

# **Diagnostic Study of Steel Re-Rolling Mill Cluster**

Presented by

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**SISI**

# Introduction

The Steel Re-rolling Mill cluster has been adopted by SIDO under Small Industry Cluster Development Programme (SICDP). The cluster diagnostic study has been conducted to lay down the broad path for initiation of cluster development. One of the main objectives of such a study is to suggest a vision for the future and strategic plan in line with UNIDIO methodology by understanding the current situation of the cluster & to identify the factor constraining the smooth functioning and growth of the cluster.

# Objectives

- To study the existing infrastructure facilities and the constraints faced by the units.
- To study the resources available – both human and material present utilization and raw material availability.
- To identify the problem faced by existing unit including technology level , problems related to availability of finance and marketing sources etc.
- Suggestions and Measure required to be taken to overcome the existing problems.

# Scope & Methodology

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- Review of Secondary data sources, relating to the cluster.
- In all, about 25 formal interviews have been carried out among a cross-section of stakeholders, apart from the informal interaction that has been taken place during CDE working in the cluster.

- In the order to achieve the above objective, different segments were identified to determine the existing status of the Re-rolling as well as to assess the availability of various resource, and infrastructure etc.

# Industrial Scenario

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- The Steel Re-rolling sector in the secondary producers category has undisputed position. In the Indian market today due to its extensive restructuring within its resources and within the financial crunch which the sector is facing from the very start after Independence.

- The past few years have been tough for the secondary steel re-roller in India. Hit by sluggish demand coupled with falling prices, high raw material prices, high wages payments absorption power tariff increase and fuel price increase.
- There are approximately 2600 re-rolling mills throughout India, out of which approximately 1800 units are working inclusive of scrap re-roller in India.

- Out of total 1800,1167 re-rolling mills are on the list of Government.
- The first Re-rolling Mill in the Country was installed in the year 1928 at Kanpur mainly for salvaging scrap materials.
- With the economic liberalization and with the end of the era of subsidies to steel industry in public sector. The main steel producers were forced to take modernization and renovation steps at their plant.

- The arising of scrap and defectives started to shrink at their end. This has made the steel re-rolling sector learn to live with its own steel making capacities.
- In the year 1980 the capacity of the sector was assessed at 20 million tonnes, which has been increased to approximately 24 million tonnes at present
- The relentless effort has made this sector in producing various common as well as most

typical steel sections in their mills. The TOR steel, the flats, special squares window section, thinner size HR strips, thinner gauge HR strips, hexagons, wire rods, angles, channels, H-Beams, I-Beams, tele-channels etc. are the products of this sector.

- With the recent development in reinforcement bars worldwide this sector now produces high quality, high grade TMT Bars throughout India.

- Some units have installed the TMT plants under the license of indigenously developed thermex technology and the other units have developed their own water quenching technology which is fully capable to produce the same quality of TMT Bars.
- As per our survey, the re-rollers in the secondary steel producers are shifting the old technology and getting even ISO: 9000 status. Several re-rollers have already come

under the control of Bureau of Indian Standards for their products.

# Export

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- The substantial quantities of steel rolled products are being exported to the various parts of the world in addition to all neighbouring Country like Bangladesh, Nepal and Bhutan.
- Various fabricated and steel items, which are produced out of the rolled products, are export to the most developed countries of the world like USA, Canada etc.

# Domestic Supply

- The estimated demand of the re-rolled products has been estimated at about eight million tonnes.
- The share of the secondary steel producers in India out of the total production of finished steel has been assessed at 59 percent which itself proves the achievement of this sector.

- The Steel re-rolling industry caters to the needs of the domestic field up to the tune of 68 percent of the total requirement. 80 percent of the total exports of rounds and bars have been recorded from the steel the secondary steel producers.

# Pollution

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- We are not informed of proper technology to consume high ash contain coal which is abundantly available here and are forced to consume furnace oil increasing the import budget of India.
- The technology to consume pullverised coal is well within the reach of the steel re-rollers, which also does not create any pollution.

inclusive of West Bengal. Sincere efforts  
assistance from all sectors are deserved.

