Material Management Department of each Plant/unit. The materials supplied should be as per clause and specification of purchase order. For verifying the specification, inspection is carried out by the Inspection Department. Audit noted that there was no standard policy for inspection in SAIL and each Plant followed its own policy. Bokaro Steel Plant and Rourkela Steel Plant had formulated an inspection manual in 2005 and 2012 respectively whereas Bhilai Steel Plant formulated a Standard Operating Procedure but there was no such manual in Durgapur Steel Plant and IISCO Steel Plant. Further, it was noted that there was no specific time limit for completion of inspection.

Audit analysed the average time taken for inspection of materials by steel plants of SAIL during 2016-17 to 2022-23.

Table 7.1: Details of inspection done and time taken after receipt of material by the Inspection departments of Steel Plants at Bokaro, Bhilai, Durgapur and Alloy Steels Plant* at Durgapur during 2016-17 to 2022-23

Year	0-7 days	08-15 days	16-30 days	31-60 days	61-180 days	181-365 days	More than 365 days	Total
2016-17	32,001	2,796	1,190	609	173	26	18	36,813
2017-18	25,650	2,128	807	448	121	39	20	29,213
2018-19	22,142	3,454	2,914	2,740	1,167	103	5	32,525
2019-20	20,789	3,523	3,044	2,669	1,842	42	5	31,914
2020-21	17,582	4,897	3,627	1,449	666	145	11	28,377
2021-22	32,342	6,914	5,679	2,575	751	89	9	48,359
2022-23	39,128	8,469	4,472	1,365	447	27	1	53,909
Total	1,89,634	32,181	21,733	11,855	5,167	471	69	2,61,110
% of Total	72.63	12.32	8.32	4.54	1.98	0.18	0.03	100

Source: Data furnished by Management

* In Alloy Steels Plant, inspection could not be carried out during 2021-23 due to shortage of manpower.

It was seen that inspection was completed in 16 to 30 days in 8.32 *per cent* cases whereas, inspection time taken by the department was between 31 to 180 days in 6.52 *per cent*. Further, in 471 cases, the delay was between 6 months and one year and in 69 cases, the inspection was carried out after one year of receipt of the materials. This indicated that the material was not urgently required by the user department. The delay in inspection was attributed by the Management to shortage of manpower which should have been addressed by the Management.

Management replied (October 2022) that in 90 *per cent* cases inspection is done in 0-7 days and there was delay in 10 *per cent* cases on account of non-submission of documents and other related activities. Issue of shortage of manpower had been addressed and continuous efforts were being made to issue of Goods Received Note within the norms.

Reply of the Management may be seen in the light of the fact that in more than 25 *per cent* of cases, delays have occurred which could have been avoided by deploying sufficient manpower etc.

Ministry stated (December 2022) that action had been taken for strengthening of Inspection wing for carrying out inspection activities and regular monitoring at different levels was being done to plug the gaps.

Audit further noted that the number of cases of delay in inspection increased by 70 *per cent* in 2021-22 and 90 *per cent* in 2022-23 over that of 2020-21.

7.1.5 Extra expenditure of ₹ 14.92 crore towards re-procurement of missing inventories

A contract for Basic Oxygen Furnace was awarded by IISCO Steel Plant, Burnpur in March 2008 to Consortium of M/s SMS Siemag Germany for supply of technology and equipment. Another contract for storage and erection of equipment for Basic Oxygen Furnace was awarded to M/s UB Engineering Ltd. Clause 6.2 of the contract entered with M/s UB Engineering Ltd. stipulated that erection contractor shall arrange comprehensive insurance for all Plants and equipment required to be erected and commissioned in Basic Oxygen Furnace and Continuous Casting Plant from the stage of unloading of consignment, handling, storage at site, transfer to place of installation, unpacking, erection, commissioning and final acceptance by IISCO Steel Plant, Burnpur.

Due to poor performance of M/s UB Engineering Ltd. and to speed up the erection for earliest start of production, the contract for balance erection job of Converter 2 and 3 was awarded to M/s SMS India by reducing the scope of work from the contract of M/s UB Engineering Ltd. without handing over the stores to M/s SMS. The contract with M/s UB Engineering Ltd. was terminated (August 2014) due to poor performance of the party but the party did not hand over the equipment and items in their custody and the same were left at the site (storage and erection site).

Audit noted that the contract (Clause D of work order dated 27 May 2014) entered with M/s SMS for balance activities inter alia included a clause that missing or damaged or stolen materials or whose warranty or shelf life has expired, if any, shall be procured by the employer and would be given to the contractor as free issue. While erection work was in progress by M/s SMS, it was found that some items were missing/stolen. Management failed to detect the missing/stolen items due to lack of examination, inspection and call for test of the material at all reasonable times. Custodian of equipment, M/s UB Engineering Ltd. left the site without informing and handing over the equipment/materials to IISCO Steel Plant due to which missing items like various spares and equipment viz., bolt, nut washer, casing baffle, electrodes, valves etc., were not located. Further, the insurance claims of missing inventory against respective orders were disallowed by the Insurance Company on the ground that losses had taken place on number of days and were inventory losses which were excluded in the policy (December 2017).

