



A Navratna Company

VISAKHAPATNAM STEEL PLANT

RASHTRIYA ISPAT NIGAM LIMITED
TECHNICAL TRAINING INSTITUTE DEPT

A Project Report On

**"A PROJECT ON COMPUTERISED RAWMATERIALS
MANAGEMENT SYSTEM"**



In Partial Fulfillment for Trade Apprenticeship Training

"COMPUTER OPERATOR AND PROGRAMMING ASSISTANT" (COPA)

Under the guidance of
Shri. Dipankar Dey, Dy.Manager (Trg).

Submitted by

P.BHARATH BABU

TRAINEE NO: 052543

(BATCH-2021-22)



CERTIFICATE

This Is To Certify That The Project Work Entitled “**A PROJECT ON COMPUTERISED RAWMATERIALS MANAGEMENT SYSTEM**” Technical Training Institute, Visakhapatnam Steel Plant, **Rashtriya Ispat Nigam Limited, Visakhapatnam**” Is Done By **P.BHARATH BABU, (COPA)** Trainee, In Partial Fulfillment Of The **COMPUTER OPERATOR AND PROGRAMMING ASSISTANT (COPA)** Trade Apprenticeship Training During **1st October 2021 To 30th September 2022.**

DATE:

PLACE:

Signature of Project Guide

ACKNOWLEDGEMENTS

I express my sincere gratitude and in debtendness towards my training & project guide **Shri. DIPANKAR DEY, Dy.Manager (TRG)**, for his inspiration, encouragement, assistance & guidance in carrying out the project work without which have been possible on my part to complete the project work in time.

I am highly obliged for the kind cooperation extended by our

Shri. TADI BHASKARA REDDY, Asst.Manager (TRG) .

Also, i will be very thankful to **Shri.T.GOUTHAM, HOD (RMD)**, for his valuable guidance and support, in completing this project.

Special thankful to **Shri. S.SUDARSANA RAO, General Manager (RMD)**.

Special thankful to **Shri. B.SankaraRao, Sr.Manager (RMD)**

Special thankful to **Shri. K.Brijendranath, Dy. Manager (RMD)**.

Adding to them I would also like thank all the members of the Department for supporting me in each and every step during completion of my project.

(P.BHARATH BABU)



DECLARATION

I hereby declared that project work entitled by “**A PROJECT ON COMPUTERISED RAWMATERIALS MANAGEMENT SYSTEM**” in partial fulfillments of “**COMPUTER OPERATOR AND PROGRAMMING ASSISTANT (COPA)**, Trade Apprenticeship Training” is a bonafied work done by me under guidance of **Shri. DIPANKAR DEY, Dy.Manager (Trg)** Visakhapatnam steel plant to the best of my knowledge.

DATE:

PLACE:

(P.BHARATH BABU)

Trainee No:052543

Introduction

About the

"A PROJECT ON COMPUTERISED RAWMATERIALS MANAGEMENT SYSTEM"

RAW MATERIALS DEPARTMENT

(RMD)

CONTENTS

<u>SL.NO</u>	<u>CHAPTERS</u>	<u>PAGE NO</u>
1.	<i>INTRODUCTION TO STEEL PLANT</i>	: 1-8
2.	<i>ACTIVITIES OF LEARNING AND DEVELOPMENT CENTER :</i>	9-14
3.	<i>INTRODUCTION TO RAW MATERIALS DEPARTMENT</i>	: 15-29
4.	<i>ABREVIATIONS FOR RAW MATERIALS DEPARTMENT</i>	: 30-31
5.	<i>CONCLUSION & DISCUSSION</i>	: 31-32

1. INTRODUCTION TO STEEL PLANT



It is the first coastal based located 16km west of city of destiny that is Visakhapatnam. Bestowed with modern technologies, VSP has an installed capacity of 5.772 million tons of hot metal, 5.272million tons of crude steel, and 5.138 million tons of saleable steel. The total power required is 350MW.

The products of the Vishakhapatnam Steel plant are Rebars, Wire rod coils, plain rounds, structurals etc. The efforts of VSP have been recognized. Some of the major awards received by VSP so far are

1. Priyadarshini Vrikshamitra award.
2. Nehru memorial national award for pollution control.
3. Golden peacock (first prize) National Quality Award.
4. World quality commitment award of Spain.

Visakhapatnam Steel Plant Popularly known as Vizag Steel, is an integrated steel producer India built using German and Soviet technology. The company has grown from a loss-making industry to 3-billion-dollar turnover company registering a growth of 203.6% in just four years.

Vizag Steel Plant was conferred status on 17 November 2010. Founded in 1971, the company focuses on producing value-added steel, with 214,000 tones produced in August 2010, out of 252,000 tones total of salable steel produced.

History

On 17 April 1970, the Prime Minister of India, the , announced the government's decision to establish a steel plant at Visakhapatnam. With the offer of assistance from the government of the erstwhile , a revised project evolved some years later. A detailed project report for a plant with a capacity of 3.4 Mtpa was prepared in November 1980 and in February 1981, a contract was signed with the USSR for the preparation of working drawings and . The blast furnace foundation was laid, with first mass concreting, in January 1982. The construction of the local township was also started at the same time In the 1970s, Kurupam Zamindars donated 6,000 acres of land for Vizag Steel Plant. A new company (RINL) was formed on 18 February 1982. Visakhapatnam Steel Plant was separated from and RINL was made the corporate entity of Visakhapatnam Steel Plant in April 1982.

Vizag Steel Plant is the only Indian shore-based steel plant and is situated on 33,000 acres (13,000 ha), and is poised to expand to produce up to 20 MT in a single campus. Turnover in 2011-2012 was Rs 14,457 On 20 May 2009, Prime Minister launched the expansion project of Visakhapatnam Steel Plant from a capacity of 3.6 MT to 6.3 MT at a cost of Rs. 8,692 crores. But the investment was revised to 14,489 crores with the following classification

- Expenditure for the financial year 2009-10 Rs 1840 crores.
- Rs 5883 crores since inception of the project.
- Total commitment, including enabling works, steel procurement, consultancy, spares, etc. is Rs 11591 crores as of 25 March 2010.

The expansion project is expected to become functional by 2012. Currently, the steel plant has completed the expansion from 3.6 MT to 6.3 MT with a total investment of Rs.12,300 crore. The company has planned to expand its production capacity further by one more MT which requires an investment of Rs.4,500 crore.



**VIZAG
STEEL**
Pride of Steel



Company profile:

Rashtriya Ispat Nigam Limited, the corporate entity of Visakhapatnam Steel Plant is a Navaratna PSE under the Ministry of Steel. Visakhapatnam Steel Plant fondly called Vizag steel. It is the first shore based Integrated Steel Plant in the country and is known for its quality products delighting the customers. It is a market leader in long products and it caters to the needs of diverse Industrial sectors. It is the first Steel plant to be certified ISO 9001:2008 (presently 2015), ISO 14001:2004 (presently 2015), OHSAS 18001:2007 and ISO/IEC 27001:2013 Standards. It is also the first PSE to be certified ISO 50001:2011 - Energy Management Systems and has acquired CMMI Level 3 Certification for s/w development.

VISION 2025

To be the most efficient Steel Maker having the largest single location shore based steel plant in the country.