# Shortage of appropriate and adequate raw materials

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- The Re-Rolling Industry consumes the inappropriate raw materials i.e. also inadequate quantity and improper quality. Through the steel making capacity in the country has been growing but in a very steady and slow pace, main producers should increase the production of semis, which will not be harmful financially for them.

# Finance for Modernization

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- The time has come that industry should sincerely consider the modernization and technological upliftment in the re-rolling mills. Economy in consumption of fuel and power, reduction in rising of mill scales and roll spoils (missroll ) is the of life and bread for this industry.

- No one can expect to compete the world champions without proper renovation and modernization of the age-old plant and machines.
- It is quite embarrassing for India that per capita consumption of crude steel in China

increased @ of 7.5 percent annually to reach a level of nearly 90 Kg from 2 Kg in 1950.

- In comparison, India started with a per capita consumption of 5 Kg, which grew at 3.24 percent annually over the last half century to 24/26 Kg presently.
- Steel is not steel before re-rolling or forging
- It should always be kept in mind that the steel re-rolling industry in private sector can

only generate the employment in India, can generate maximum revenue for India through Central Excise and can earn the maximum foreign exchange if it get the proper raw material in adequate quantity and at genuine prices.

- If steel is produced cheaper which is a must, the per capita consumption of steel may reach to 100 Kg within a very short span of period.

- The fittest will survive and the fitness with the secondary steel re-rollers once the raw material is available at genuine prices.

# Historical Performance

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- The Steel Re-Rolling Mill Industries came in to existence in Chhattisgarh in early 70's.
- There are about 120 steel re-rolling mills are operating in the State.
- They are mainly concentrated in Raipur & Bhilai
- The instated capacity of the Sector is about 15 lakh tonnes / year.

- About 72 (60%) of the using coal fired heating furnace comes in low investment category & rest of the them use oil fired furnace.
- There are 6 units having complete automatic plant involve capital investment of about 3 – 5 crore each
- Average annual turnover of this sector is about Rs. 5crore / each.
- There are 29 sponge iron manufacturing plants have already installed having annual

capacity of about 12 lakh tonnes. Sponge iron is used for casting steel ingots, which is main raw materials for steel re-rolling mills.

- There are about 15 units having there own ingots casting unit, using induction furnace.
- 15 re-rolling mills got ISO – 9000 certification.

# Inception of BSP a turning point

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- The Bhilai Steel Plant, a public sector undertaking was installed in 1954 but the down stream industries based on steel come in to existence since 1978 with declaration of 31 Small Scale Industries as its ancillaries. It was the turning point for re-rolling units also when BSP opened door for supply of steel billets, blooms & cuttings to SSI sectors.

# Cluster Actors

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- Raipur & Bhilai re-rolling mills cluster is the one of the largest cluster in the country after mandigovindgarh.
- The cluster accounts for 20 – 30% of the value of production of steel re-rolling products in the country. The nucleus or building blocks of the cluster undoubtedly has been the public sector owned Bhilai Steel Plant (BSP).

# Related Cluster Actors / Enterprises

## Suppliers

- In case of Raw Material supply Bhilai Steel Plant is the major suppliers of billets, blooms & scrap cuttings of re-rolling mills through SAIL stockyard. Since last 6 month, short supply of main raw material have been noticed.

Some of the re-rolling mills have also installed ingots casting plant based on sponge iron to meet-

out raw material requirement.

- Coal is used as a fuel in case of coal fired furnace, it is procured from South Eastern coalfield Ltd., (SECL), a company of coal India Ltd. Recently SECL started e-auction procedure for coal. The state associations opposing it and in turn DC (SSI) has taken up the matter with coal India Ltd. to sort out the problem.
- Furnace oil as fuel is used in oil fired furnaces and it is procured from HPC.

- Small suppliers / dealers of consumables like lubricants, grease & spares are also present in the market.
- These suppliers don't provide any kind of technical assistance or ways to increase effectiveness.
- Suppliers for critical stores like fire bricks, nozzles & C. I. rollers are supplied from outside from outside of the state.

# Support Institution

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## Financial Institutions

- Presence of SIDBI, ICICI, NSIC and Other Nationalized Banks.

## Technical Institutions

- Presence of PCRA, CITCON, SISI & from outside NISST- Nagpur.

## Testing Lab

- Presence at Engineering College & with Large Firms.

