Induction & Orientation Training Programme For MT(Tech.) - 2025 Extension Batch

Introduction of Medium Structural Mill (MSM)

Durgapur Steel Plant

INTRODUCTION OF FACULTY

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Designation: AGM, MSM (Mill-Operation)

Work Experience: IT (2 Yrs), SAIL-DSP (15+ Yrs)

Experience Areas:

. Rolling of Structurals

. Roll Pass Design

. Management Systems: QMS (ISO 9001:2018), EMS (ISO 14001:2018), EnMS (ISO 50001:2018), ABMS (ISO 37001:2016)

. Lead Auditor for QMS, Internal Auditor for EMS, EnMS and ABMS

. Convener of C&CD Sub-committee for on-going '*Jagriti*' safety project of DSP/SAIL in association with consultant M/s. E&Y

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DISCUSSIONS

- Safety Message
- Introduction of Steel Industry
- Steel Rolling Mills, Products and Applications
- Reheating Furnaces
- Types of Rolling Mills
- Rolling Basics
- Introduction of MSM

. Rolling Challenges
. Quality Issues / Defects
. Production Constraints / Challenges
. Upgradations / Developments for production
. Production trends

SAFETY MESSAGE

Source: https://www.hsewebsite.com

Source: https://www.slogansinhindi.com

INTRODUCTION OF STEEL INDUSTRY

. Steel industry is highly energy intensive key sector of global economy.

. Continuous increase in energy cost in steel production and it is around 20-40% of total cost.

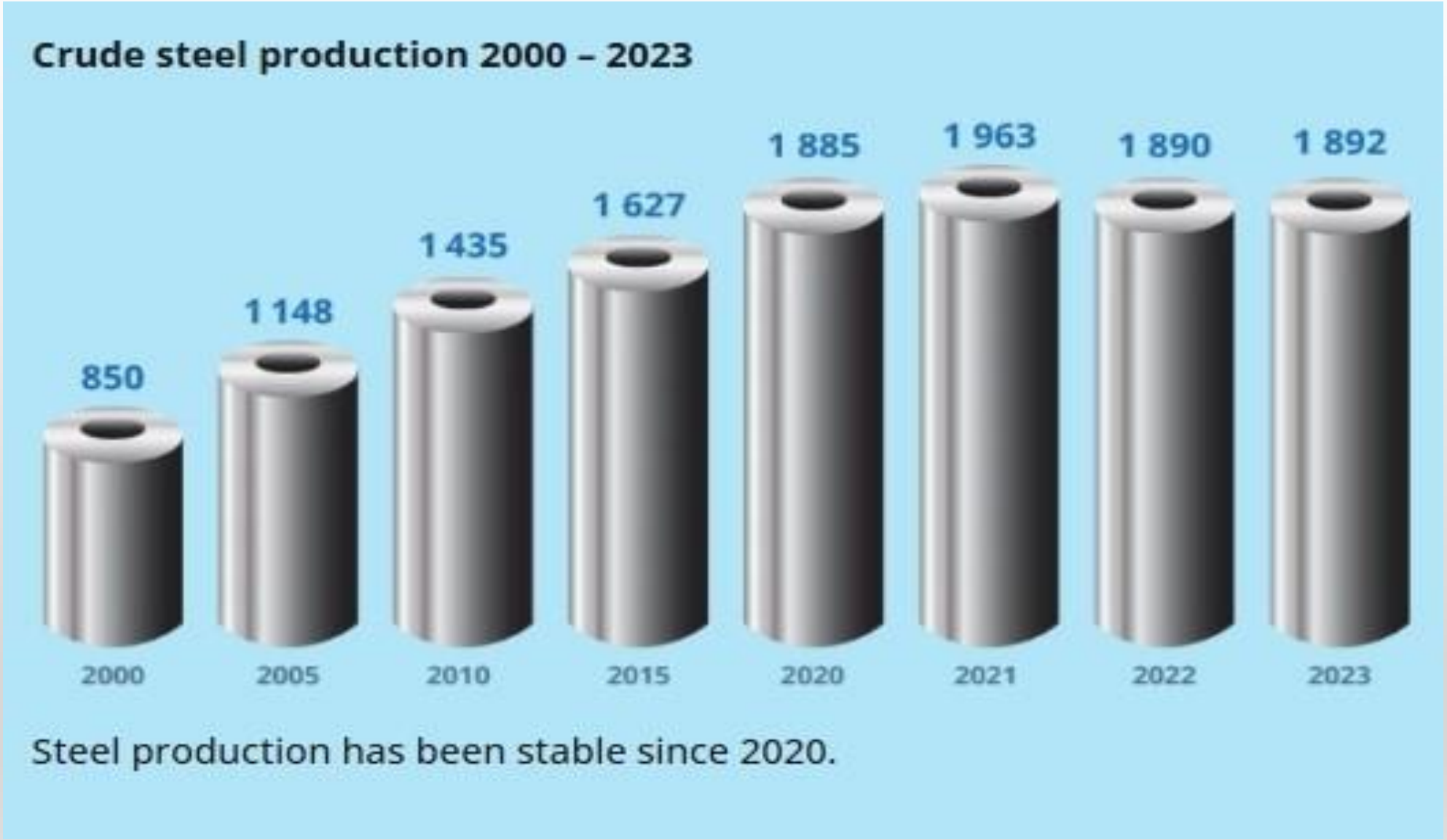
. Steel is an essential material used in construction, manufacturing, transportation etc. due to its *strength, durability, and versatility.*

. Challenges related to environmental concerns, fluctuating demand, and international competition.

. Necessity to adopt new technology to improve product quality, reduce energy & production cost.

. Steel continues to be vital part of economic development & industrial growth.

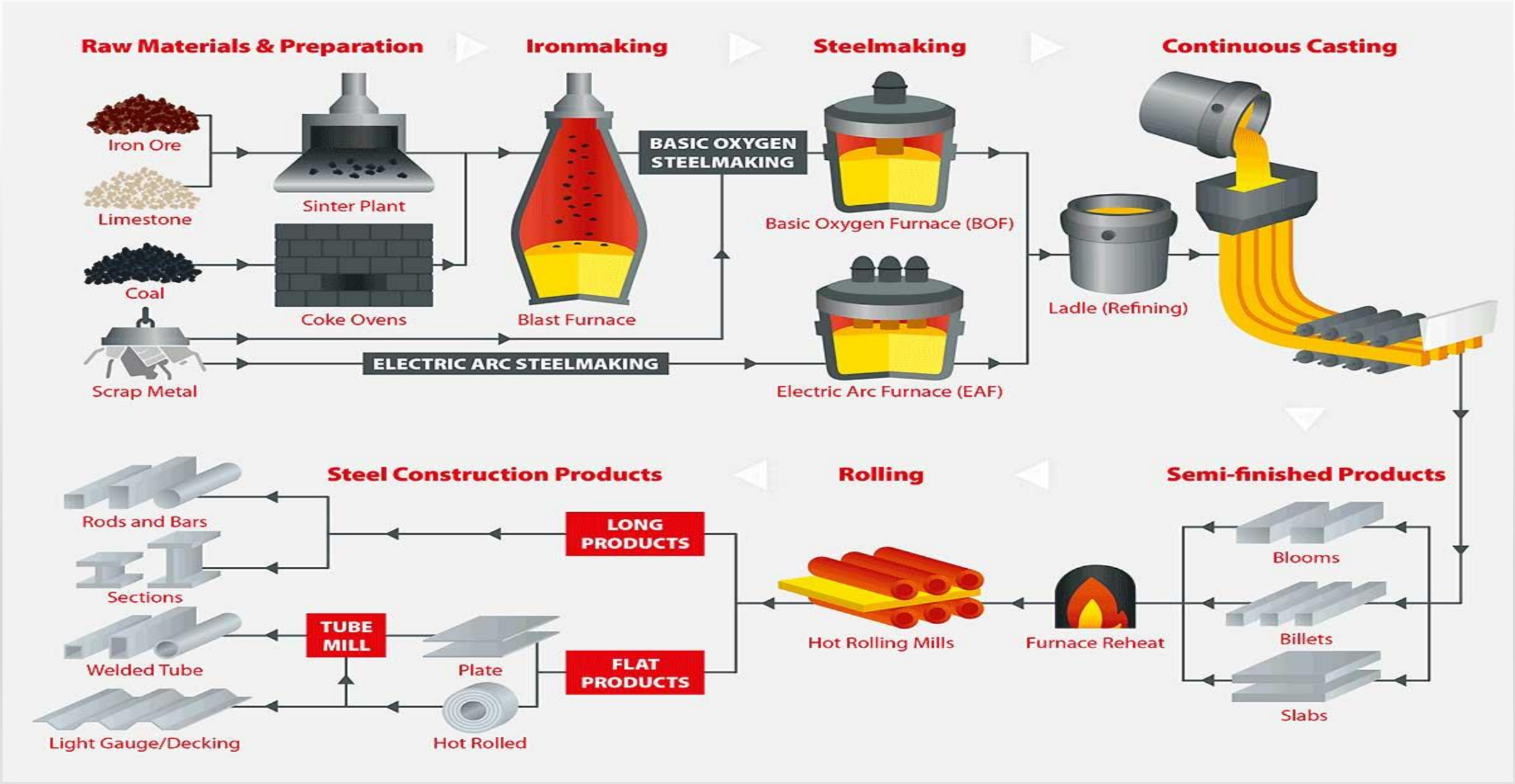
WORLD CRUDE STEEL PRODUCTION TREND



(Unit: million tonnes)