Audit noted that IISCO Steel Plant placed orders on proprietary basis to the consortium of M/s SMS for procurement of missing inventories resulting in extra expenditure of ₹14.92 crore which was a loss to the Company.

Management/Ministry replied (October 2022/December 2022) that Notice of Recovery of an amount of ₹ 98.07 crore was issued to M/s UB Engineering Ltd. on 15 June 2017. M/s UB Engineering Ltd. also filed a claim against IISCO Steel Plant and referred the matter for arbitration. An application had been filed on 26 June 2018 before National Company Law Tribunal Bombay for lodging the claim of IISCO Steel Plant. Matter

was currently sub-judice. Ministry further stated (December 2023) that an internal Committee had been formed (June 2023) to resolve the issue of missing inventories.

Reply of the Management may be viewed in the light of the fact that claim for ₹ 98.07 crore filed by IISCO Steel Plant before the Official Liquidator of M/s UB Engineering Ltd. had been rejected (April 2018). M/s UB Engineering Ltd. had also filed (January 2017) insolvency application to National Company Law Tribunal. IISCO Steel Plant filed an application in June 2018 before National Company Law Tribunal Bombay for lodging its claim. Confirmation for acceptance of claim had not been received till date (July 2024) even after lapse of more than five years. Insurance claims for missing items had also been disallowed. Considering this, provision for the entire amount had been made (2018-19 to 2020-21) in the accounts of IISCO Steel Plant. Thus, the case was not sub-judice and the fact remained that the possibility for recovery of ₹14.92 crore seemed remote.

7.1.6 Deficient physical verification of stocks (Central Marketing Organisation)

Stock verification is necessary to exercise check and control on stocks, ascertain discrepancies in stock in time, ascertain reasons for the discrepancies and to take remedial steps, make true and fair valuation of stock for the purpose of profit and loss account and to meet statutory obligations. On scrutiny of stock verification system prevalent in Central Marketing Organisation warehouses, Audit noticed the following:

(i) The guidelines (November 2016) on stock verification of Central Marketing Organisation stipulated that physical verification should ascertain the discrepancies in existence of stock and reasons thereof. Scrutiny of stock verification reports at 14 selected warehouses revealed that stock was verified on estimation/delivery basis. Stock verification report was not prepared as prescribed in the guidelines of November 2016. The stock verification report was only a copy of inventory report and stocks were merely tick marked on visual inspection/eye-estimation basis.

Management replied (October 2022) that stock verification was done on visual estimation basis mostly for products which were countable and available in coils/ packets etc. For items which were non-countable, physical weighment was resorted to in case of small balances up to five tonnes.

The reply may be viewed in light of the fact that the discrepancy report as stipulated in the guidelines (showing the stocks physically available and not shown in system and stocks shown in system but physically not available) was not available on record in four (Patna, Durgapur, Kolkata and Bhilai) out of 14 warehouses visited by Audit. Stock verification stipulated 100 *per cent* verification of stocks which was not being adhered to at all the warehouses.

Ministry stated (December 2022) that adequate care was being taken to monitor quality of stock verification as desired by Audit.

Audit noted that Ms RITES Ltd was engaged for physical verification of stocks at warehouses (July 2023).

(ii) The stock verification was initially carried out by nominated stock verifiers. Due to retirement of all experienced stock verifiers, Junior Assistants posted in warehouse were assigned for stock verification of warehouses.

Management stated (October 2022) that the Junior Assistants/Assistants assigned with the responsibility of stock verification were suitably trained to carry out stock verification. Ministry added (December 2022) that regular training programs were being conducted to enable the Junior Assistant/Assistant vested with responsibility of stock verification to carry out their work effectively.

Subsequently, it was noted by Audit that in view of absence of designated stock verifiers and to ensure statutory compliance, SAIL outsourced (July 2023) the stock verification activity to a third party (RITES Limited) to bring about more efficient system of stock verification at stipulated intervals.

(iii) As per extant policy of Central Marketing Organisation, stock verification was required to be carried out on half-yearly basis. Audit noticed that, in 46 out of 49 stockyards, stock verification was not conducted on half yearly basis in one or more years during 2016-17 to 2022-23. Out of this, in 10 stockyards, stock verification had not been conducted at all during this period. Audit noted that during 2023-24, in four[84] out of 14 selected stockyards, stock verification was not conducted on half yearly basis.

Management stated that most of the yards wherein stock verification was not carried out were yards which were closed/not in operation and yards where the stock of materials was at bare minimum with the physical stock matching the system stock thereby obviating the need for stock verification. Ministry, in their reply, noted (December 2022) the concern of Audit.

Management reply may be viewed in the light of the fact that these yards were operational during 2016-17 to 2022-23. Stock verification should have been carried out also in the yards with low quantum of stock.

(iv) Audit noticed that old materials lying inside the yard, which were found to be in excess over a period of time, were not linked with the SAP-ERP system. Consequently, there were delays in their identification/disposal leading to blocking up of fund[85]. The delay in linking of Saleable Steel in stockyard system could have been avoided with effective and timely stock verification.