## Association

- Presence of C. G. Re-Rolling Mills Association, C.G. Udyog Mahasang, C. G. Small & Sahayak Udyog Sang, CII, Chhattisgarh Chamber of Commerce.

# BDS

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- Presence of Services providers for ISO, export, finance, Presently the Small Firms not having good linkages with most of these institutions due to lack of awareness about the services / schemes being provided.

# Technology

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## Strength

- Running units since last 10 – 15 years on proven technology.
- Having Experts of the technology / process being used.

## Weakness

- SME's are not conversant with modern methods of production to improve productivity.
- Desired level of automation in the production process has not yet been achieved.

- Absence of proper R & D facilities.
- Energy conservation measures have not been adopted.

## Opportunities

- Focus on R & D activities by establishing a R & D centre can contribute significantly in improving quality of product & reduction in cost of production.
- Energy Audit should be carried out for cost reduction.

- Furnace productivity can be improved by the introduction of innovative technologies and optimization of process parameters
- Introduction of below mentioned technology can improve productivity and profitability and profitability:
  - i) Waste heat recovery.

- ii) Proper & effective insulation.
- iii) Combustion control measure.

## Threats

- Local SME's of the state are not well acquainted with modern production and service facilities and any attempt to introduce radical changes may face resistance.
- Future success will largely depend upon ability to respond with technology advances

- The development and implementation of modern technology entails significant and business risk.

# Inputs Availability

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## Strength

- The raw material & consumables available locally.
- Skilled manpower is available locally.
- There is not much power shortage.
- Water supply availability in industrial estate is at nominal rate.

## Weakness

- BSP is the single major PSU in the state most of the units rely upon it for raw material supply.
- Currently, the units are facing coal shortage problem and are forced to purchase coal at higher rate.

- Lack of skilled, Well-trained and motivated work face for advance technology.
- Frequent power cuts abrupt flow of process.

## Opportunities

- Use good quality coal should be encouraged to improve productivity.
- MDP's training and orientation programs should be frequently organized to enhance manpower skills.
- SME's should seek government's assistance for regular supply of power.

- Financial assistance from government bank, and financial institutions in the form of cash credit and term loan facilities can enable SME's to install Modern P & M and other utilities.

## Threats

- Labour intensive operations call for good monitoring and maintenance of relations.
- Any disruption on supply of power, basis infrastructural facilities, and telecom lines could adversely effect the business and production process of the company or subject it to excess cost.

# Business Environment

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## Strength

- There has been a steady growth of rolling mills in the region. This local agglomeration to assist SME's to grow rapidly, upgrade their skills, improve their productivity and technology, develop product niche market and gain access to distant markets.

- The region enjoys location advantage being well connected to metropolitan cities through road, rail and air route. Raipur is connected by regular flights to Delhi, Mumbai, Nagpur, Bhubaneswar, Chennai. It is in mail rail route between Mumbai & Kolkata.

- Fiscal and monetary policies of the local government are encouraging.
- As per current regulatory policies, Government is favoring captive generation of power.
- The birth of Chhattisgarh State with Raipur as its Capital has very positive impact on the industrial development of the region.

- **Communication Facilities** : - All the districts of Chhattisgarh are linked with optical fiber cable and all Tahsils. Internet speed are high due to high bandwidth provided by two basis service providers BSNL and Airtel.

- **Financial Assistance** :- Raipur city alone is served by about, 114 commercial Banks, 55 co-operative Banks and 41 RRB

## Opportunities

- The State Government is planning to create two integrated urban agglomerates in the State. One is the triangle of Bhilai, Durg and Raipur. The other is the twin city of Bilaspur and sipat. Both these cluster would be developed in an integrated manner. The crux of this approach is the

approach is the development of a fast and efficient transport system.

- **Good Governance** : The Government of Chhattisgarh is committed to provide a business friendly environment and to minimize rules and procedure that impede industrial growth.

## Weakness

- There are no exports processing zones.
- Lack of proper distribution Channels.
- No research and development center and testing laboratory available for industrial products.

- There is agglomeration of rolling mills in the region.
- Re-rolling Mills has not been covered under capital linked technology upgradation scheme of Govt. of India

## Threats

- Conditional availability of government incentives may put budding industries into hot water.
- Government of India has perused policies of economic liberalization, including relaxation of restrictions on the private sector, however we cannot assure that

these liberalization policies will continue in future.