Source: worldsteel.org

FLOW CHART OF STEEL MANUFATURING



GLOBAL STEEL DEMAND

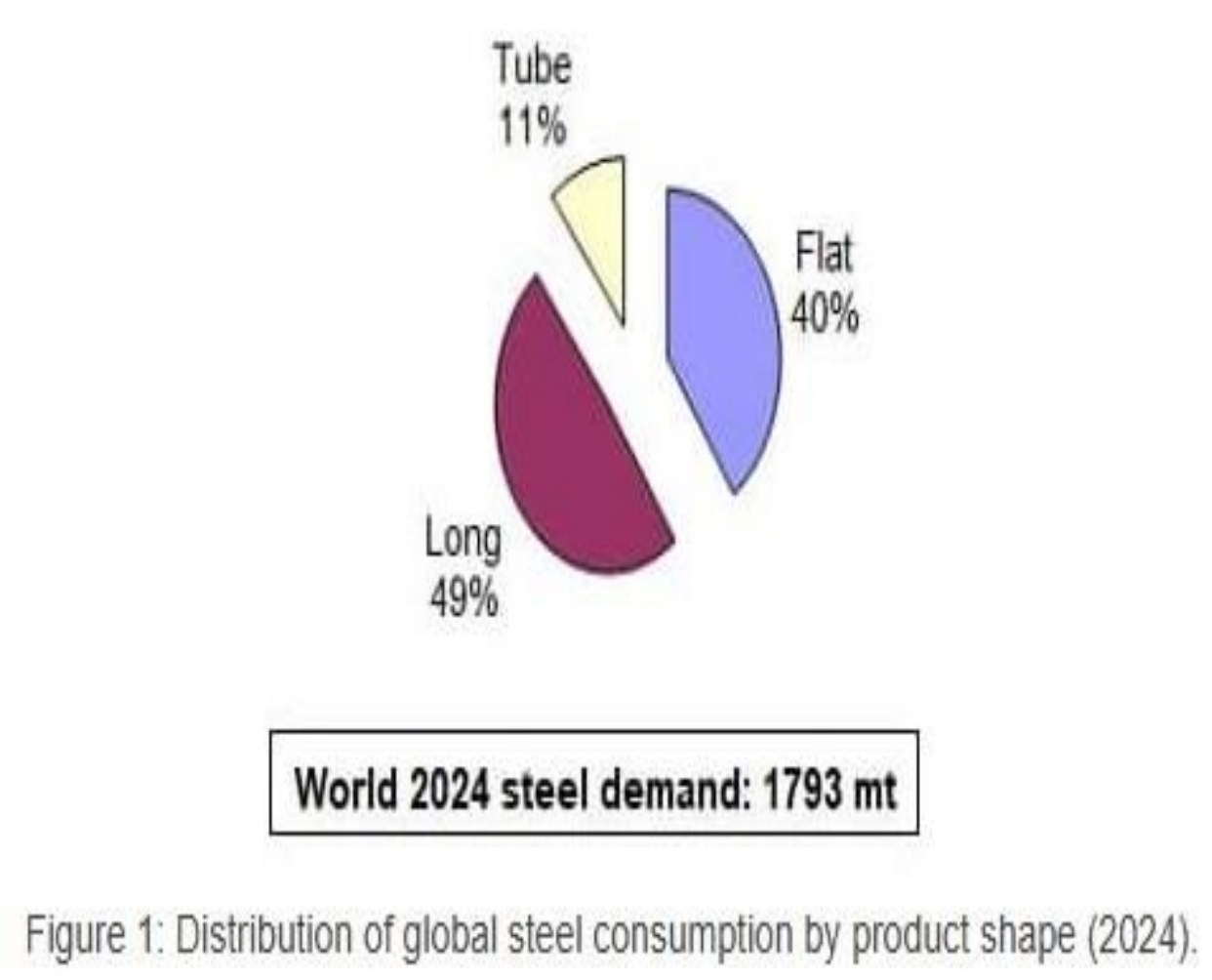
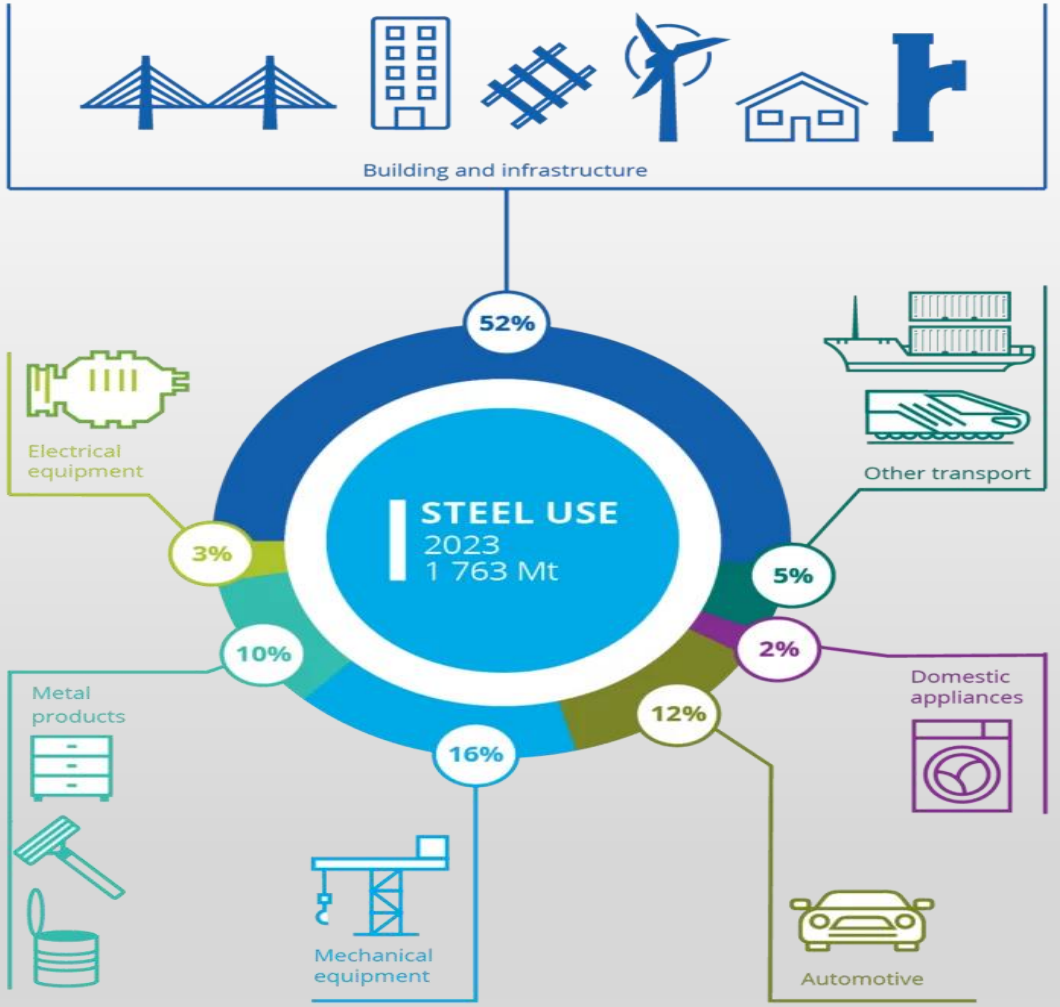