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[84] ***Ghaziabad, Faridabad, Chandigarh and Visakhapatnam***

[85] ***The quantification of such material was not possible as the materials were not depicted in SAP.***

Management/Ministry replied (October 2022/ December 2022) that warehouses were conducting stock reconciliation on regular basis depending on the item-wise stock levels and taking necessary action to ensure parity between the physical stocks held and book balance and linking of excess/unlinked materials were accordingly being done. Management also stated that special drive was taken up during 2021-22 and again in the months of April/May 2022 to identify and link the unlinked materials in all warehouses.

The fact remained that unlinked stocks were noticed during joint verification of various warehouses in 2021-22 by Audit and respective Warehouse Managers of SAIL.

Recommendation 18: Management may ensure that the process of physical verification of stock is strengthened in SAIL to ensure highlighting the discrepancies in stock accurately and to prevent delays in identification/disposal of old materials.

7.1.7 Inappropriate methodology of calculation of age of stock

As per extant practice, age of stock is determined based on the date on which the material is received in a particular yard. In case of stock transfer from one branch to another, the material is treated as a fresh arrival in the receiving yard and its age starts afresh.

During 2016-17 to 2020-21, 1.72 million tonnes finished steel was transferred from one branch to another. Audit noticed that the age of these stocks was not reflected correctly in SAP-ERP system. The age of such items that were transferred from one branch to another should have been calculated from the date of initial receipt of the material and not from the date at which it was received at a particular branch/unit. This resulted in delay in disposal of these products as Central Marketing Organisation emphasises on sale of stocks which is aged more than three months.

Management stated (October 2022) that the responsibility for sale of materials is vested with the concerned branch and age was calculated after receipt at that branch. It also stated that the stock of transferred materials was invariably sold immediately on receipt.

The reply may be seen in view of the fact that the system generated report on a particular date would not reflect the correct age of stock. Further, Audit noted that stock transfer materials were not sold immediately after receipt in destination yard in Branch Sales Office/Ghaziabad, Faridabad and New Delhi.

Ministry stated (December 2022) that branches had been advised to sell the stock transfer materials on priority. However, sometime due to various business reasons disposal action got delayed.

Audit noted that there had been no change in the system (August 2024) of calculation of age of finished steel at CMO yards which have been transferred from another stockyard of CMO.

7.1.8 Non-implementation of bar coding system

Central Marketing Organisation constituted (March 2009) a Committee to study implementation of bar coding of Consignment Advices and Test Certificate data on materials at warehouses and undertook a pilot project (January to March 2008) at Chennai warehouse. The Committee identified various benefits of bar coding at warehouses such as faster and accurate linking of materials between Plants and warehouses, easy traceability of materials, improvement in services from stockyards and better order servicing. Audit noticed that despite recommendation of the Committee for designing a standalone system for Central Marketing Organisation to derive various benefits and streamline warehouse operations which would go a long way towards customer satisfaction, the same was yet to be implemented in the warehouses.

Management replied (October 2022) that Central Marketing Organisation had progressed further and embarked on a project to assess the effectiveness of QR code through a pilot project being taken up at Bengaluru Warehouse.

The reply may be seen in view of the fact that the pilot project was undertaken in Chennai in 2008. Management was still in the process of implementation of bar coding system.

Ministry added (December 2022) that the Company was going in for smart warehouse project under the aegis of Industry 4.0.

It was noted by Audit that, CMO has envisaged to use the Quick Response (QR) codes generated by the plants and uploaded in Quality Council of India (QCI) server for implementing barcoding system for delivery of materials from CMO stockyards. This has been implemented at one Warehouse (Kolkata) of CMO. Further, action was being taken by CMO to generate the QR code for materials being converted at conversion agents premises.

Summing up:

All the five integrated steel plants of SAIL have implemented SAP-ERP system, however, same was yet to be implemented in all units/offices of SAIL. Besides, the IT systems in each Plant were running in isolation which led to various control issues like non-availability of real time data on stock of raw materials, absence of centralised vendor database and manual intervention in SAP-ERP system etc. There was delay in inspection of stores and spares and physical verification etc.

Inventory is largest component (67 *per cent*) of current assets and constitutes up to 48 *per cent* of the total expenditure. As inventory constitutes such a significant part of assets and substantial part of expenditure, the economy, efficiency and effectiveness of management of inventory by SAIL is key to successful operation of the Company.

(Anand Mohan Bajaj)
Deputy Comptroller and Auditor General
(Commercial) and Chairman, Audit Board

New Delhi
Dated: 06 June 2025

Countersigned

(K. Sanjay Murthy)
Comptroller and Auditor General of India

New Delhi
Dated: 10 June 2025

Annexures

Annexure-I

(Referred in Para 5.2)

Potential Additional Expenditure due to consumption of imported coal beyond norms during 2016-17 to 2022-23