- Any adverse change in Government policies relating to sponge iron, ferro alloys, Iron ores, stainless steel may have an impact on the profitability of the industry.

- Any changes in Sales Tax, Income Tax, Custom Duty, Import Export restriction and Excise Duty, which has negative impact on the sector, will reduce profitability.
- Failure to comply with environmental laws, rules and regulation may adversely affect rolling mills of the state.

# Need of Technical and Financial Intervention

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- It is noticed from the average cost wise break up of running expenses incurred for conversion of raw materials in to finished product that cost of oil, burning losses & electrical energy accounted at 80% of the total running cost excluding cost of raw materials or its about 40% of total cost of production including raw materials.
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- It is undoubtedly stated that this cluster could be increased its productivity by efficient energy management system.

# Technical

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- A brief of the energy saving opportunities have been identified in most of the units, which are given herein :

- Improvement in storage, handling and preparation of furnace oil.
- By the insulation of the service tank and oil pipe line upto the burners.
- By close monitoring of combustion parameters.
- Monitoring of air fuel ratio.

- By installing automatic fuel firing system for the oil firing in the soaking zone..
- By reduction in scale loss or burning loss by optimum operation of furnace and temperature control.

- By improving the insulation on roof and end wall etc.
- By installing the waste heat recovery system to preheat the combustion air system.
- In case of coal fired furnace system sizing of the coal for complete combustion is very important unit should have optimum

size of the coal i.e. 1.5” to 2” to get sufficient air for complete combustion.

- The technical parameters mentioned above have been discussed with the PCRA officials and as per their view, the total energy saving potential estimated around 40 – 50 lakh per annum with an investment of Rs. 6 lakh.

- It is suggested to undertake energy audit and implement it.
- An analysis has been attempted to analyse the scope of improvement, estimated saving & investment required as given in the Annexure - 5

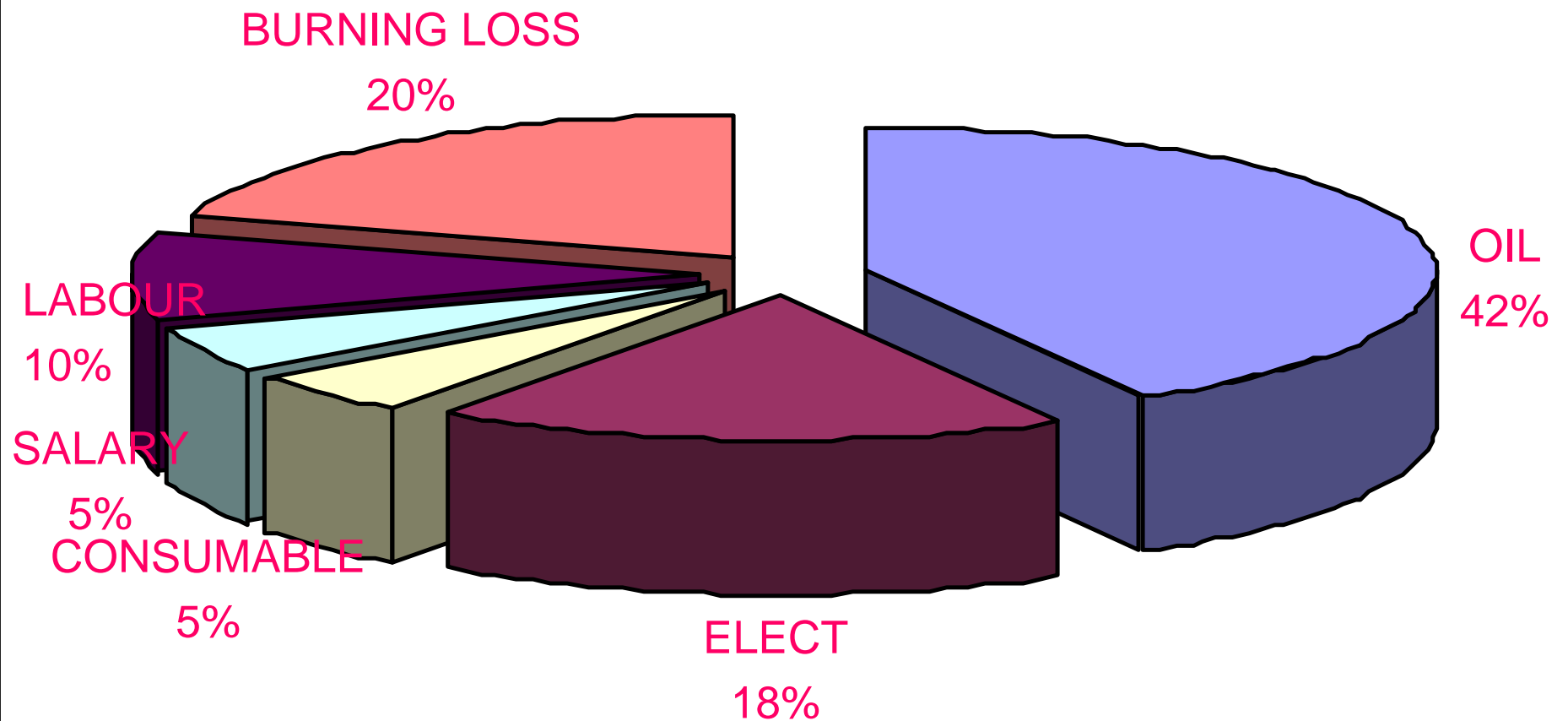
- For the measurement of following parameters a list of instruments is also given in Annexure – 4 of the report.
  1. Combustion control / Gas Analyzer.
  2. Furnace temperature indicator / Recorder.
  3. Furnace pressure indicator.
  4. Combustion air, flue gas temperature indicator & recorder.
  5. Fuel input measurement.