OBJECTIVES

- Achieve Gross Margin to Turnover ratio > 10%
- Plan for finishing mill to integrate with 7.3 MT capacity and commission the same by 2017-18.
- Achieve rated capacity of new & revamped units by 2017-18.
- Capture markets for high –end value added products by focusing on sector specific applications and customer needs.
- Globalisation of operations through acquisition of mines and setting up of marketing network abroad.
- Diversify through operationalizing of Bhilwara Mines, setting up of Pelletization Plant, DRI-EAF unit, Wheel & Axle Plants.
- Create high performance and safe work culture by nurturing talent and developing leaders.
- To grow in harmony with the environment & communities around us.

CORE VALUES

I	Initiative	: Have a self-propelled & proactive approach.
D	Decisiveness	: Decide with speed & clarity.
E	Ethics	: Be consistent with professional & moral values
A	Accountability	: Take responsibility for actions.
L	Leadership	: Lead by example
S	Speed	: Demonstrate swiftness and efficiency in everything we do.

VIEW OF ADMIN BUILDING AND STEEL PLANT



STEEL PLANT VIEW



RINL PRODUCTS



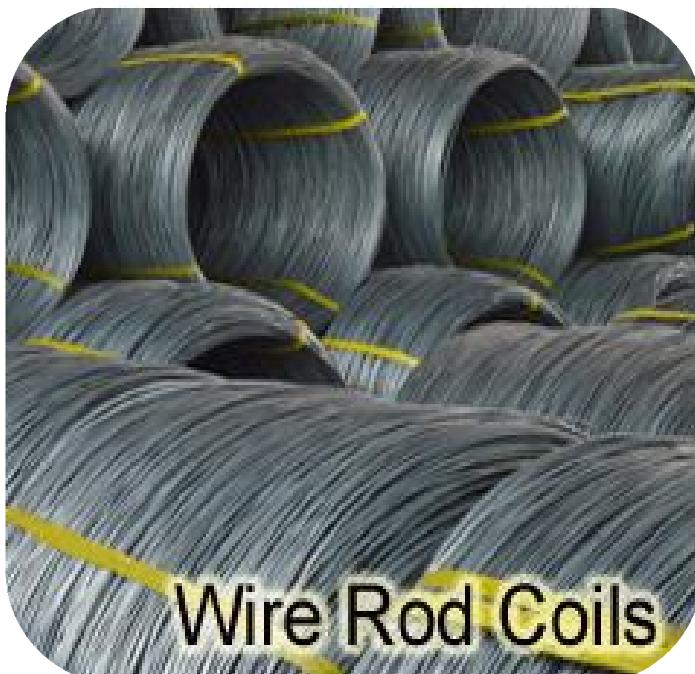
RINL PRODUCTS



Angles



Billets



Wire Rod Coils



Rebars

2.ACTIVITIES OF LEARNING AND DEVELOPMENT CENTER

1. Adopt a planned approach towards Training and Development in RINL.
2. Design and conduct suitable training package for freshers at various intake levels incorporating concepts of job enrichment and multiskill approach to work.
3. Design and conduct suitable training package for the employees as per need to develop skills, knowledge and attitude.
4. Assist in developing standard operating/maintenance practices for technological areas of the plant/unit.
5. To expose selected employees to latest technologies and workpractices abroad.
6. Motivate and develop internal training faculty.
7. Knowledge sharing and giving adequate opportunities to the employees for self-development.
8. To make training productive and cost effective.
9. Organise training of apprentices as per act obligations.
10. Constantly enrich the quality of training and upgrade training facilities to meet the requirement.
11. Providing training services to outside organisations.
12. To have interaction with academic institute
13. ions and fulfill social obligations.

TRAINING OBJECTIVES

- Identifying training needs
- Providing training input
- Monitoring training effectiveness
- Creating learning environment
- Facilitating self-development
- Innovativeness & self-expression
- Enabling employees to assume higher responsibility
- Meeting the Statutory requirements & Social Obligations

TRAINING SCHEMES:

Fresher's Training:

- VSP recruits Engineers, post Graduates in arts or science, Diploma holders, ITI Certificate holders a Management Trainee (Technicial), Management Trainee (Adman), Senior Trainees, Junior Trainees respectively. After imparting appropriate training they are regularized.
- Apprenticeship Training: Under the apprenticeship Act 1961, VSP is engaging Graduates in Engineering, Diploma holders and ITI Certificate holders and Intermediate Apprenticeship/ Regional Directorate of apprenticeship Training.
- **Remarks:**

No obligation by Industry to give employment and also no obligation on part of apprentice to serve the Industry on completion of training.

- **Vocational Training:**

Students studying degree in Engineering, Information Technology computer science, etc. are given facilities to do project work/ undergo training for a period of 2 to 8 weeks as per the requirement of their university / Institution. They work on Projects mutually beneficial to individuals as well as VSP. The requests for such training have to be given through the head of the institution. Training charges are payable to RINL by the students as per rules.

- **Employees Training:**

RINL is one the few organization where a definite HRD philosophy was evolved right forms its inception stage. Two training advisory committees with Divisional heads as members regularly monitor, review and guide training and Development activities. HRD policy was adopted in the year 2002 reflecting the organization vision, Mission and core values which flows corporate policies on HR, Quality, Occupational Health and safety, Energy and Environment. Every year about 20000 employees are trained in different.

- Technological,
- Skill development,
- Computer based,
- Refresher,
- Safety and Health related,
- On the job training programmes,
- Refresher training programs.
- Training need analysis is carried out to decide on the nature of training Programmers, no. of training programmers to be conducted in the financial year. Accordingly a calendar is prepared for the year. An on line information system called TRAINS (Training Information System) is in vogue to get the nominations form different departments, confirming the nominations and other training related activities.

- **Foreign Training :**

Some VSP employees based on the organization needs are sent abroad to gain specialized knowledge by attending training programmers, conferences, seminars, business trips etc. The whole activity is coordinated by TTI.

- **Training for other Organization:**

VSP is a turnaround company. It has become a role model to Indian Industries in many fronts, particularly Steel sector. Many organization look up to VSP to get trained their employees. We extend necessary training facilities to them on payment basis; this training consists of class room lectures as well as On-the-Job training.

- **Comprehensive Managerial Course:**

Is conducted for Non-unionized supervisory cad in three phases. Phase one (Induction Course) is of 6-9 days duration. Phase-2 (Foundation Course) is of 17 weeks –part time 6-8 PM. phase-3 (Specialized Course) is of 14 weeks-part time, 6-8 PM. This course consists of Technical and Non- Technical subjects.

- **TRADE TESTS:**

To facilitate career growth of employees. Trade Tests are conducted to assess the knowledge and skill. These Trade Tests are conducted for promoting the employees from Khalasis/Helper to Technician level and from Technician level to Charge man level based on the Trade Test specification. After promotion Non-unionized supervisory cadre employees undergo a Comprehensive Training to become eligible for Executive Cadre.

- **Classrooms :**

There are 6 Well furnished & Air conditioned class rooms, a conference hall and 10 class rooms.

- **Work Shop:**

A full- fledged workshop exists with the following facilities a machine shop, fitting and assembling shop, welding shop, electrical shop, Hydraulics section, Valves and pumps section, mechanical model room, carpentry shop and Material handling Section to conduct various skill development programs.

USES OF COMPUTER IN L & DC

Computer operation courses and training programs available online are often part of non-credit or continuing education programs, as well as work force training & secretarial and business programs. they help students gain basic computer skills. such as typing and using word processing or database programs.