Rourkela Steel Plant								
Year	**ABP Norm (in % age)**	**Actual (in % age)**	**Imported Coal consumed (T)**	**Excess consumption (Tonne)**	**Rate of imported coal (₹ /T)**	**Rate of Indigenous Coal (₹/T)**	**Rate Diff (₹/T)**	**Extra expenditure (in ₹)**
1	2	3	4	5=[(4)/(3)] x [(3)-(2)]	6	7	8=6-7	(9)=(5)x(8)
2016-17	87.2	85.92	NA	NA	NA	NA	NA	NA
2017-18	83.2	85.75	23,30,568	69,305.521	15,180.33	9,221.19	5,959.14	41,30,01,300
2018-19	83.8	89.3	26,21,371	161,450.622	16,812.92	8,458	8,354.92	134,89,07,027
2019-20	81.5	90.31	26,76,942	261,143.384	14,692.25	9,544.26	5,147.99	134,43,63,530
2020-21	85.4	92.02	26,42,984	190,138.601	11,528.57	8,282.36	3,246.21	61,72,29,828
2021-22	90.0	90.40	30,34,129	13,425.350	21,218.74	9,013.83	12,204.91	16,38,55,183
2022-23	88.7	89.60	29,98,164	30,115.487	31,019.98	11,193.25	19,826.73	59,70,91,622
Total								**448,44,48,490**
								₹ 448.44 crore

IISCO Steel Plant

Year	ABP Norm (in % age)	Actual (in % age)	Imported Coal consumed (T)	Excess consumption (Tonne)	Rate of imported coal (₹/T)	Rate of Indigenous Coal (₹/T)	Rate Diff (₹/T)	Extra expenditure (in ₹)
1	2	3	4	(5)=[(4)/(3)] x [(3)-(2)]	6	7	(8)=(6)-(7)	(9)=(5)x(8)
2016-17	85	83.6	15,00,215	-25,123				0
2017-18	80	88.9	15,75,594	157,737	15,208	8,486	6,722	106,03,08,114
2018-19	90	93.3	17,26,068	61,051	16,681	8,778	7,903	48,24,86,053
2019-20	90	94.6	18,35,398	89,248	14,323	9,129	5,194	46,35,54,112
2020-21	95	95	16,93,024	0	11,483	9,437	2,046	0
2021-22	95	94.4	17,91,212	-11,384.82203	20,690	9,613	11,077	
2022-23	93.3	91.3	16,83,535	-36,879.18949	29,126	14,904	14,222	
Total								**200,63,48,279**
								₹ 200.63 crore

Durgapur Steel Plant

Year	ABP Norm (in % age)	Actual (in % age)	Imported Coal consumed (T)	Excess consumption (Tonne)	Rate of imported coal (₹/T)	Rate of Indigenous Coal (₹/T)	Rate Diff (₹/T)	Extra expenditure (in ₹)
1	2	3	4	(5)=[(4)/(3)] x [(3)-(2)]	6	7	(8)=(6)-(7)	(9)=(5)x(8)
2016-17	80	77.9	1327233	-35779				0
2017-18	80	82.4	1429421	41634	15,025	8,815	6,210	25,85,47,140
2018-19	80	85.6	1622768	106162	16,380	8,443	7,937	84,26,07,794
2019-20	78	85.4	1631619	141382	14,476	8,939	5,537	78,28,32,134
2020-21	84	83.7	1519142	-5445				0.00
2021-22	84	82.85	1668135	-23154				0.00
2022-23	82	80.9	1630334	-22167				0.00
Total								**188,39,87,068.00**
								₹ 188.40 crore

Bhilai Steel Plant

Year	ABP Norm (in % age)	Actual (in % age)	Imported Coal consumed (T)	Excess consumption (Tonne)	Rate of imported coal (₹/T)	Rate of Indigenous Coal (₹/T)	Rate Diff. (₹/T)	Extra expenditure (in ₹)
1	2	3	4	(5)=[(4)/(3)] x [(3)-(2)]	6	7	(8)=(6)-(7)	(9)=(5)x(8)
2016-17	80.00	77.30	34,97,067	-1,21,924.2	0.00	0.00	0.00	0
2017-18	80.00	88.88	36,81,179	3,67,638	15,213.16	8,935.31	6,277.85	2,30,79,76,427
2018-19	79.00	93.73	42,16,818	6,62,586	16,899.42	8,641.51	8,257.91	5,47,15,73,561
2019-20	85.00	92.36	39,96,991	3,18,330	14,553.84	9,332.19	5,221.65	1,66,22,09,549
2020-21	87.00	89.73	37,83,145	1,15,222	11,538.71	10,508.74	1,029.97	11,86,74,929.7
2021-22	86.00	89.00	42,37,888	1,42,850	21,133	10,464	10,669.00	1,52,40,68,328
2022-23	86.00	89.00	41,96,777	1,41,464	31,040	13,233	17,807.00	2,51,90,56,451
Total								**13,60,35,59,246**
								₹ 1,360.35 crore

Bokaro Steel Plant

Year	ABP Norm (in % age)	Actual (in % age)	Imported Coal consumed (T)	Excess consumption (Tonne)	Rate of imported coal (₹/T)	Rate of Indigenous Coal (₹/T)	Rate Diff (₹/T)	Extra expenditure (in ₹)
1	2	3	4	(5)=[(4)/(3)] x [(3)-(2)]	6	7	(8)=(6)-(7)	(9)=(5)x(8)
2016-17	80	76.94	22,28,099	0	11,583	6,148	5,435	0
2017-18	78	79.8	25,64,207	57,878	15,099	8,315	6,784	39,26,44,352
2018-19	82	85.17	28,52,704	1,06,159	16,746	7,916	8,830	93,73,83,970
2019-20	79	85.62	29,22,959	2,25,957	14,868	9,000	5,868	1,32,59,15,676
2020-21	82	86.13	27,13,718	1,30,273	11,592	8,356	3,236	42,15,63,428
2021-22	82	82.73	37,14,181	27,114	21273	8693	12,580	34,10,84,286
2022-23	82	80.59	39,90,749	NA			NA	NA
Total								**3,41,85,91,712**
								₹ 341.86 crore
								Total: ₹ 2,539.68 crore