# Financial

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- Most of the firms availing working capital limit from the nationalized banks. The limit, which was, sanctioned on the basis of old rates of raw materials, consumables & finished goods. The working capital limit should be reassessed on the basis of current market trends.

# Cost wise Break up of Running Expenses for Conversion of Raw Mat. Into Finished Product



# Vision

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- “The Raipur Re-Rolling Mill Cluster will increase its share in global market by offering competitive quality products range by developing its image by the year 2008.”

# Conclusions & Recommendations

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- Joint exposure visit to developed cluster to understand the applied cluster system.
- Visit of business delegation in international trade fair for exploring international market and to get ideas about new products / technology. It is found that South Korean steel makers are most efficient producers in the world, an exposure visit of the business delegation should be made for [ISI](#)

- Exploring cost benefit of South East Asian countries, choice for competitive cost action can be accessed through interpolation of available technology indigenous resources in the line and filling up specific requirement of Indian origin.
- Steel Re-Rolling Mills should be included in the list of capital linked Technology upgradation scheme, so the cluster unit will be benefited.

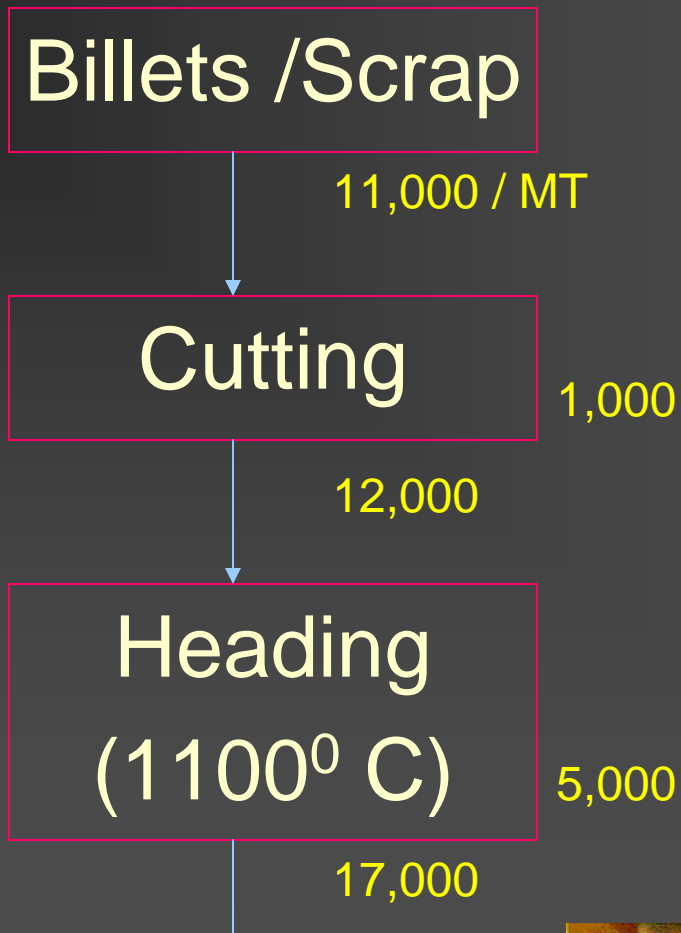
- It is proposed to organize seminar on ISO-9000, Energy conservation and Quality technology up gradation.
- Raw materials and consumables consortia should be formed for collective purchasing at economic scale.
- Collective consortia marketing approach should be exercised in a phase manner.