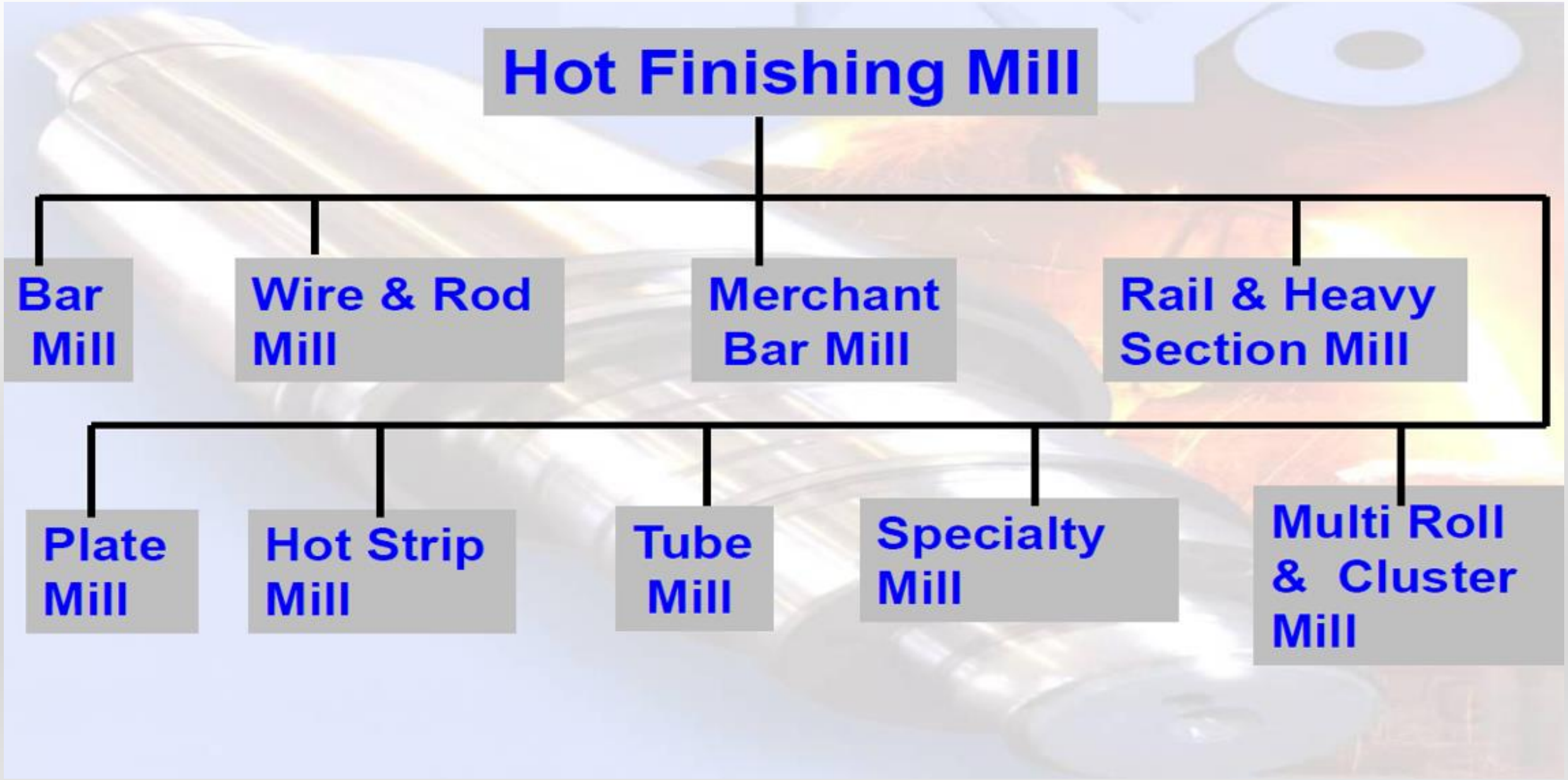
Figure 1: Distribution of global steel consumption by product shape (2024).

source: https://www.steelonthenet.com



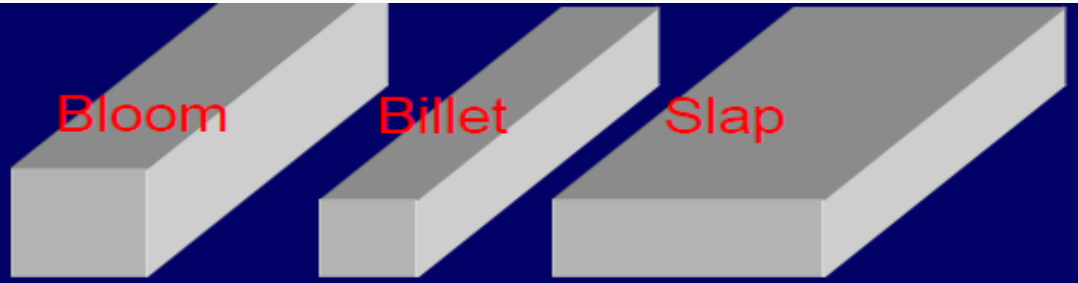
source: https://www.worldsteel.org

STEEL ROLLING MILLS & PRODCUTS



STEEL ROLLING MILLS & PRODCUTS

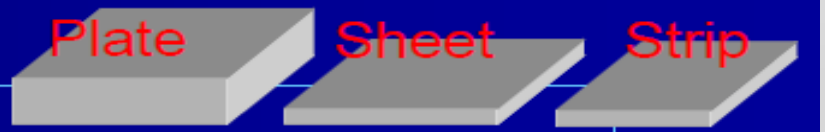
Terminology



Semi-finished products

- ***Bloom*** is the product of first breakdown of ingot (cross sectional area > 230 cm^2).
- ***Billet*** is the product obtained from a further reduction by hot rolling (cross sectional area > 40x40 mm^2).
- ***Slab*** is the hot rolled ingot (cross sectional area > 100 cm^2 and with a width ≥ 2 x thickness).

Further rolling steps



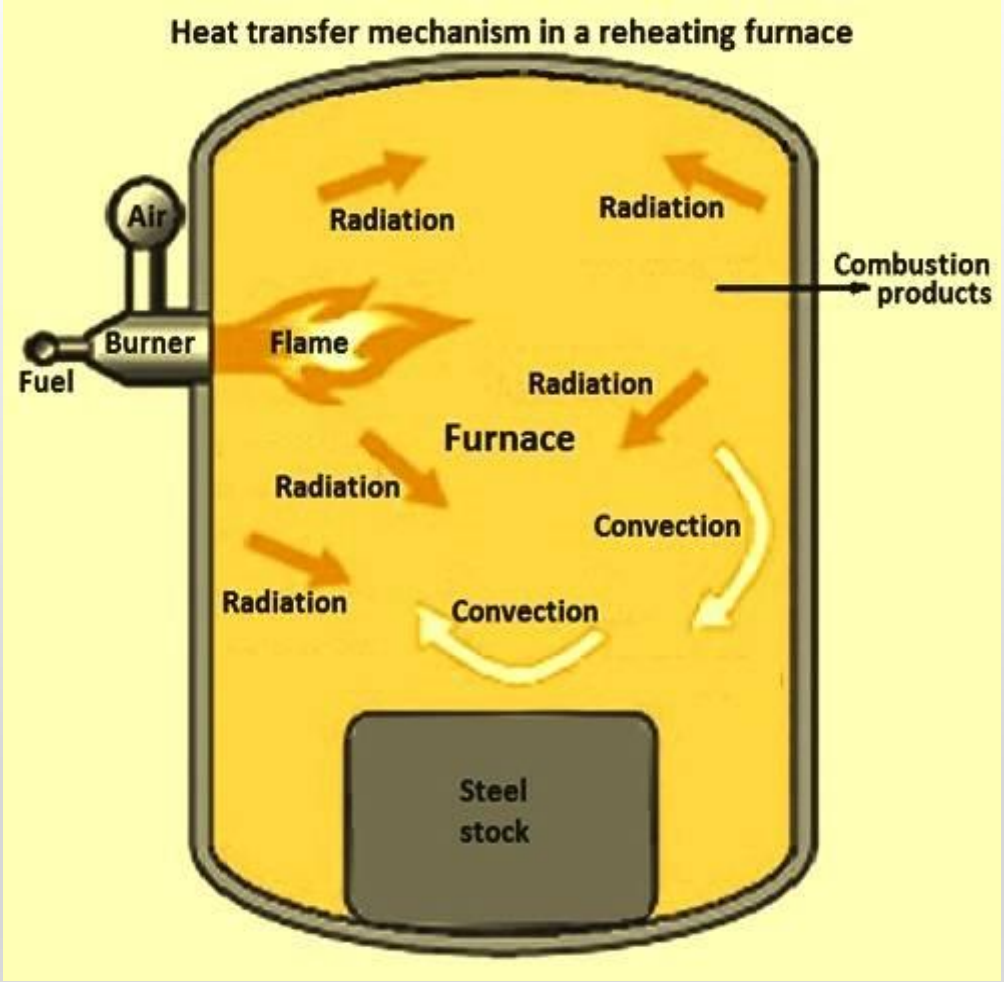
Mill products

- ***Plate*** is the product with a thickness > 6 mm.
- ***Sheet*** is the product with a thickness < 6 mm and width > 600 mm.
- ***Strip*** is the product with a thickness < 6 mm and width < 600 mm.

REHEATING FURNACES

REHEATING FURNACES:

Reheating furnaces are used in hot rolling mills to heat the steel stock (Billets, blooms or slabs) to the rolling temperatures of around 1200 ^{0}C which is suitable for plastic deformation of steel and hence for rolling in the mill.