Annexure-II

(Referred in Para 5.3)

Potential additional expenditure due to consumption of Dolomite, Limestone and Iron Ore fines beyond the norms in Bhilai Steel Plant during 2016-17 to 2022-23

FLUX (Dolomite) Consumption at Sinter Plant-II of BSP								
Year	**Production of sinter**	**Management norm for dolomite consumption Kg/Tonne of Sinter production**	**Actual consumption of dolomite per Kg/Tonne of Sinter production**	**Excess consumption of Dolomite per Tonne of Sinter production (in Kg)**	**Excess consumption to Norms (in *per cent*)**	**Excess consumption of Dolomite (in Tonne)**	**Average consumption Rate (₹/Tonne)**	**Value of dolomite excess consumed (₹)**
a	b	c	d	e (d-c))	f(e*100/c)	g (b*e/1000)	h	i (g*h)
2016-17	28,17,763	108	105	-3	0			
2017-18	27,16,336	100	93	-7	0			
2018-19	26,09,738	100	71	-29	0			
2019-20	24,28,813	100	69	-31	0			
2020-21	21,44,609	75	64	-11	0			
2021-22	26,28,279	89	83	-6	0	0	0	0
2022-23	26,00,815	75	87	12	16	31,210	1,491	4,65,33,781.98
Total	**1,79,46,353**					**31,210**		**4,65,33,781.98**

₹ 4.65 crore

Negative figure means consumption within the norms

FLUX (Dolomite) Consumption at Sinter Plant-III of BSP								
Year	**Production of sinter**	**Management norm for dolomite consumption Kg/Tonne of Sinter production**	**Actual consumption of dolomite per Kg/Tonne of Sinter production**	**Excess consumption of Dolomite per Tonne of Sinter production (in Kg)**	**Excess consumption to Norms (in *per cent*)**	**Excess consumption of Dolomite (in Tonne)**	**Average consumption RATE (₹/Tonne)**	**Value of dolomite excess consumed (₹)**
a	b	c	d	e (d-c)	f(e*100/c)	g (b*e/1000)	h	i (g*h)
2016-17	42,19,236	100	70	-30	0	0	0	0
2017-18	37,88,668	86	84	-2	0	0	0	0
2018-19	43,08,248	86	121	35	41	1,50,789	1,770	26,68,95,964
2019-20	48,90,191	96	106	10	10	48,902	1,123	5,49,20,268
2020-21	47,23,758	115	121	6	5	28,343	838	2,37,51,055
2021-22	52,65,400	138	124	-14	0	0	0	0
2022-23	54,31,425	130	102	-28	0	0	0	0
Total	**3,26,26,926**					**2,28,034**		**34,55,67,287**

₹ 34.56 crore

Negative figure means consumption within the norms

FLUX (Lime Stone) Consumption at Sinter Plant-II of BSP								
Year	**Production of sinter**	**Management norm for lime stone consumption Kg/Tonne of Sinter production**	**Actual consumption of lime stone per Kg/Tonne of Sinter production**	**Excess consumption of lime stone per Tonne of Sinter production (in Kg)**	**Excess consumption to Norms (in *per cent*)**	**Excess consumption of lime stone (in Tonne)**	**Average consumption RATE (₹/Tonne)**	**Value of lime stone excess consumed (₹)**
a	b	c	d	e (d-c)	f(e*100/c)	g (b*e/1000)	h	i (g*h)
2016-17	28,17,763	124	130	6	5	16,907	997	1,68,56,279
2017-18	27,16,336	140	144	4	3	10,865	1,015	1,10,27,975
2018-19	26,09,738	130	158	28	22	73,073	1,065	7,78,22,745
2019-20	24,28,813	120	142	22	18	53,434	1,181	6,31,05,554
2020-21	21,44,609	125	171	46	37	98,652	1,221	12,04,54,092
2021-22	26,28,279	172	132	-40	0	0	0	0
2022-23	26,00,815	140	86	-54	0	0	0	0
Total	**1,79,46,353**					**2,52,931**		**28,92,66,645**

Negative figure means consumption within the norms **₹ 28.93 crore**

FLUX (Lime Stone) Consumption at Sinter Plant-III of BSP								
Year	**Production of sinter**	**Management norm for lime stone consumption Kg/Tonne of Sinter production**	**Actual consumption of lime stone per Kg/Tonne of Sinter production**	**Excess consumption of lime stone per Tonne of Sinter production (in Kg)**	**Excess consumption to Norms (in *per cent*)**	**Excess consumption of lime stone (in Tonne)**	**Average consumption Rate (₹/Tonne)**	**Value of lime stone excess consumed (₹)**
a	b	c	d	e (d-c)	f(e*100/c)	g (b*e/1000)	h	i (g*h)
2016-17	42,19,236	111	140	29	26	1,22,358	997	12,19,90,926
2017-18	37,88,668	98	112	14	14	53,041	1014	5,37,83,574
2018-19	43,08,248	98	97	-1	0	0	0	0
2019-20	48,90,191	88	86	-2	0	0	0	0
2020-21	47,23,758	100	70	30	0	0	0	0
2021-22	52,65,400	125	81	-44	0	0	0	0
2022-23	54,31,425	140	86	-54	0	0	0	0
Total	**3,26,26,926**					**1,75,399**		**17,57,74,500**