A Technical Training Institute (TTI) refers to an education institution that is set up in order to provide students with skills in courses such as technology, art, secretarial, agriculture, applied sciences amongst others. The purpose of this study was to determine the role which TTIs play in the achievement of Kenya's Vision 2030's Social Pillar. The descriptive research design was used for the study. Research question guided the study with the structured questionnaires comprising close-ended questions for collecting primary data were exclusively relied on. Data collected was processed with the aid of the Statistical Packages for Social Sciences (SPSS) software. Descriptive statistics (proportions, percentages, measures of central tendencies and frequency distribution) were used to analyze the data collected. Chi-square was the inferential statistics employed to establish relationship and/or association between independent and dependent variables. It was concluded that; clear training programs for TTI's trainers highly affected the achievement of the social pillar. It was recommended that the government should facilitate both financial and technical support to the TTIs in order to enable them contribute better towards the achievement of the social pillar. Also, greater emphasis should be put on TTI's programs and such programs should be aligned to the social pillar.

In Management of Institutes:

The researcher sought to establish the role of TTIs management in the achievement of social pillar as entrenched in Kenya's Vision 2030. The results of the findings were presented in form of frequencies and percentages given that these two parameters were found to be the most appropriate in describing the variability of individual responses vis-à-vis management of the institute.

1. In EMPLOYEE PROGRAMES:

- ❖ The importance of computer skills in the workplace. as employer , motivating Your employees to become computer literate will increase productivity and also stave off problems that can cost time and significant amounts of money.
Many companies have started to depend upon computerized technology to get work done.

- ❖ Computer used for storing data, presentation in employee programs & also used for preparing IOM, Enters the employee date for attendance slips.

2. In Apprenticeship Training:

- ❖ Organized All India Trade Test for the Trade Apprentices. Conducted Skill Test for all the Trade Apprentices who appeared for All India Trade Test.
- ❖ Organized screening of online applications, conducting interviews and selection for trade apprentices.

3. In Fresher's Training:

- ❖ Organized Induction & Orientation, Basic Engineering, Plant Practice Lectures, Plant General & On the job training for the newly joining trainees are under going on the Job training in various departments in the presentation used

4. In Central Library activities:

- ❖ Procured on line Journals. Uploaded e books and articles in Digital Library.
- ❖ Downloading the different books.
- ❖ When employees will come to take the books in the library they will enter the employee id no & name & book reference number into the system.
- ❖ When the new books will bring to the central library will be given reference number.

(RMD)

3. RAW MATERIALS DEPARTMENT

SECTIONS OF THE RAW MATERIALS DEPARTMENT

- RMD is responsible for procurement, dispatch/loading and accounting of receipts of these bulk materials handled through RMHP.
- For procurement of raw materials, RMD is required to interact with the PPM department for annual requirements and with the purchase department for procurement. For movement of the raw material, RMD is required to interact with the supplier, Railways and Traffic Department.
- For Accounting of receipts of raw materials, RMD is required to interact with Finance for raising of GRN's (Goods Receipts Note) and loading complaints.
- In addition to the above, RMD is also required to take up the quality aspects with suppliers and public analysts as when required.