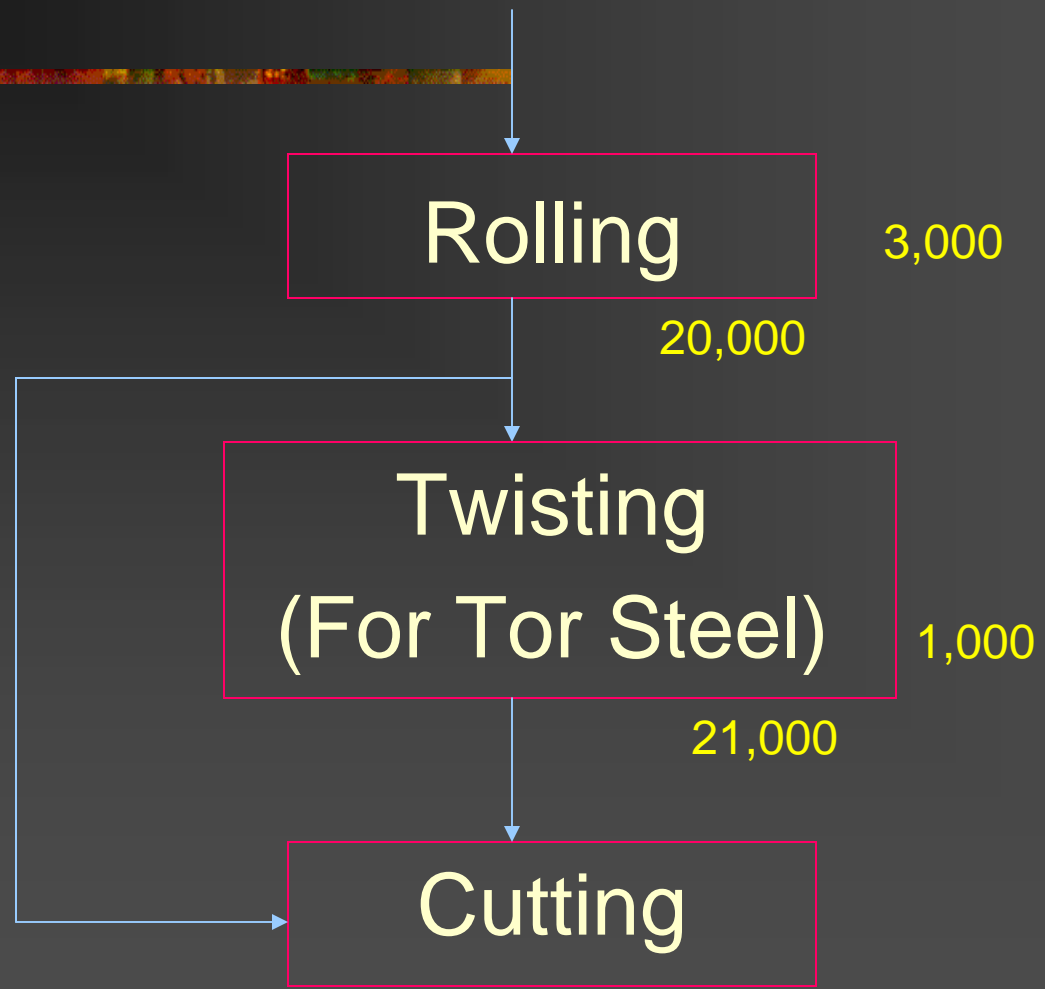
- Energy audit should be carried out and recommendation be implemented for cost reduction principal features to be considered are as Annexure – V in the order of progression.
- Adaptation modulation and specific cost conversion for particular cluster are appended as per annexure V.