₹ 17.58 crore

Negative figure means consumption within the norms

Potential additional expenditure due to consumption of Dolomite, Limestone and Iron Ore fines beyond the norms in Rourkela Steel Plant during 2016-17 to 2022-23

Dolomite:

Year	ABP for Dolomite Consumption (kg/T of Sinter)			Actual Dolomite consumption (kg/T of Sinter)			Excess consumption (kg/T of Sinter)			Sinter production (Tonne)			Total excess consumption (Tonne)			Cost of Dolomite (₹/Tonne)			Value of excess consumption (in ₹)			Total excess consumption (in ₹)
1	2			3			4 = 3-2			5			(6)=(5)x(4)/1000			7			8 = 6 x 7			9
	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP1 + SP2 + SP3
2016-17	153	163	163	144	139	105	0	0	0	3,16,291	17,50,438	32,03,360	0.000	0.000	0.000	1033.10	1033.10	1033.10	0	0	0	0
2017-18	136	129	105	143	137	107	7	8	2	3,25,194	16,68,079	33,12,496	2276.358	13344.632	6624.992	1068.90	1068.90	1068.90	24,33,199	1,42,64,077	70,81,454	2,37,78,730
2018-19	145	119	115	135	78	85	0	0	0	8,24,913	19,52,076	35,32,982	0.000	0.000	0.000	1053.36	1053.36	1053.36	0	0	0	0
2019-20	116	83	78	132	64	95	16	0	17	5,62,969	19,08,243	35,48,485	9007.504	0.000	60324.245	1095.53	1095.53	1095.53	98,67,991	0	6,60,87,020	7,59,55,011
2020-21	128	56	94	107	85	78	0	29	0	9,03,945	16,57,575	36,66,250	0.000	48069.675	0.000	877.58	877.58	877.58	0	4,21,84,985	0	4,21,84,985
2021-22	116	79	77	97	92	97	0	13	20	13,78,572	19,19,204	37,10,758	0.000	24949.652	74215.160	855.39	855.39	855.39	0	2,13,41,683	6,34,82,906	8,48,24,589
2022-23	95	90	90	94	80	84	0	0	0	12,93,328	20,64,753	36,53,922	0.000	0.000	0.000	923.42	923.42	923.42	0	0	0	0
Total																						**22,67,43,315**

₹ 22.67 crore

Limestone:

Year	ABP for Limestone Consumption (kg/T of Sinter)			Actual Limestone consumption (kg/T of Sinter)			Excess consumption (kg/T of Sinter)			Sinter production (Tonne)			Total excess consumption (Tonne)			Cost of Limestone (₹/Tonne)			Value of excess consumption (in ₹)			Total excess consumption (in ₹)
1	2			3			4 = 3-2			5			(6)=(5)x(4)/1000			7			8 = 6 x 7			9
	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP1 + SP2 + SP3
2016-17	83	47	47	80	51	56	0	4	9	316291	1750438	3203360	0.000	7001.752	28830.240	2294.82	2294.82	2294.82	0	16067761	66160211	82227972
2017-18	79	57	57	94	53	56	15	0	0	325194	1668079	3312496	4877.910	0.000	0.000	2413.78	2413.78	2413.78	11774202	0	0	11774202
2018-19	87	58	70	113	101	71	26	43	1	824913	1952076	3532982	21447.738	83939.268	3532.982	2640.55	2640.55	2640.55	56633825	221645834	9329016	287608674
2019-20	95	73	68	115	111	86	20	38	18	562969	1908243	3548485	11259.380	72513.234	63872.730	2471.13	2471.13	2471.13	27823392	179189628	157837819	364850839
2020-21	90	90	80	129	102	73	39	12	0	903945	1657575	3666250	35253.855	19890.900	0.000	2330.78	2330.78	2330.78	82168980	46361312	0	128530292
2021-22	110	90	70	153	108	90	43	18	20	1378572	1919204	3710758	59278.596	34545.672	74215.160	2411.10	2411.10	2411.10	142926623	83293070	178940172	405159865
2022-23	164	109	82	136	101	85	0	0	3	1293328	2064753	3653922	0.000	0.000	10961.766	2736.80	2736.80	2736.80	0	0	30000161	30000161
Total																						**1310152005**

₹ 131.01 crore

Iron Ore Fines:

Year	Management norm (kg/T of Sinter)			Actual consumption (kg/T of Sinter)			Excess consumption (kg/T of Sinter)			Sinter production (Tonne)			Total excess consumption (Tonne)			Consumption rate of Iron Ore Files (₹/per tonne)			Extra expenditure (in ₹)			Total excess consumption (in ₹)
1	2			3			(4)=(3)-(2)			5			(6)=(5)x(4)/1000			7			(8)= (6)x(7)			9
	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP-1	SP-2	SP-3	SP1 + SP2 + SP3
2016-17	800	800	800	869.55	802	686	69.55	2	0	3,15,925	17,50,438	32,03,118	21,972.584	3,500.876	0.000	1121.60	1121.60	1121.60	2,46,44,450	39,26,583	0	2,85,71,032
2017-18	835	803	751	922.67	814	683	87.67	11	0	3,25,663	16,68,079	33,12,496	28,550.875	18,348.869	0.000	1061.73	1061.73	1061.73	3,03,13,321	1,94,81,545	0	4,97,94,865
2018-19	905	812	679	895.36	767	730	0.00	0	51	8,24,328	19,52,076	35,32,982	0.000	0.000	1,80,182.082	1251.83	1251.83	1251.83	0	0	22,55,57,336	22,55,57,336
2019-20	872	780	737	888.03	757	713	16.03	0	0	5,62,969	19,08,242	35,48,485	9,024.393	0.000	0.000	1216.34	1216.34	1216.34	1,09,76,730	0	0	1,09,76,730
2020-21	900	746	701	875.06	805	760	0.00	59	59	9,03,945	16,57,575	36,66,250	0.000	97,796.925	2,16,308.750	1354.36	1354.36	1354.36	0	13,24,52,243	29,29,59,919	42,54,12,162
2021-22	830	800	761	848	765	746	18	0	0	13,78,572	19,19,204	37,10,758	24,814.296	0.000	0.000	2517.29	2517.29	2517.29	6,24,64,779	0	0	6,24,64,779
2022-23	853	763	748	854	781	780	1	18	32	12,93,328	20,64,753	36,53,922	1,293.328	37,165.554	1,16,925.504	1911.96	1911.96	1911.96	24,72,791	7,10,59,053	22,35,56,887	29,70,88,731
Total													59,547.852	1,19,646.670	3,96,490.832				**13,08,72,072**	**22,69,19,423**	**74,20,74,141**	**1,09,98,65,636**

₹ 109.99 crore

Annexure-III

(Referred in Para 6.5)

Potential amount of revenue not earned due to excess production of Pig Iron during 2016-17 to 2022-23

Rourkela Steel Plant												
Year	Production Plan (T)	Actual Production (T)	Excess Production than Plan (T)	Contribution of Pig iron		% of Finished Steel (%)	Hot Metal used for Pig Iron (T)	Hot Metal used for ecess Pig Iron (T)	Equivalent Finished steel from Hot Metal used for Pig iron (T) (10*8%)	Contribution of Finished Steel		Contribution loss (₹)
				(₹/T)	₹					(₹/T)	₹	
1	2	3	4 = (3-2)	5	6 = (4*5)	7	8	9 = (8/3*4)	10 = (9*7%)	11	12 = (10*11)	13 = (12-6)
2016-17	24,000	54,315	30,315	1,765	5,35,05,975	87.00	64,109	35,781	31,130	7,987	24,86,33,549	19,51,27,574
2017-18	0	35,071	35,071	3,696	12,96,22,416	87.00	41,352	41,352	35,976	10,340	37,19,94,322	24,23,71,906
2018-19	0	1,51,426	1,51,426	7,085	1,07,28,53,210	87.00	1,77,364	1,77,364	1,54,307	14,400	2,22,20,16,192	1,14,91,62,982
2019-20	43,000	52,780	9,780	5,674	5,54,91,720	87.00	59,978	11,114	9,669	9,263	8,95,63,770	34,0,72,050
2020-21	90,000	1,70,674	80,674	12,683	1,02,31,88,342	87.00	1,98,349	93,755	81,567	17,558	1,43,21,56,691	40,89,68,349
2021-22	1,33,000	2,04,999	71,999	12,004	86,42,75,996	87	2,36,520	83,070	72,271	26,447	1,91,13,41,371	1,04,70,65,375
2022-23	1,31,000	1,15,096	-	0	-	87	0	0	0		0	0
Total												**3,07,67,68,235**

₹ 307.68 crore

IISCO Steel Plant												
Year	ABP Target (T)	Production of Pig (T)	Excess Production (T)	Contribution of Pig Iron		% of Finished Steel	Hot Metal used for Pig Iron (T)	Hot Metal used for Excess Pig Iron (T)	Equivalent Finished Steel for Hot Metal used for pig iron (T)	Contribution of Finished Steel		Contribution loss (₹)
				(Rs./T)	₹					(₹/T)	₹	
1	2	3	4 = (3-2)	5	6 = (4*5)	7	8	9 = (8/3*4)	10 = (9*7%)	11	12 = (10*11)	13 = (12-6)
2016-17	50,000	2,66,000	2,16,000	1,435	30,99,60,000	87	2,76,327	2,24,386	1,95,216	4117	80,37,02,938	49,37,42,938
2017-18	68,000	1,19,000	51,000	4,740	24,17,40,000	87	1,25,502	53,787	46,794	8305	38,86,26,804	14,68,86,804
2018-19	37,000	1,09,000	72,000	8,521	61,35,12,000	87	92,783	61,288	53,320	11889	63,39,26,620	2,04,14,620
2019-20	31,000	1,69,000	1,38,000	4,291	59,21,58,000	87	1,54,435	1,26,107	1,09,713	8304	91,10,55,234	31,88,97,234
2020-21	21,000	62,000	41,000	9,690	39,72,90,000	87	65,468	43,293	37,665	12940	48,73,87,930	9,00,97,930
2021-22	39,000	39,000	0	0	0	0	0	0	0	0	0	0
2022-23	25,000	17,000	0	0	0	0	0	0	0	0	0	0
Total												**1,07,00,39,526**