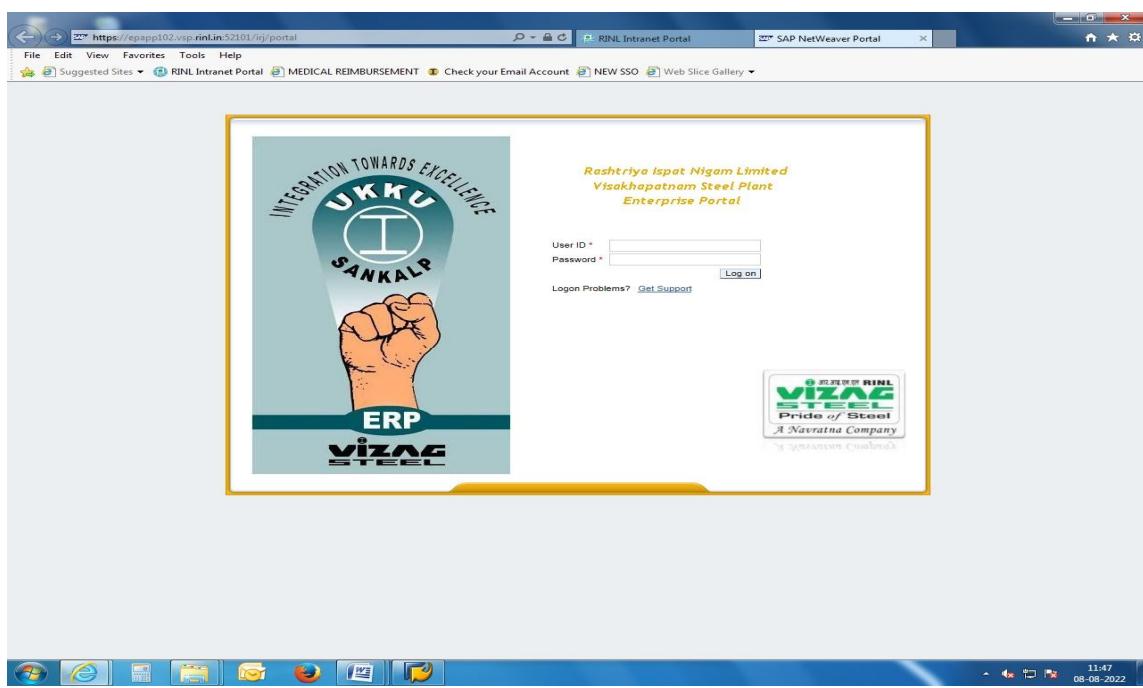
RMD CONTROL ROOM

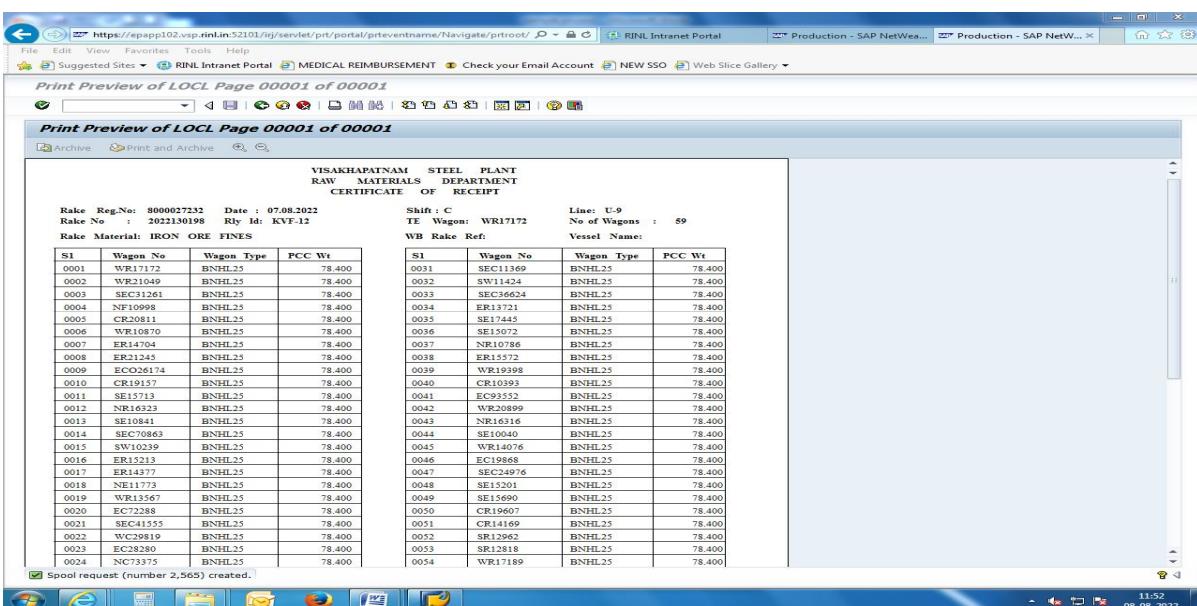
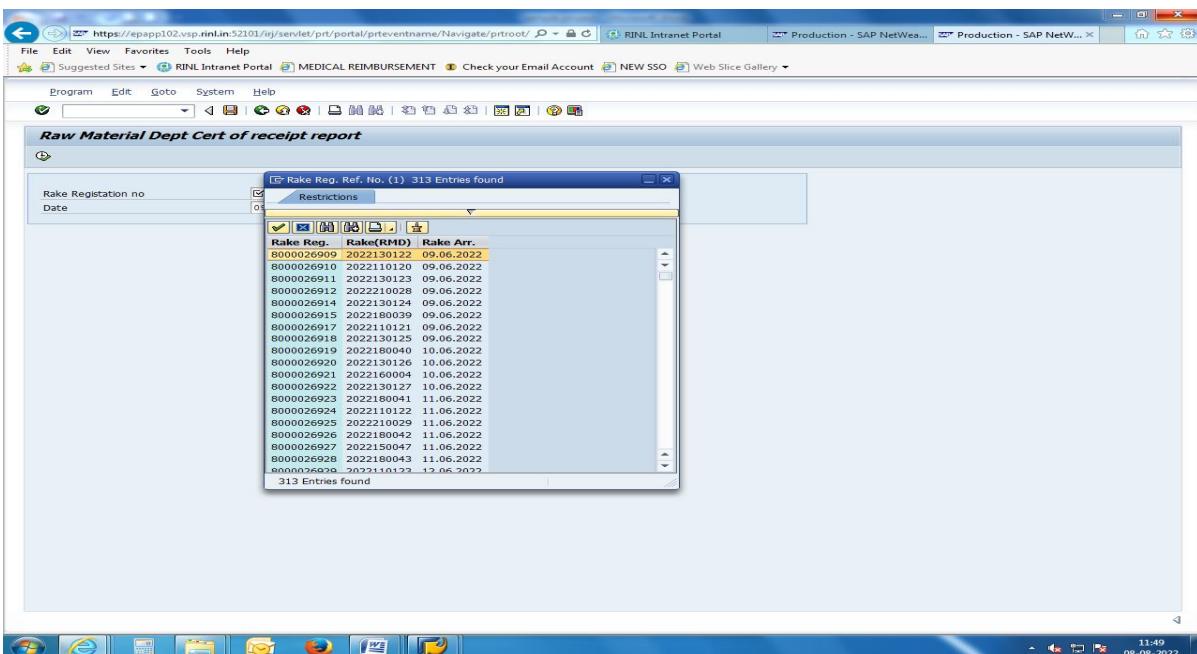
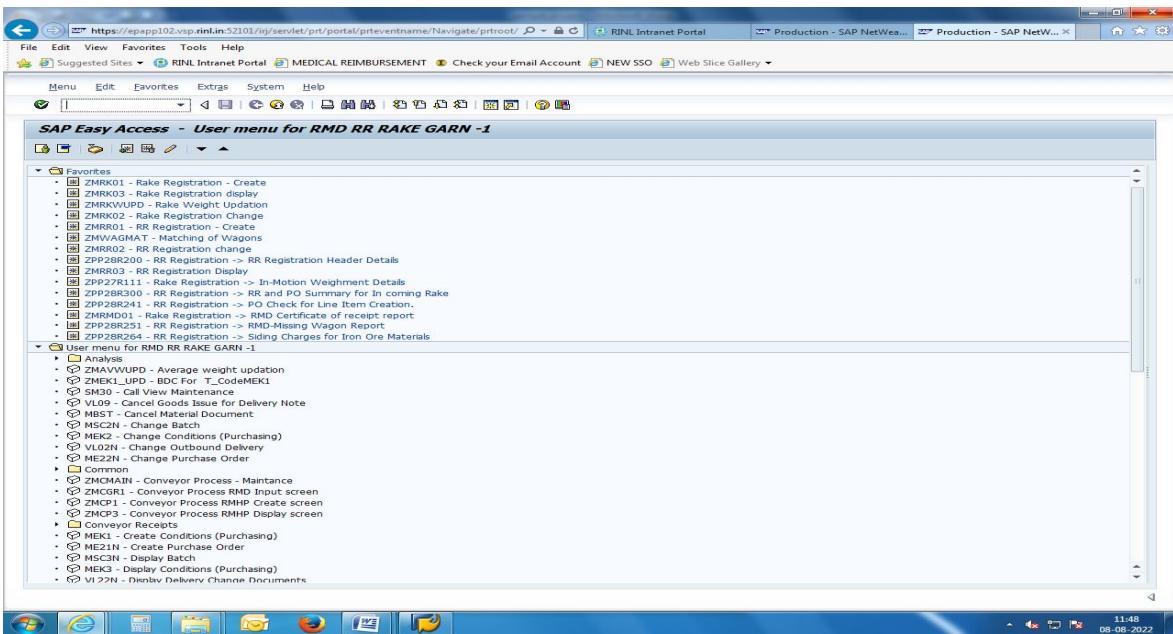
- The Daily Information of loading and receipts of different raw materials is collected from different sources.
- Further other relevant information regarding stocks, indents for rake placements are collected on a daily basis. This Information is presented in the form of a daily report.
- This information is furnished to RMD Shift office, Traffic, PPM and RMHP Departments.
- Railway receipts (RR's) upon Receipt at RMD are identified for the rake number with the help of wagon details in the Certificate Of Receipt (COR) by the shift office section of RMD.
- The relevant details like RR No, Date and RR Qty, Source, Freight per Tonne, Total freight and date of Receipt of RR ect.
- Are records in the RR movement register. This helps to keep the track of the RR's.
- The weighment reports received from PPM are identified for rake number and the details are recorded in the weighment register.

RMD SHIFT OFFICE

- The rake received at RMD is identified physically for the source and type of material by RMD Shift Office personnel.
- This is done with either the help of loading information or vehicle guidance (VG) of railways. After identification the information is passed on immediately to RMHP, PPM.
- Further the details of rake loading the entire wagon numbers are recorded in the document called CERTIFICATE OF RECEIPT (COR).
- Materials like managerse, Quantity, River Sand, titani ferrous are being received by road transport (Trucks) at Visakhapatnam Steel Plant.
- After the receipts of materials by trucks, the details of the same are recorded as per the delivery challan after verifying for the draw of the sample, weighment at Visakhapatnam Steel Plant AND CISF Entry.
- The trucks are then sent to RMHP for unloading. The truck's documents are collected after unloading certification by RMHP. All such documents collected for the day are sent to the Road - Material Section on the following day.