CLASSIFICATION OF REHEATING FURNACES

(i) Based on the method of *heating*

(ii) Based on method of *charging* the reheating furnace

(iii) Based on the *movement of steel stock* in the reheating furnace

(iv) Based on the *heat recovery* methods

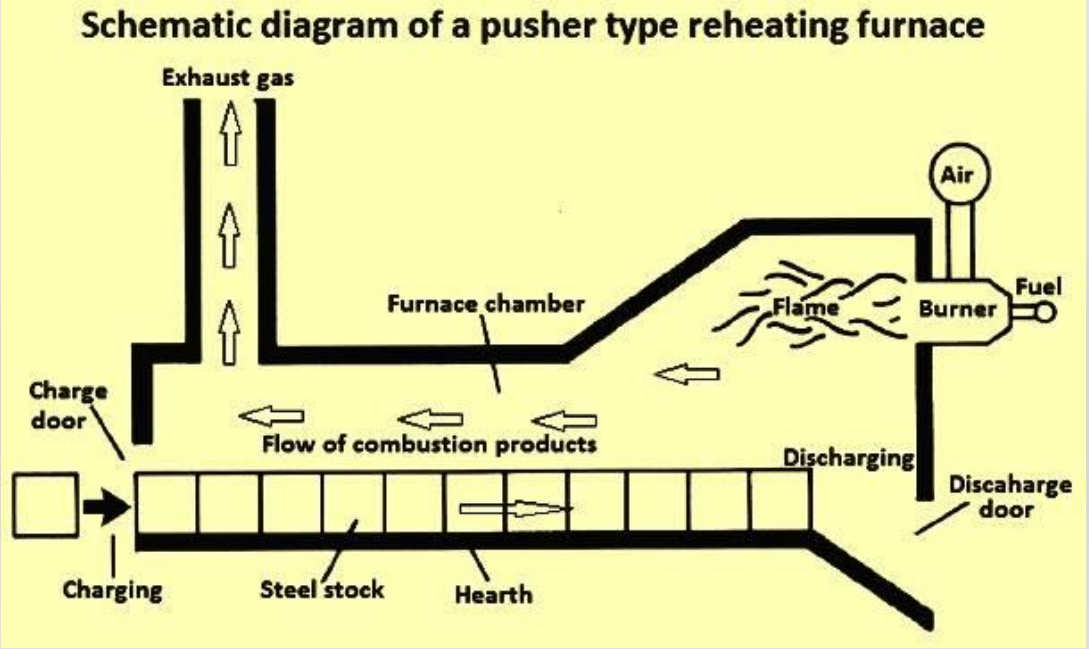
TYPES OF REHEATING FURNACES

1. BATCH TYPE FURNACES :

Steel stock to be heated in this type of furnace is charged and drawn through front doors by a charging machine.

2. SINGLE OR MULTIZONE CONTINUOUS PUSHER TYPE

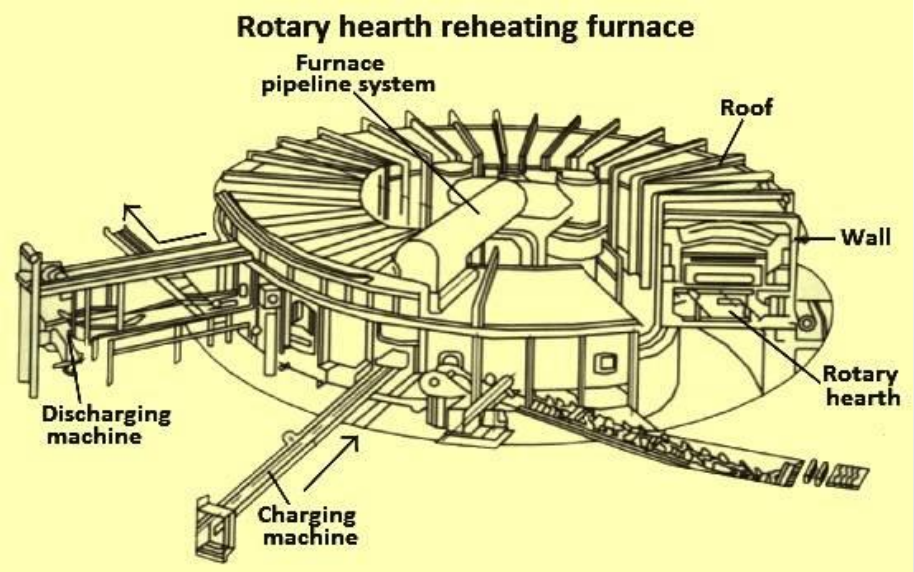
Cold steel stock is pushed forward with the help of pushers at the charging side.



TYPES OF REHEATING FURNACES

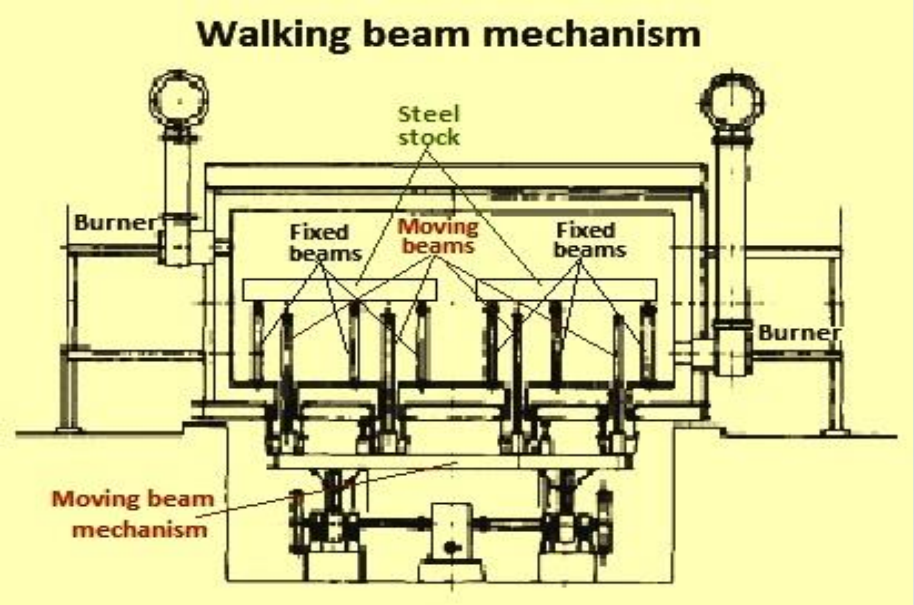
3. ROTARY HEARTH

It is used for heating round billets in pipe rolling mills and for heating short length blooms or billets in forging plants.



4. WALKING BEAM

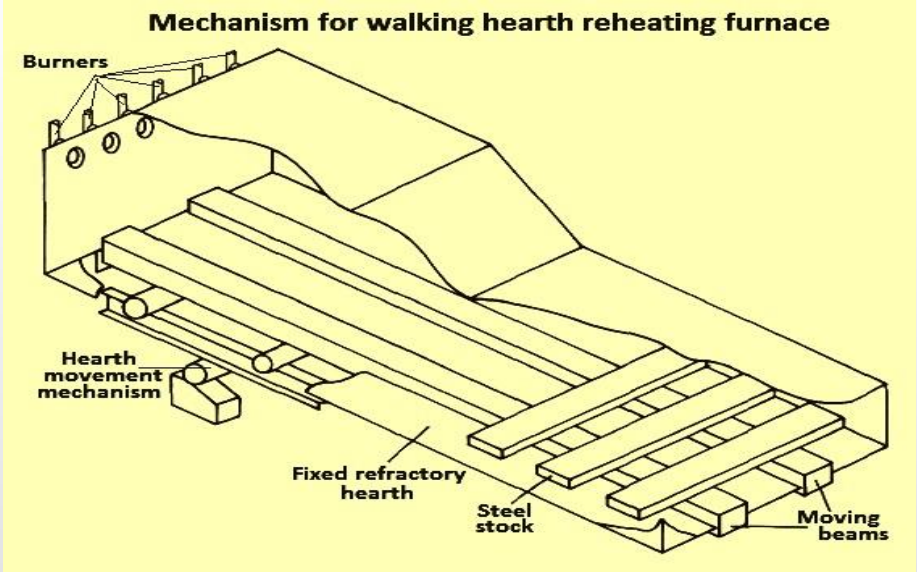
Walking beam furnaces are usually designed with end or side charging and discharging.



TYPES OF REHEATING FURNACES

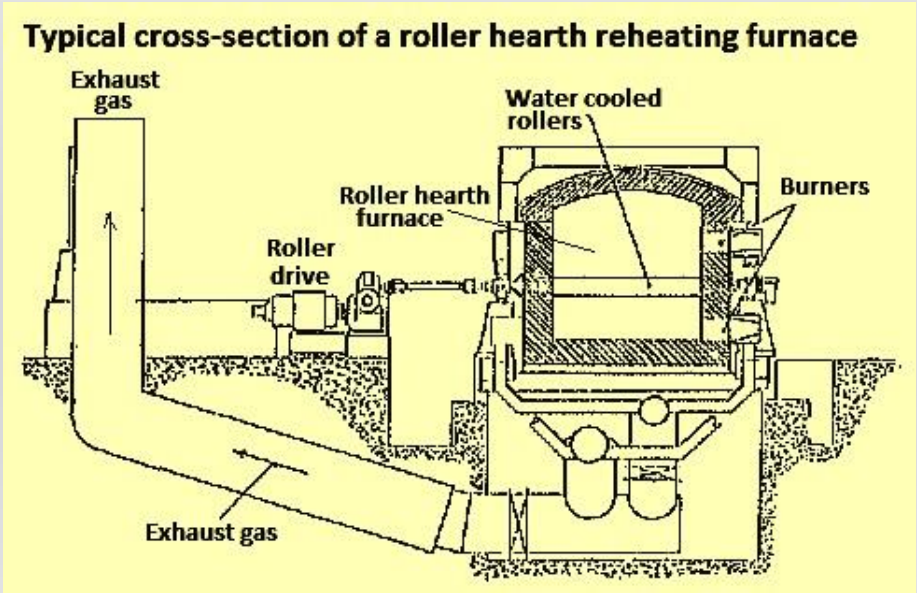
5. WALKING HEARTH

Similar to walking beam furnace, the difference lies in the method of conveyance in these two furnaces. The steel stock rests on the fixed refractory piers.