₹ 107 crore

Bhilai Steel Plant												
Year	Production Plan (T)	Actual Production (T)	Excess Production than Plan (T)	Contribution of Pig Iron		% of Fini. Steel (%)	Hot Metal used for Pig Iron (T)	Hot Metal used for Excess Pig Iron (T)	Equivalent Finished Steel from Hot Metal used for Pig iron (T)	Contribution of Finished Steel		Contribution loss (₹)
				₹/T	₹					₹/T	₹	₹
1	2	3	4 = (3-2)	5	6 = (4*5)	7	8	9 = (8/3*4)	10 = (9*7%)	11	12 = (10*11)	13 = (12-6)
2016-17	150000	0				87.00	0		0			
2017-18	135000	0				87.00	0		0			
2018-19	0	66973	66973	6891	461510943	87.00	72303	72303	62904	12827	806864605.5	345353662.5
2019-20	0	171990	171990	5828	1002357720	87.00	185674	185674	161536	15520	2507044618	1504686898
2020-21	34000	162652	128652	12679	1631178708	87.00	175595	138889.4569	120834	20251	2447005840	815827132
2021-22	300000	138599	0	0	0	87.00	0	0	0		0	0
2022-23	140000	34818	0	0	0	87.00	0	0	0		0	0
Total	759000	575032										**2665867692**

₹ 266.59 crore

Bokaro Steel Plant												
Year	ABP Target (T)	Production of Pig (T)	Excess Production (T)	contribution in Pig Iron (`/T)	Total contribution	% of finished steel	Hot metal used for making pig iron	Hot metal used for Excess pig iron	Equivalent finished steel from hot metal used for pig iron	Contribution in Saleable Steel (`/T)	Total contribution from saleable steel	Contribution loss (₹)
1	2	3	4 = (3-2)	5	6 = (4*5)	7	8	9 = (8/3*4)	10 = (9*7%)	11	12 = (10*11)	13 = (12-6)
2016-17	3906	28501	24595	3563	87631985	87	30645	26445	26661	9376	249974942	162342957
2017-18	13020	56680	43660	4914	214545240	87	60947	46947	53024	11766	623879090	409333850
2018-19	2604	85194	82590	8744	722166960	87	91606	88806	79697	14515	1156805148	434638188
2019-20	48400	129890	81490	4360	355296400	87	139667	87624	121510	8631	1048755313	693458913
2020-21	54140	167805	113665	18458	2098028570	87	180436	122221	156979	18984	2980095411	882066841
2021-22	149600	163663	14063	13392	188331696	87	184306	15837	13778	26538	365640577	177308881
2022-23	72200	150933	78733	13775	1084547075	87	179682	93730	81544.83	13302	1084709302	162227
Total												**2759311857**

₹ 275.93 crore

Durgapur Steel Plant												
Year	Production Plan	Annual Production	Excess Production than Plan	Contribution of Pig Iron (per Tonne)	Total Contribution of Pig Iron	% of Saleable Steel	Hot Metal used for Pig Iron	Hot Metal used for excess Pig Iron	Equivalent Salable steel from Hot metal used for pig iron	Contribution of saleable Steel (Per Tonne)	Total Contribution of saleable Steel	Contribution loss (₹)
1	2	3	4 = (3-2)	5	6 = (4*5)	7	8	9 = (8/3*4)	10 = (9*7%)	11	12 = (10*11)	13 = (12-6)
2016-17	22000	97605	75605	6,464	488679301	87.00	110800	85826	74669	6785	506608333	17929032
2017-18	15000	59849	44849	9,227	413822730	87.00	66441	49789	43316	8875	384417758	0
2018-19	21000	68870	47870	10,043	480766507	87.00	76519	53187	46272	13683	633162787	152396280
2019-20	21000	48713	27713	8,227	227982343	87.00	54123	30791	26788	11257	301543394	73561051
2020-21	36000	21633	0	18,008	-258726094	87.00	23949	0	0	18412	0	0
2021-22	22500	22000	0	-	0	0.00	0	0	0	0	0	0
2022-23	20000	51200	31200	13,001	405631200	87.00	56877	34659	30154	11158	336454951	405631200
Total												**649517562**

₹ 64.95 crore

Summarised Statement

Rourkela	2.9	6.69	3.79	130.69	307.68
IISCO	2.07	7.25	5.18	250.24	107
Bhilai	0.34	4.02	3.68	1082.35	266.59
Bokaro	3.44	7.83	4.39	127.62	275.93
Durgapur	0.99	3.26	2.27	229.29	64.95
				Total	**1022.15**

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