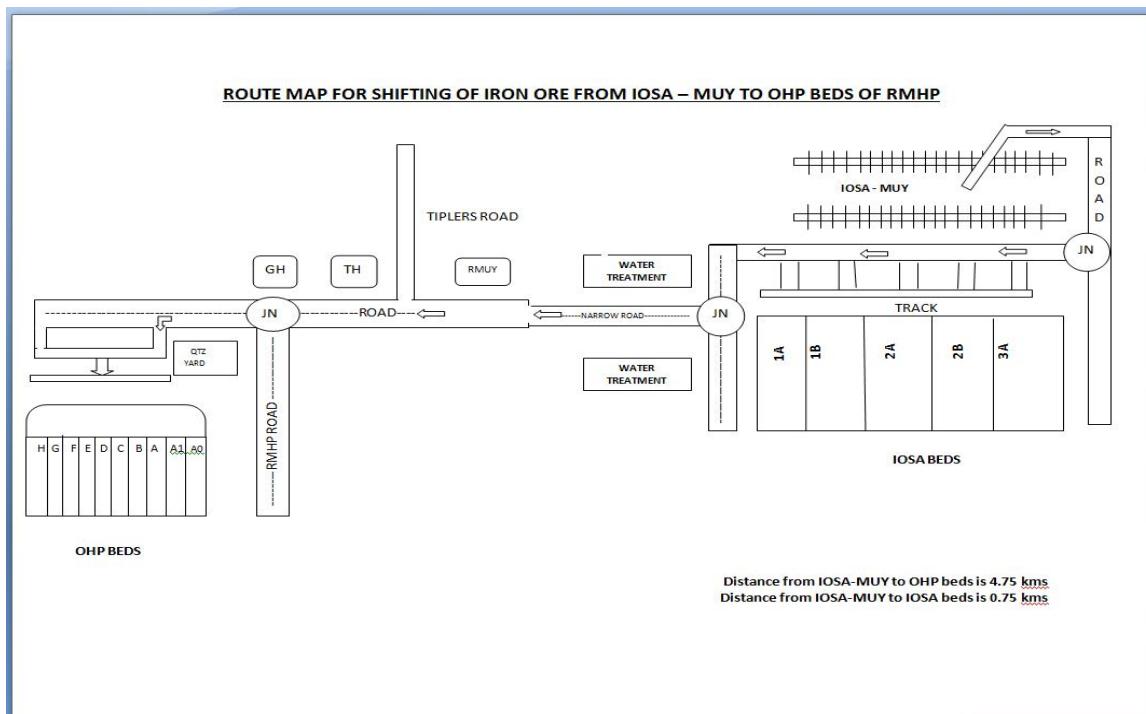
RAKE REGISTRATION & FEEDING





SHIFT OFFICE ACTIVITIES

- Identification of materials by Rail / Road.
- Received information on the rakes arrived.
- Is to take down details of Raw material receipts preparation of COR's (Certificate Of Receipts) and writing shift report and logbook.
- Giving information to the department consult (Like plant controls, OCR,CCR,QATD etc...)
- Monitoring shifting job Raw materials and stocks & assessing different materials stock.
- Route allotment lines.
 - Ore
 - Coal
- Cross checking the loading information and daily report in case of required.
- FOIS verification for the rakes to be received in a particular shift.
- And also consult the officer concerned materials information to
 - OCR - ORE (Control Room)
 - CCR - COAL (Control Room)
 - Ensure the recipes of coking coal and other raw materials with the interaction of RMHP & GPL.
 - Line No: U-4 to U-15 → ORE Tippling Room
U-25 to U-30 → COAL Tippling Room
- RAW Materials are stored in the bead of stock yards and ground hoppers/track hoppers.



Details of the particular RMD material code:

- Iron Ore Fines(IOF) - 6013000
- Iron Ore Slime - 6013001
- Iron Ore Lump(IOL) - 6011000
- Iron Ore Pellets(IOP) - 6014000
- BF Lime Stones(BF L/S) - 6016000
- BF Dolomite(BF Dolo) - 6021000
- SMS LimeStones(SMS L/S) - 6018000
- SMS Dolomite(SMS Dolo) - 6022000
- Boiler Coal(BC) - 6006000
- BF Coke - 6096000
- Bf Coke Import - 6097000
- Medium coking Coal(MCC) - 6002000
- Calibrated Lump Ore(CLO) - 6012000

Details of the particular RMD Rake Numbers:

- Iron Ore Fines(IOF) - 202213001
- Iron Ore Slime - 202212001
- Iron Ore Lump(IOL) - 202211001
- Iron Ore Pellets(IOP) - 202214001
- BF Lime Stones(BF L/S) - 202216001
- BF Dolomite(BF Dolo) - 202221001
- SMS LimeStones(SMS L/S) - 202218001
- SMS Dolomite(SMS Dolo) - 202222001
- Boiler Coal(BC) - 202206001
- BF Coke - 202296001
- Bf Coke Import - 202297001
- Medium coking Coal(MCC) - 202202001
- Calibrated Lump Ore(CLO) - 202212001

Accounting of Raw Materials:

- Accounting of all raw materials received by rail and road are done on a monthly basis by the individual sections which are coal section, ore section, flux section and road materials section.
- Wagon booked vide Railway Receipts (RR's) - are tallied with certificate of receipt GRNs are prepared for the wagons received and sent to the finance department.

Role and Importance of RMD:

RMD is playing the most critical and responsible role in the Visakhapatnam Steel Plant. The aim of RMD is to procure raw materials required for steel production in the right quantity by the right time at the right cost.

Role of RMD:

- Maintaining uninterrupted flow of raw materials.
- Buying at competitive prices.
- Avoiding under inventory and Ores inventory.
- To have good relationships with other departments.
- RMD personnel need vast study of maked and redistic level of planning.

MATERIAL	SUPPLIER	SOURCE
BC (Boiler Coal)	M/s MCL	Talcher
	M/s MCL	BOCM/LOCM
	M/s SCCL	Singareni
MCC (Medium Coking Coal)	M/s CCL	RAJARAPPA / KEDLA / SWANG
	M/s BCCL	Patherdih
PCC (Prime Coking Coal)	M/s BCCL	Munidih
IOF(Iron Ore Fines)	M/s NMDC, Bailadilla Mines	NMDB, NMVK
	M/s NMDC,	RNJP
	M/s OMC	DAITARI
IOL(Iron Ore Lump)	M/s NMDC, Bailadilla Mines	NMDB, NMVK
CLO (Calibrated Lump Ore)	M/s NMDC, Bailadilla Mines	NMDB, NMVK
	M/s NMDC,	RNJP
BF Limestone	Captive Mines	JAGGAYYAPETA
SMS Limestone	Private Party	UAE, Dubai
BF Dolomite	Captive Mines	Madharam
	Private Party	Birmitrapur (BRMP) Belha (BYL)

	Captive Mines	Madharam
SMS Dolomite	Private Party	Birmitrapur (BRMP) Belha (BYL) Baradwar(BUA)
QUARTZ LUMP	Private Party	-
	Captive Mines	Kintada
QUARTZ FINES	Private Party	-
Mn. Ore Fines	Captive Mines	Garbham, Manganese Mine
MN ORE LUMP	Captive Mines	Garbham, Manganese Mine
	M/s MOIL	Maharastra
SAND	Captive Mines	Sarepalli