6. ROLLER HEARTH

Roller hearth furnaces are used to advantage when heating very long billet, bloom or slabs in the situation where it is not practical for heating in a pusher or walking beam furnace.



REHEATING FURNACES FOR ROLLING MILLS

BASIC REQUIREMENTS

- Heating metal (input) before plastic working (rolling)
- Uniform soaking in reasonable time at a minimum cost
- Minimum oxidation & surface damage of material
- Adequate furnace pressure to prevent cold air infiltration
- Increase life of Refractory materials & Furnace
- Consistent throughput with minimum waste gas temperature

TYPES OF ROLLING MILLS

Two High Mill :

Two Rolls placed one above the other and are rotated only in one direction.

Two High Reversing Mill :

Here the work can be passed back and forth through the Rolls by reversing their direction of rotation.

Three High Mill :

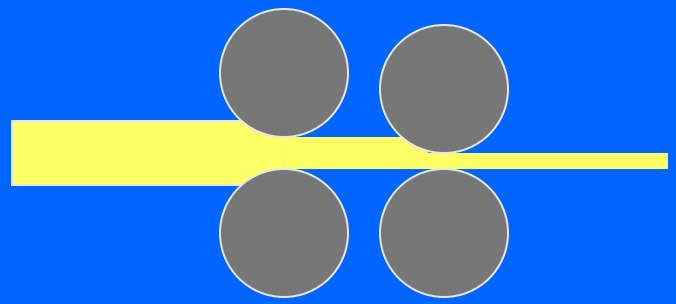
Three rolls are build one above the other and each rolls rotate in a direction opposite to each other.

Continuous Mill :

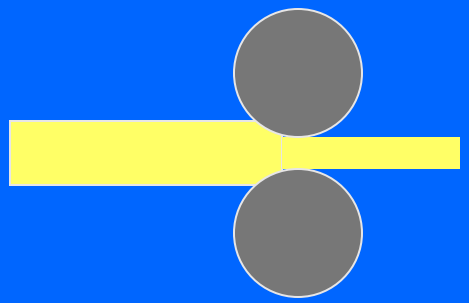
Here the bar is being rolled in two or more stands at any point of time.

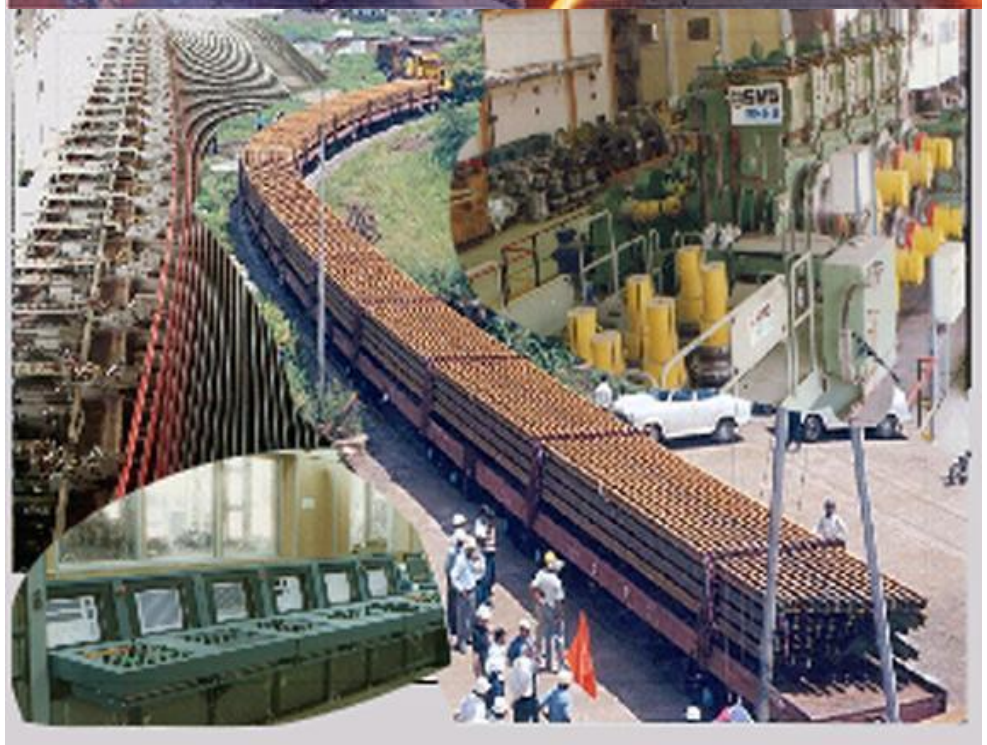
TYPES OF ROLLING MILLS

CONTINUOUS



NON-CONTINUOUS





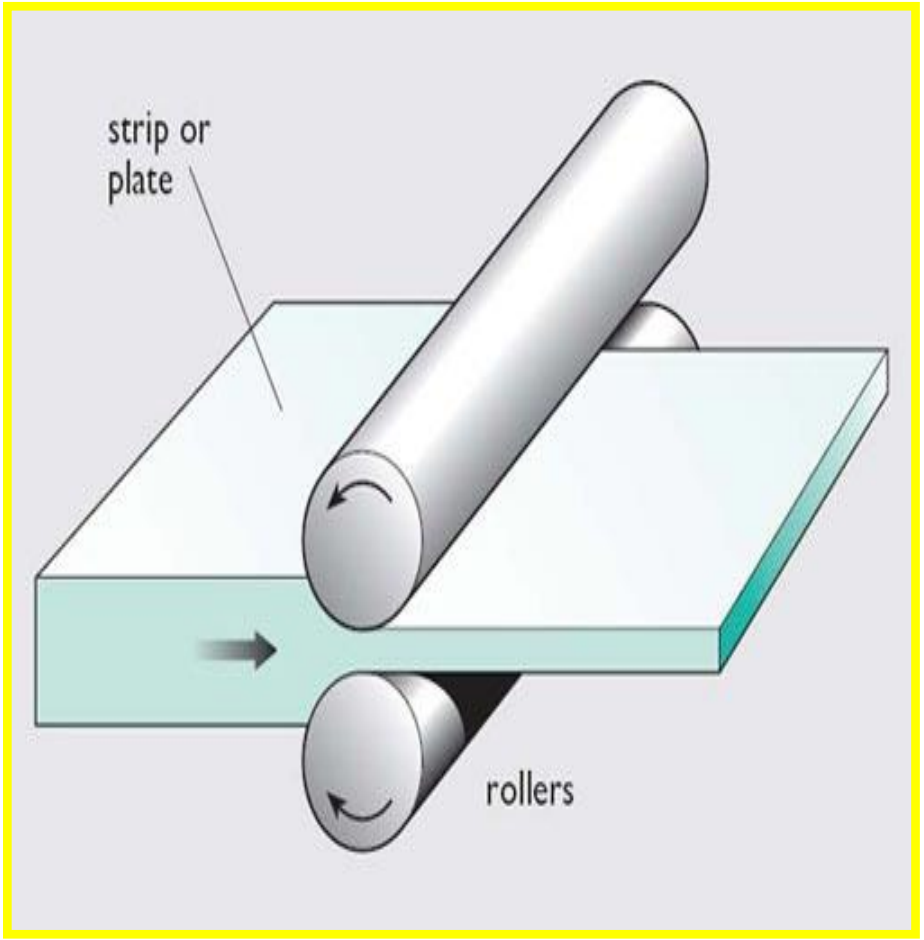
ROLLING BASICS

ROLLING BASICS

WHAT IS ROLLING ?

- Rolling is a metalworking process of plastically deforming input metal by passing through one or more pair of rolls to reduce its thickness or getting a desired shape.

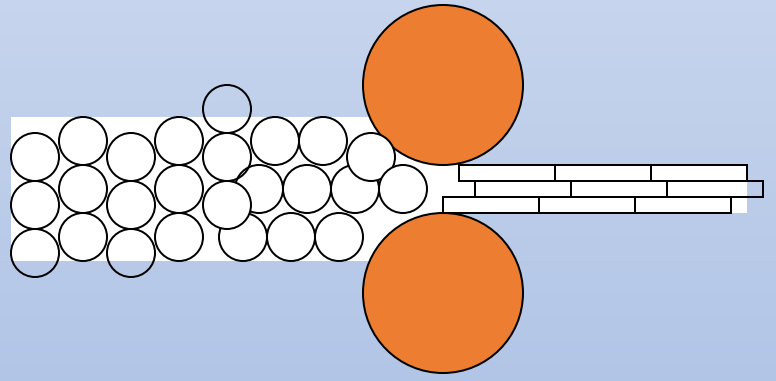
- A rolling mill basically consists of Rolls, Bearings, Guides, Strippers and Drives for applying power to the rolls and controlling their speed.