- Any future suggestions to improve upon are welcome.

# Value Chain Analysis

(Rate in Rs / MT)





## Basic Instrument in Reheating Furnace

| S. No. | Parameter To be measured         | Location of the Measurement                                  | Instrument Required                         | Required value to be |
|--------|----------------------------------|--------------------------------------------------------------|---------------------------------------------|----------------------|
| 1      | Furnace Soaking zone Temperature | Soaking Zone Side Wall                                       | PT/PT-RH Thermocouple and Recorder          | 1200 –1300 C         |
| 2      | Flue Gas Temperature             | Flue Gas Exit from the Furnace and Entry to the Recuperators | Chromel Alummeml Thermo-couple with indicor | 700 C (Max.)         |
| 3.     | Flue Gas Temperature             | After Recuperator                                            | Hg in Steel Thermometer                     | 300 C (Max)          |

|   |                                             |                                                    |                                                                         |                         |
|---|---------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------|-------------------------|
| 4 | Furnace Hearth Pressure in the Heating Zone | Near Charging End Side Wall Over the Hearth Level. | Low Pressure Ring Gauge.                                                | +0.1 mm of WG           |
| 5 | Flue Gas Analyzer                           | Near Charging End Side Wall                        | Fuel Efficiency Monitor<br>Oxygen & Temperature.<br>A Probe of 4' Long. | 02% - 5,<br>Temp. 700 C |
| 6 | Billet Temperature                          | Portable                                           | Radiant Pyrometer or Pyrometr                                           |                         |

# Basic Instrument in Reheating Furnace

## A. coalFired furnace

| Technology up gradation Identified                                                                                                                                                                                       | Estimated Saving/Year | Instrument Required | Instruments Required                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <p>By close monitoring of combustion parameters</p> <ul style="list-style-type: none"> <li>- Proper air fuel ratio.</li> <li>- Installing automatic fuel firing system for the oil firing in the soaking zone</li> </ul> | 7.00 Laks             | 1.00 Lakh           | <ol style="list-style-type: none"> <li>1. Flue gas analyzer.</li> <li>2. Temp. indicator Digital.</li> <li>3. Fuel firing system</li> </ol> |

|                                                                                                                                         |             |                  |                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| - By reduction in scale loss or burning gas by optimum operation of furnace and temperature control (By the way of saving the material) | -23.00 Laks | --               | <ol style="list-style-type: none"> <li>1. To reduce excess air (Manually)</li> <li>2. To maintain optimum temp. of furnace (Temp. Indicator)</li> </ol> |
| - Improving the insulation on roof and end wall.                                                                                        | 8.00 Laks   | 1.2 to 2.0 Lakhs | Ceramic fibres & Refractory bricks<br>Insulation bricks<br>Thermal insulation<br>Scanner.                                                               |
| Installing the waste heat recovery system to pre heat the combustion air system                                                         | 13.00 Lakhs | 3.00 Laks        | <ol style="list-style-type: none"> <li>1. Recuperators</li> <li>2. Ducting</li> </ol>                                                                   |

## B. Oil Fired furnace

| S. No.       | Technology Up gradation            | Instrument Required                                 | Saving Potential (Tons of Coal) |
|--------------|------------------------------------|-----------------------------------------------------|---------------------------------|
| 1*           | By Excess air control              | Manually controlled                                 | 05                              |
| 2            | By the waste heat recovery         | Same as in oil fired                                | 50                              |
| 3            | By the control in Radiation losses | By insulating as given in case of oil fired furnace | 35                              |
| <b>Total</b> |                                    |                                                     | <b>90 Tons</b>                  |

\* Control excess air more closely in the furnace as due to manual firing % of excess air in the flue gas varies from 50% to 250% depending on the firing of coal, the firing of the coal to be maintained at such a interval that all the air entering the furnace should be utilized to the maximum extend.

Doors of the furnace should not be opened frequently.



Thanks You !



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