Imported Coking Coals:

I.C.C –Hard Coals:

I.C.C - Peakdown	Australia to GPL
I.C.C - Goonyella	
I.C.C - Moranbha North	
I.C.C - Cambria Creek	USA to GPL
I.C.C - Benga PHCC	Mozambique to GPL
I.C.C - Tuhup (Indonesia)	Indonesia to GPL

I.C.C – Soft Coals:

I.S.C - BWS	Australia to GPL
I.S.C – Blue Diamond Soft	USA to GPL
I.S.C – Kestrel	Australia to GPL
I.S.C – Moura Soft	
PCI	
Iron Ore Fines	Bacheli, Kirandul, KIOCL(GPL), SAIL(BXF), OMC(Daltari), RNJP(DIOM), OMDC(Barbilil)

FLOW OF WORK (RMD):

- Users departments give consumption plan to plant control.
- Plant control gives the requirement to RMD.
- RMD raises PR and Sent to MM(Material Management).
- The MM department calls for tenders from parties.
- Received quotations will be sent to RMD for TR (Technical Recommendation).
- The MM department finalizes the supplier for TR from RMD.
- Commercial aspects are to be taken care of by RMD with railways.
- Transfer/Transport activities are to be taken care of by the traffic department.

Specific Consumption of Raw Materials:

- **(Per Tonne of Hot Metal)**

- Sinter → 1287 kg
- IOS → 347 kg

- **Fuel:**

- Coke → 534 kg
- Nut Coke → 9 kg
- PCI → 15.5 kg
558 kg

For 6.3 MT(Metric Tonne) Production 24 MT Of Raw Material required.

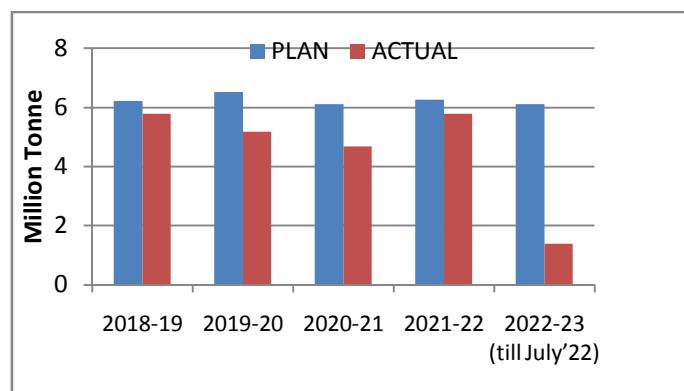
Constituent	Chemical Formula
Iron Ore	Hematite (Fe ₂ O ₃)
Limestone	CaCO ₃
Dolomite	(SiO ₂) MgCO ₃
Coke	Carbon

Iron Ore Chemical Composition:

- % Fe → 63 to 65 %
- % SiO₂ → 1.5 % Max
- % Al₂O₃ → 1.2 % Max
- % P → 0.06 %
- % S → 0.02 %

• Hot Metal Statistics:

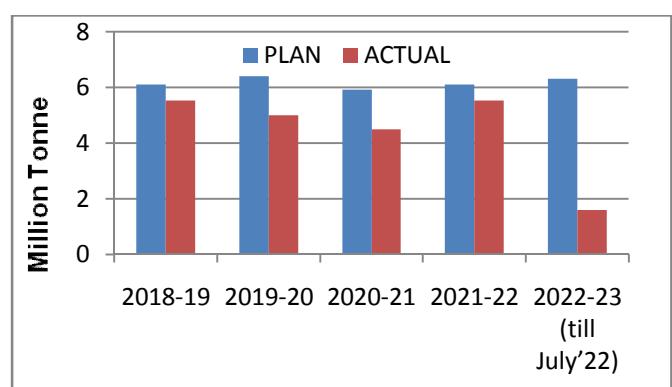
<u>YEAR</u>	<u>PLAN</u>	<u>ACTUAL</u>	<u>FULFILLMENT</u>
2018-19	6.2 MT	5.77 MT	93 %
2019-20	6.5 MT	5.16 MT	79 %
2020-21	6.1 MT	4.68 MT	77 %
2021-22	6.25 MT	5.77 MT	92 %
2022-23 (till July'22)	6.1 MT	*1.38MT	-



Note: * Up to Apr-Jul'22

Liquid Steel Statistics:

<u>YEAR</u>	<u>PLAN</u>	<u>ACTUAL</u>	<u>FULFILLMENT</u>
2018-19	6.1 MT	5.52 MT	90 %
2019-20	6.4 MT	4.98 MT	78 %
2020-21	5.9 MT	4.49 MT	76 %
2021-22	6.10 MT	5.51 MT	90 %
2022-23 (till July'22)	6.3 MT	*1.59 MT	-



Note: * Up to Apr-Jul'22

Material	Source	Supplier
Iron Ore Fines	Bacheli / Kirandul (Chhattisgarh)	NMDC (National Mineral Development Corporation)
Iron Ore Lump	Bacheli / Kirandul	NMDC
Calibrated Lump Ore (Sized Ore)	Kirandul	NMDC
IOP (Iron Ore Pellets)	Raipur	GPIL (Godavari Power ispat Limited) KIOCL (Kudremukh Iron Ore Company Limited) NMDC (Kumaraswami, Donimalai)

SPECIFICATIONS OF IRON ORE

Iron Ore Lump (IOLC):

- TFe → 65.5% Min
- Al₂O₃ → 2.25% Max
- SiO₂ → 2.25% Max
- Phosphorus → 0.075% Max
- Sulfur → 0.040% Max
- Size → 10-150 mm

Iron Ore Fines (IOF):

- TFe → 64.5% Min
- Al₂O₃ → 3.0% Max
- SiO₂ → 3.0% Max
- Phosphorus → 0.075% Max
- Sulfur → 0.040% Max
- Size → 10 mm

Iron Ore Sized (IOS/CLO):

- TFe → 65% Min
- Al₂O₃ → 3.0% Max
- SiO₂ → 3.0 Max
- Phosphorus → 0.075 Max
- Sulfur → 0.040 Max
- Size → 10-30 mm

Iron Ores:



Iron Ores are rocks and minerals from which metallic iron can be economically extracted. The ores are usually rich in iron oxides and vary in color from dark gray, bright yellow, deep purple, to rusty red. The iron itself is usually found in the form of magnetic (Fe_3O_4), Hematite (Fe_2O_3), Goethit ($\text{Fe}(\text{OH})$), Limonite (feo(OH)), Siderite (FeCo_3).