ROLLING BASICS

Rolling Terminology

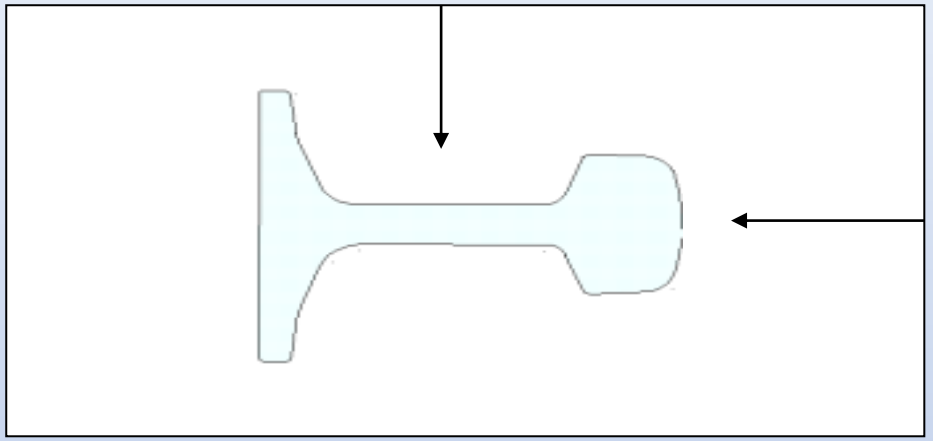
- Hot & Cold Rolling ?
- Recrystallisation Temperature ?



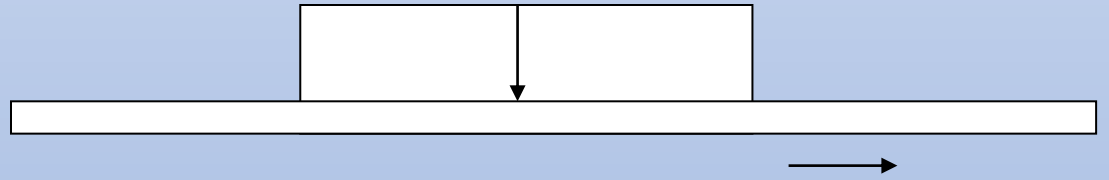
ROLLING BASICS

Rolling Terminology

LONG PRODUCTS



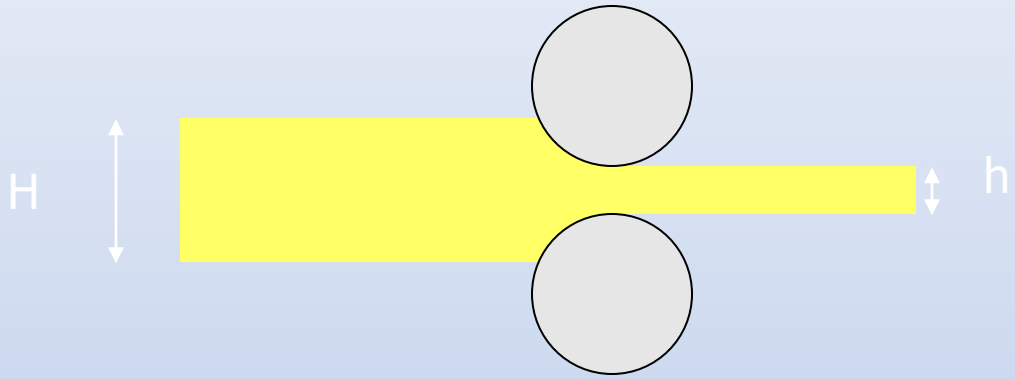
FLAT PRODUCTS



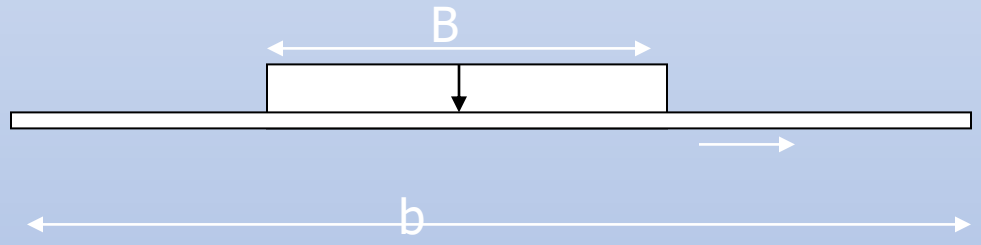
ROLLING BASICS

Rolling Terminology

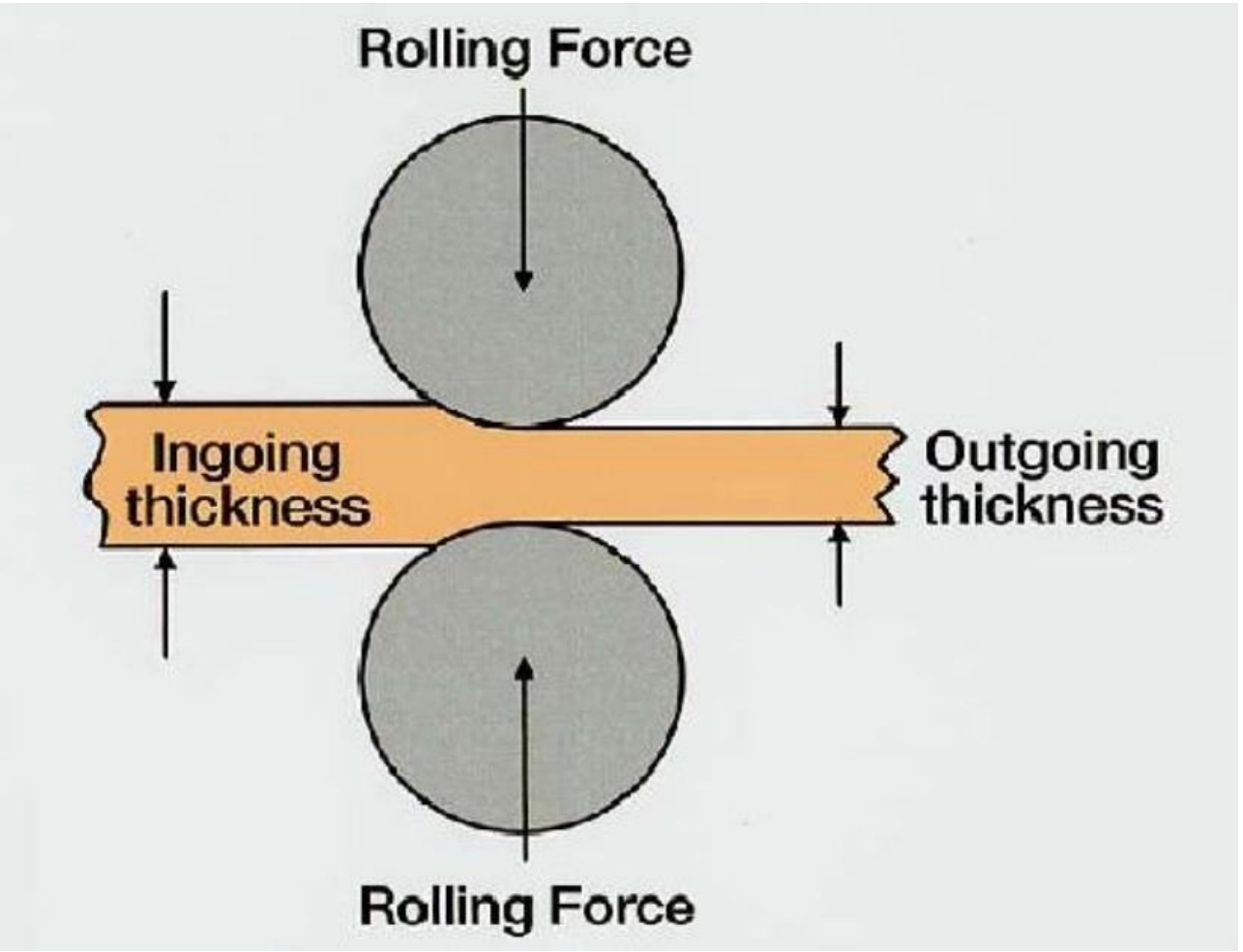
- Draft (H-h)

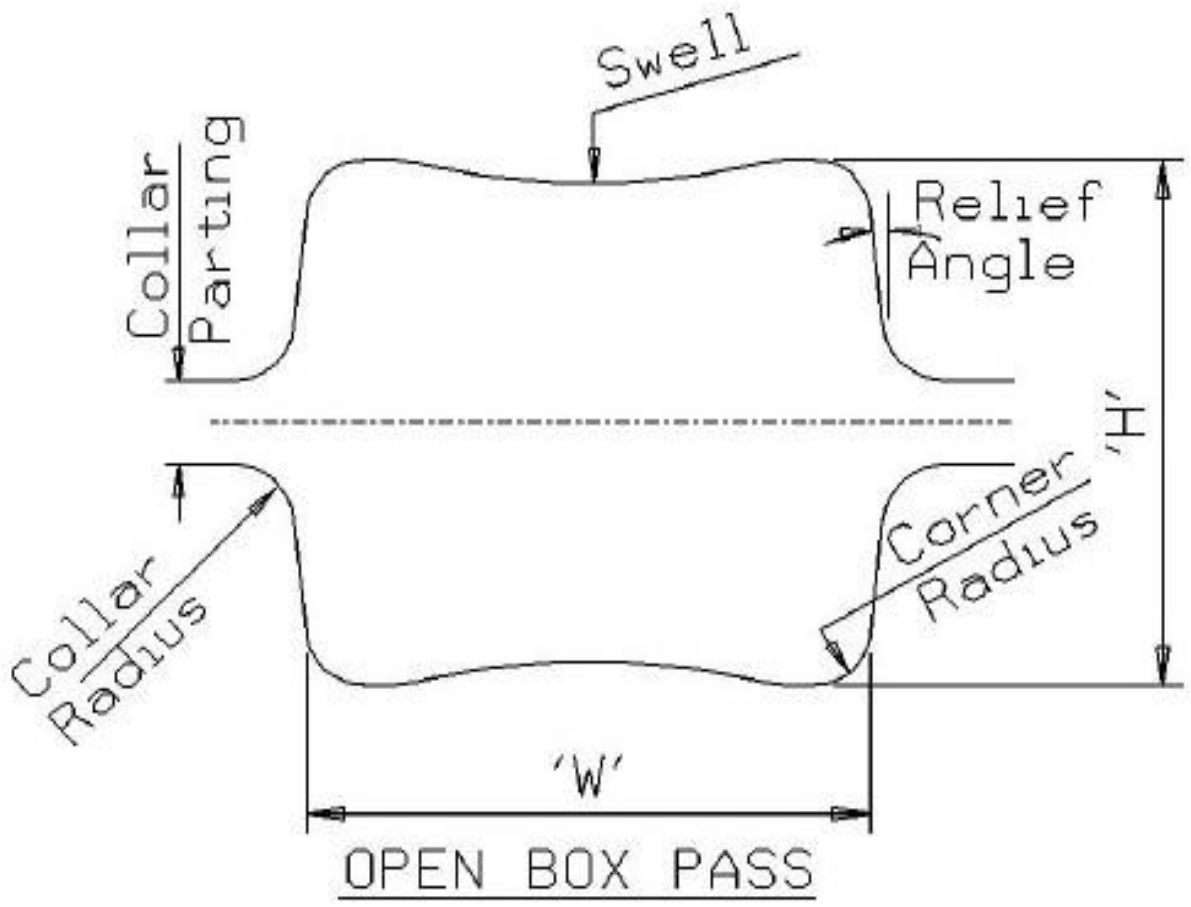


- Spread (b-B)



SECTION ROLLING





ROLLING BASICS

- Elongation = $(L_f - L_i)$
- Reduction = $(A_i - A_f)$
- Coefficient of Reduction = A_f / A_i
- Rolling Constant: $V_1 = V_2 = V_3$

QUALITY REQUIREMENTS

1. **CHEMICAL COMPOSITION:**
   Importance of segregation and free from inclusions.
2. **DIMENSIONS AND SHAPE OF PRODUCT:**
   Width, Thickness, Straightness & Flatness
3. **MECHANICAL PROPERTIES:**
   Yield, Tensile Strength, Elongation
4. **SURFACE PROPERTIES:**
   Absence of defects.
5. **MICROSTRUCTURE:**
   Grain size.

APPLICATION OF STRUCTURAL PRODUCTS

- General purpose reinforcement structures such as Building, Bridges / Dams
- Thermal / Hydel Power Plants
- High rise Buildings & Flyovers
- Underground Platforms in Metro Railways & Rapid Transport System
- Any Structural Constructions

MEDIUM STRUCTURAL MILL (MSM)

INTRODUCTION OF MSM

Medium Structural Mill (MSM) is a 2-Hi, continuous mill with state-of-the-art technology. It is designed to produce value-added long structural products like parallel flange beams, taper flange beams etc. which has better NSR compared to conventional medium structural.

This mill with universal rolling facilities is capable to produce universal beams along with conventional structural like channels, angles, rounded corner squares and rounds.

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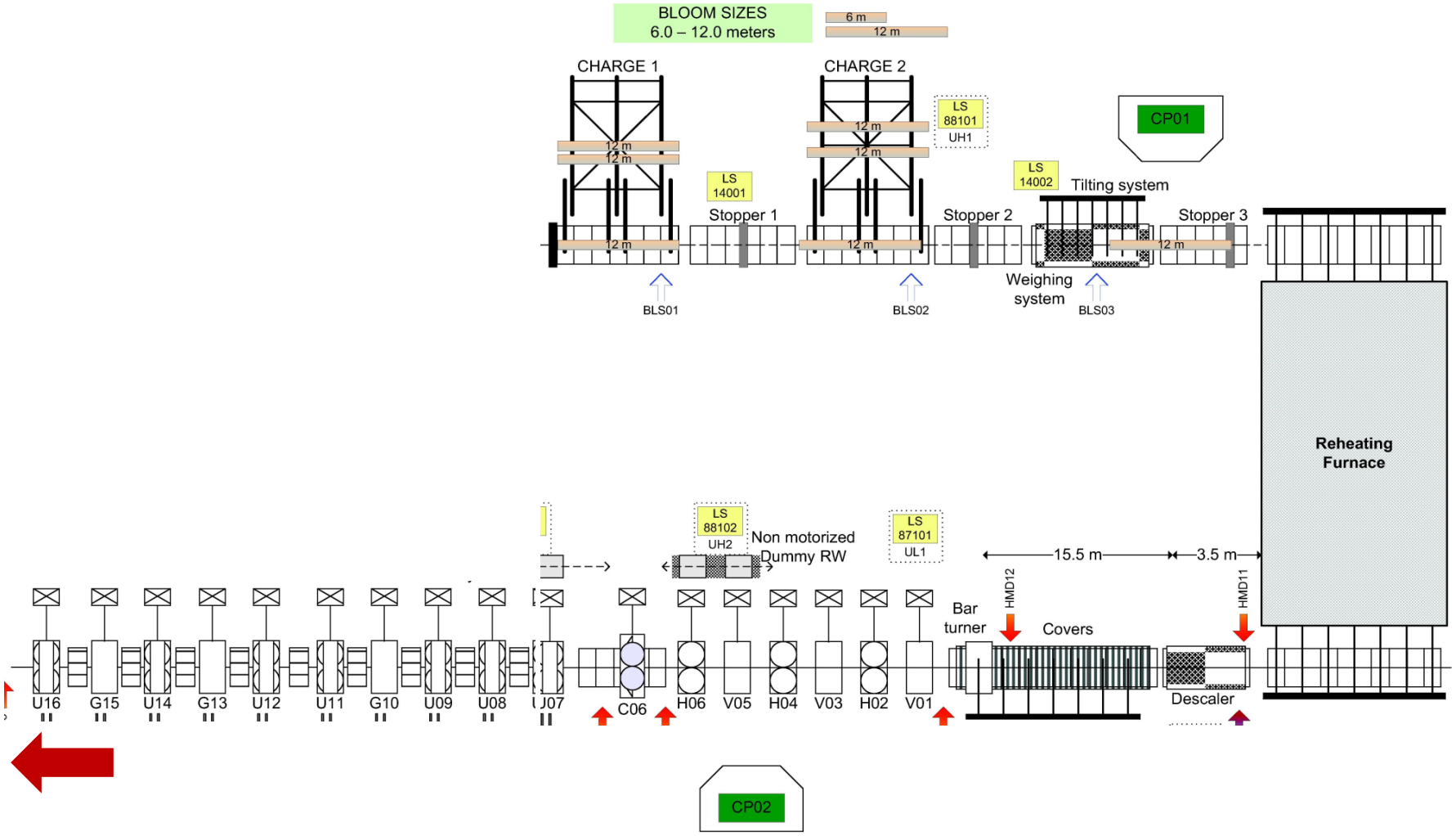
MAIN FEATURES OF MSM