Chemical Composition:

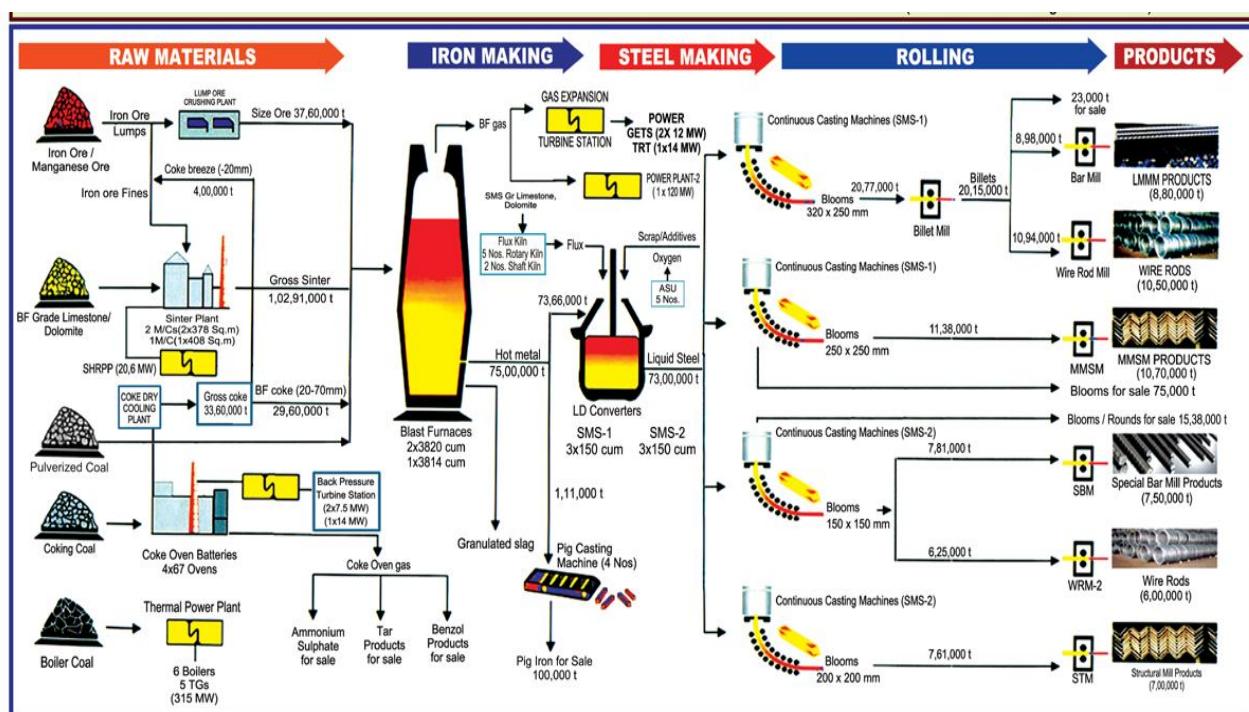
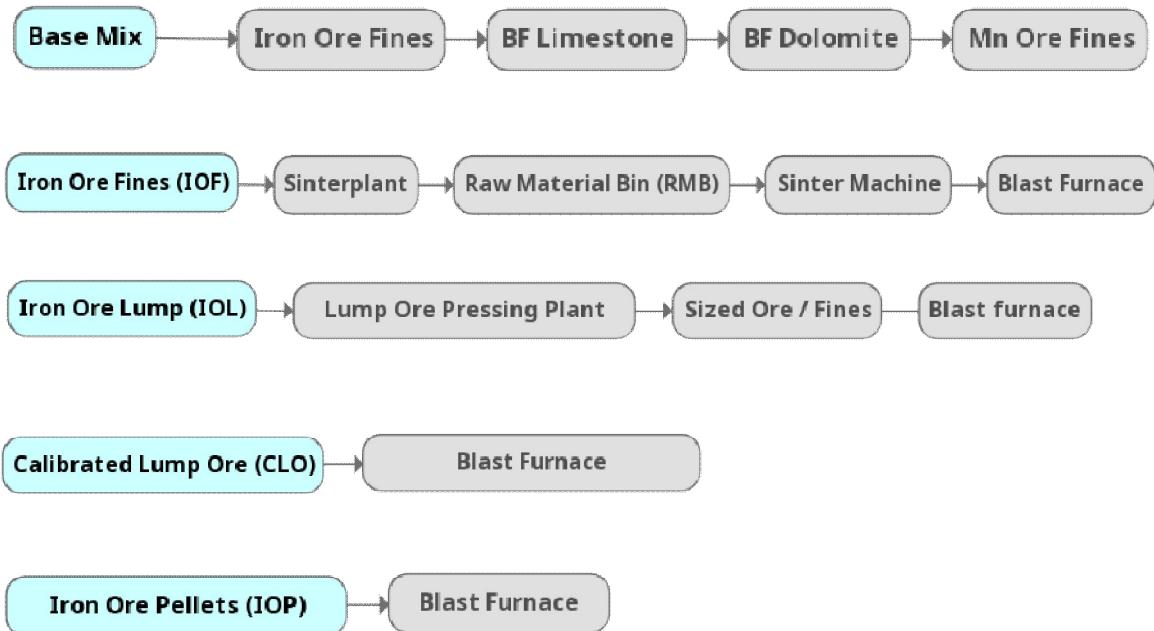
- %Fe → 63 - 65% Min
- % Al_2O_3 → 3.0% Max
- % SiO_2 → 3.0 Max
- Phosphorus → 0.06 Max
- Sulfur → 0.02 Max

Ores:

Ores of iron bearing materials are iron ore and manganese ore, Manganese ore lump.

The main source of iron input is from iron ore the hematite type of ore is used in the process of iron making. The iron content in the ore is present in the form of oxide. Which is reduced iron and the blast furnace by using coke and flux materials.

- **Raw Materials Bins (RMB):**



MAJOR RAW MATERIALS

- Raw Materials are mainly classified as below.
 1. Ores.
 2. Coals.
 3. Fluxes.

1. Ores:

They are Two Types

1. Iron Ores
2. Manganese Ores

Iron Ores:

They are 4 Types

1. Iron Ore Lump
2. Iron Ore Fines
3. Calibrated Lump Ore (CLO / Sized Ore)
4. Slime Ore Fines

2. Coals:

They are Two Types.

1. Non Coking Coal (Boiler Coal)
2. Coking coal (3 Types)
 - A. Prime Coking Coal (PCC)
 - B. Medium Coking Coal (MCC)
 - C. Imported Coking Coal (ICC)

3. Fluxes:

The fluxes are used in the process to remove the impurities in the iron ore which are known as gangue and mainly in the form of Al₂O₃ & SiO₂ the fluxes combine with gangue to form the slag and separate from hot metal /steel.

They are Two Types

- 1 Dolomite (Mgo)
- 2 Limestone (Cao)

Fluxes → BF LimeStone / Dolomite
→ SMS Limestone / Dolomite

These fluxes are Limestone, Dolomite, Quartzite and River Sand.

1. DOLOMITE:

They are Two Types

- I. BF Grade Dolomite (Blast Furnace)
- II. SMS Grade LimeStone (Steel Melting Shop)

- Siding:
 - SAIK → BF Dolomite → Madharam (RINL Captive)
→ SMS Dolomite
 - MGPV → Gangavaram Port Limited → UAE
(United Arab Emirates)
(GPL Rake → SMS Limestone)
 - RVSJ → JPTN → BF Limestone (RINL Captive)
 - Dolomite → Dolomite is a carbonite
 - Mineral composed of calcium, magnesium, carbonate $\text{CaMg}(\text{CO}_3)_2$.

- **Chemical Composition:**

- **BF Grade Dolomite:**

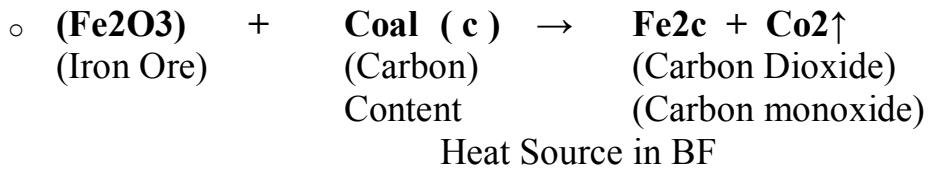
- Cao → 28-30%
 - Mgo → 18-21%
 - SiO₂ → 02-04%
 - Size → 06-80mm

- **SMS Grade Dolomite:**

- Cao → 29% Min
 - Mgo → 19-21%
 - SiO₂ → 01-02%
 - Size → 25-50mm

- ## • STEEL MAKING:

Formula:



- 1 Ton of Hot Metal = 1.6 Raw Materials Required.
 - 1 Ton of Liquid Steel Required Raw Material = 1.15 Hot Metal Required.

- **Base Mix:**

- 1.6 Ton of Raw Materials
 - 1 Ton of base mix for IOF
 - 0.7 ton of IOF

- ### • Sinter:

- 1.1 ton of base mix

- ## • Hot Metal:

- 1.47 ton of sinter

MINOR RAW MATERIALS

(Road Materials)

1. Sand
2. Quartzite Lump
3. Quartzite Fines
4. Manganese Ore Fines
5. Manganese Ore Lump

SUPPLIERS

NMDC (National Mineral Development Corporation)

Iron Ore:

- Head Office → Hyderabad
- Mines → Chhattisgarh, Kirandul, Bacheli, Bailadela
Karnataka, Rinjipura, Kumaraswami, Donimalai.

Coals:

- Boiler Coal → Singareni (Telangana)
- Imported Boiler Coal → Indonesia
Orissa
Talcher.

MCC:

- Medium Coking Coal → Jharkhand
(Kedla, Rajarappa, Kathara).

ICC:

Imported Coking Coal → Australia, US (United States), New Zealand.

Fluxes:

- Dolomite → Telangana (Madharam) → Captive Mines
Orissa → Chhattisgarh → Private Mines
- SMS Dolomite → Madharam (Captive)
Chhattisgarh (Private) Belha, Bua.

B. LIMESTONE:

They are Two Types

- BF Grade Limestone → Jaggayyapeta (Vijayawada)
- SMS Grade Limestone → Imported

Transporting Material in RINL:

There are 3 Types of Transport Ways

1. Road
2. Rail
3. Sea

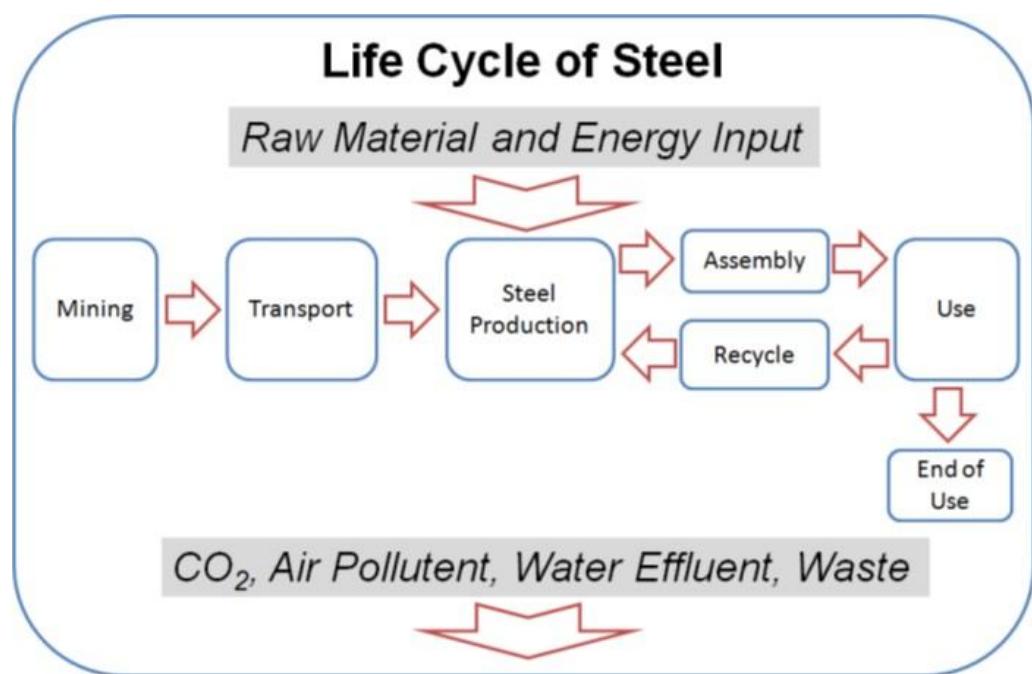
(GPL) GANGAVARAM PORT LIMITED

- ICC (Imported Coking Coal) Transferred to Conveyor GPL to VSP.
- SMS Limestone is supplied through Rakes from GPL to VSP.

4. ABREVIATIONS FOR RAW MATERIAL DEPARTMENT

- IOF → Iron Ore Fines
- IOL → Iron Ore Lump
- IOS → Iron Ore Sized
- RR → Railway Receipt
- COR → Certificate of Receipt
- GRN → Goods Receipt Note
- OMC → Odisha Mining Corporation
- DATR → Daitari
- NMDC → National Mineral Development Corporation
- RNJP → Daitari
- CLO → Calibrated Lump Ore
- MCC → Medium Coking Coal
- BC → Boiler Coal
- CTC → Central Traffic Control
- ICC → Imported Coking Coal
- HCC → Hard Coking Coal
- SCC → Soft Coking Coal
- PCI → Pulverized Coal Injection
- GPL → Gangavaram Port Limited
- OT → Ore Tippler
- CT → Coal Tippler
- IBC → Imported Boiler Coal
- SAP → Systems Applications & Products
- FAUC → Freight Adjustment Under Chargers
- POL → Punitive Over Load
- GST → Goods & Service Tax
- DS → Delevement Surcharge
- BPO → Business Process Outsourcing
- ERP → Enterprises Resource Planning
- RDE → Radhe Damoder Exporters
- RMJC → Rungta Mines
- NMET → National Mineral Exploration Trust (2% Of Royalty)
- DMF → District Mineral Fund (30% Royalty)
- FOIS → Freight Operations Information System
- GV → Gourds Voucher
- OPT → Operating Paticulations Transit
- PCC → Permissible Carrier Capacity
- MN → Moranbah North
- ROM → Run Of Mines
- PD → Peak Downs

- CC → Cambria Crick
- BPHCC → Benga Premium Hard Coking Coal
- BWS → Black Water Soft
- NZSS → Newzealand Semi Soft
- IOF → Iron Ore Fines
- IOL → Iron Ore Lump
- SMS → Steel Melting Shop
- BF → Blast Furnace
- CLO → Calibrated Lump Ore
- QF → Quartz Fines
- MnO → Manganese Ore
- SP → Sinter Plant
- IOS → Iron Ore Slime
- IOP → Iron Ore Pellets
- RMHP → Raw Material Handling Plant
- ISC → Imported Soft Coal





CONCLUSION & DISCUSSION

Raw Materials is the backbone of steel industry is one of the most sought after metal and plays a vital role in the economy of a country. The Raw materials required for Iron ore is the most important and basic Raw materials of the iron and steel industry. It takes about 1.5 tonnes of iron ore to make a ton of pig- iron. The most important Fuel are Coal and Coke.



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THANK YOU