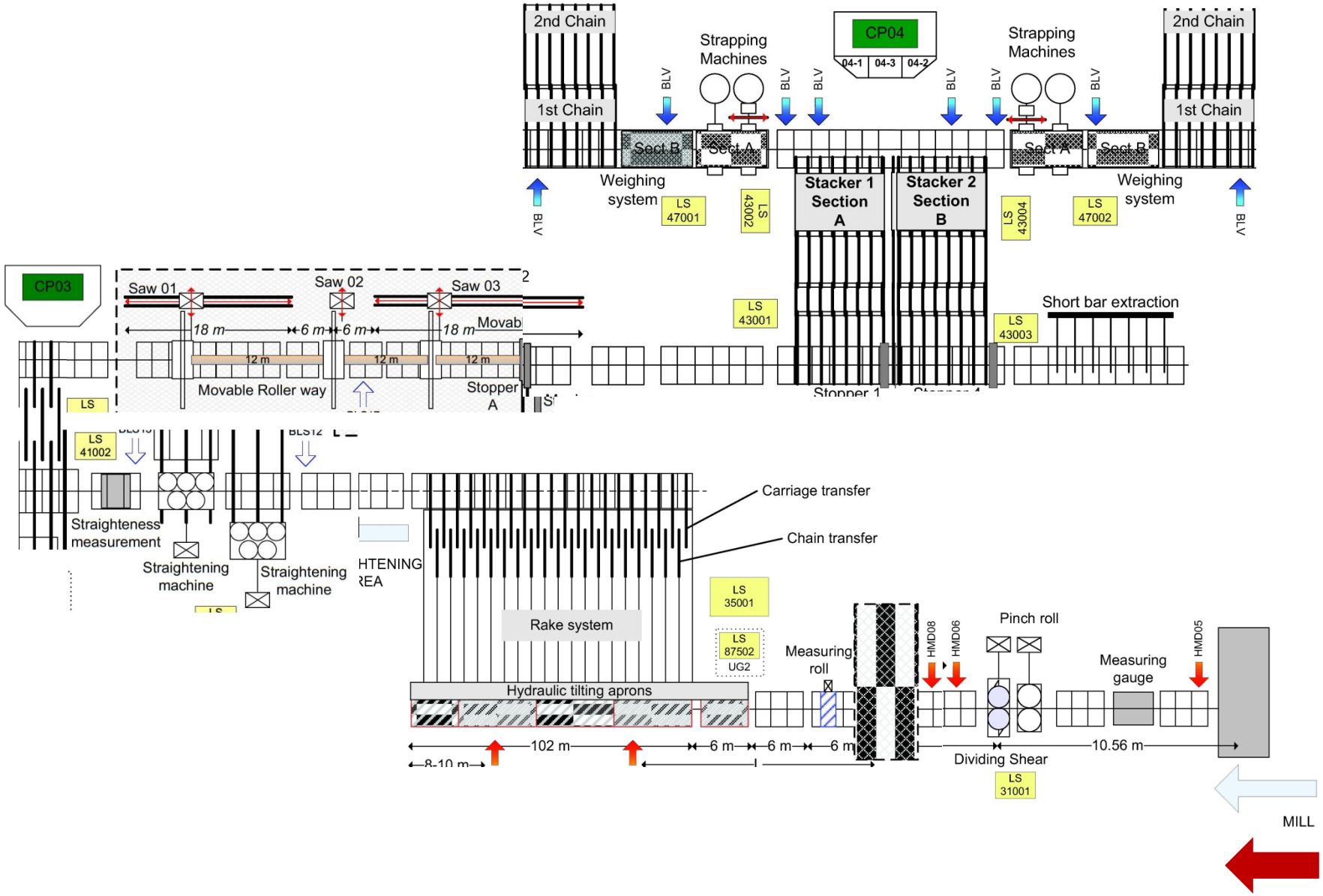
PARAMETER	DETAILS
Mill Capacity	1.0 MTPA
Furnace Capacity	220 TPH
Type Of Mill	Continuous Mill Train : 6 Nos. - Roughing Stand (H/V Combination), 10 Nos. - Finishing Stand (U/H, Convertible)
Mill Floor Level	+5.0 M
Input Bloom Sizes	CROSS SECTION: 350 mm X 240 mm , 300 mm X 150 mm LENGTH: 6 M, 8 M, 10 M & 12 M
Product Length	Primarily 12 M
Yield	Up to 96%
Mill Speed	Up to 7 M/s (Vary From Section to Section)
Output	- 62 Sections (Total 131 Sectional Variants) - Parallel Flange & Conventional Beams
Substitution Of Stands	Quick Change Device
Profile Measuring Gauge	In-line Non-contact Profile Measuring System

MAIN FEATURES OF MSM

SL.	PRODUCT	SIZE RANGE (MM)	ANNUAL PRODUCTION (TONNES)
1.	BEAMS :		4,20,000
	▪NARROW PARALLEL FLANGE BEAMS (NPB)	100 -300	
	▪WIDE PARALLEL FLANGE BEAMS (WPB)	100 - 160	
	▪TAPER FLANGE BEAMS (MB)	100 -300	
2.	CHANNELS	100 -300	2,00,000
3.	EQUAL ANGLES	90 -200	3,00,000
4.	RCS AND ROUNDS	60 – 120	80,000
	TOTAL 131 NOS. OF PRODUCTS	TOTAL	1,000,000

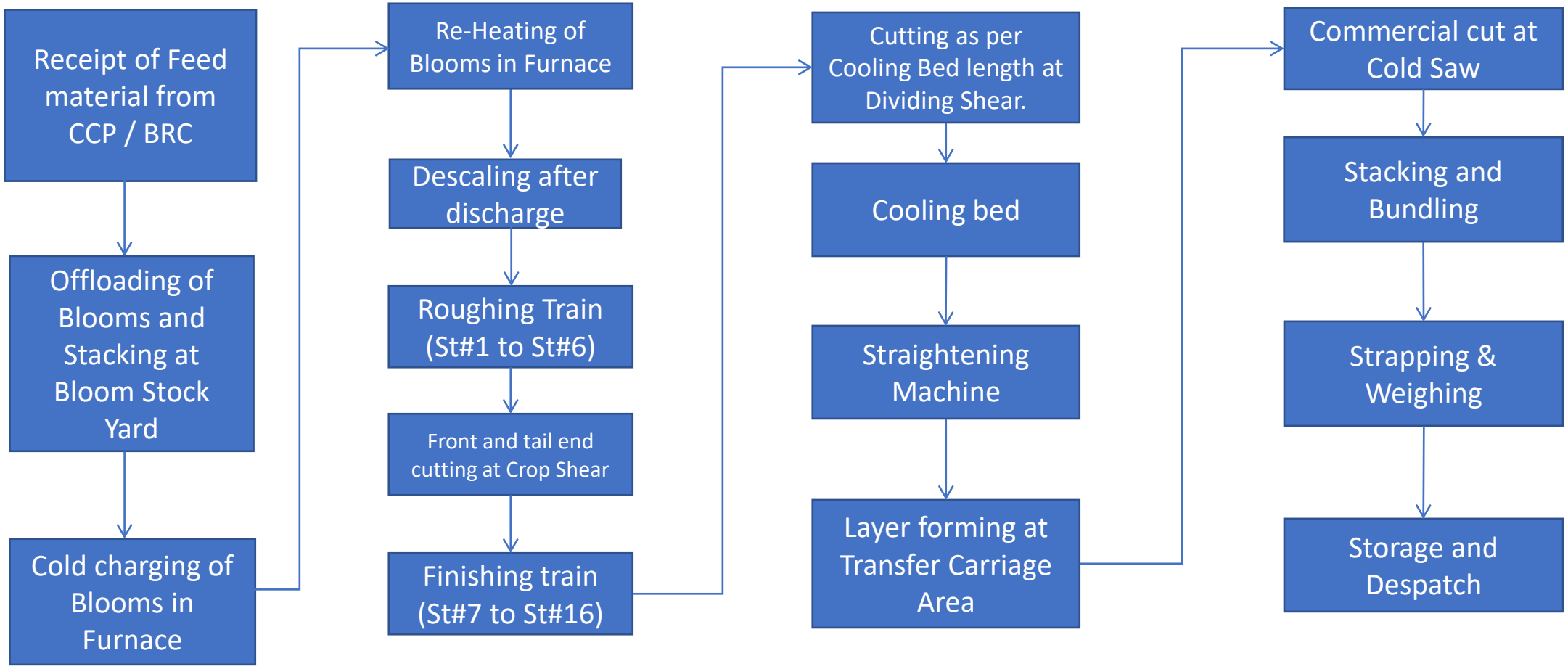
MILL LAYOUT


BLOOM SIZES
6.0 – 12.0 meters
6 m
12 m
CHARGE 1
CHARGE 2
LS 88101
UH1
CP01
LS 14001
LS 14002
Tilting system
Stopper 1
Stopper 2
Stopper 3
BLS01
BLS02
Weighing system
BLS03
Reheating Furnace
LS 88102
UH2
Non motorized Dummy RW
LS 87101
UL1
15.5 m
3.5 m
HMD12
HMD11
Bar turner
Covers
Descaler
U16
G15
U14
G13
U12
U11
G10
U09
U08
U07
C06
H06
V05
H04
V03
H02
V01
CP02



MILL LAYOUT (contd..)

PROCESS FLOW CHART : MSM



TECHNICAL PARAMETERS – REHEATING FURNACE

SL.	ITEM	DETAILS
1.	Furnace Capacity	220 T/HR
2.	Mill Floor Level	+ 5.00 M
3.	Furnace Type	Walking Beam
4.	Charging Temperature	20 ^{0}C
5.	Discharge Temperature	1100 – 1200 ^{0}C
6.	Fuel	Mixed Gas (BF + CO) OR (BF + CBM) OR (BF + LPG)
7.	Calorific Value Of Gas	2200 -2600 KCAL/NM^3
8.	Scale Loss	0.6% (Max.)
9.	Skin Temperature Max. (Wall And Hearth)	100 ^{0}C
10.	Instrumentation And Automation System	Level-2 with Provision For Level-3 Interface

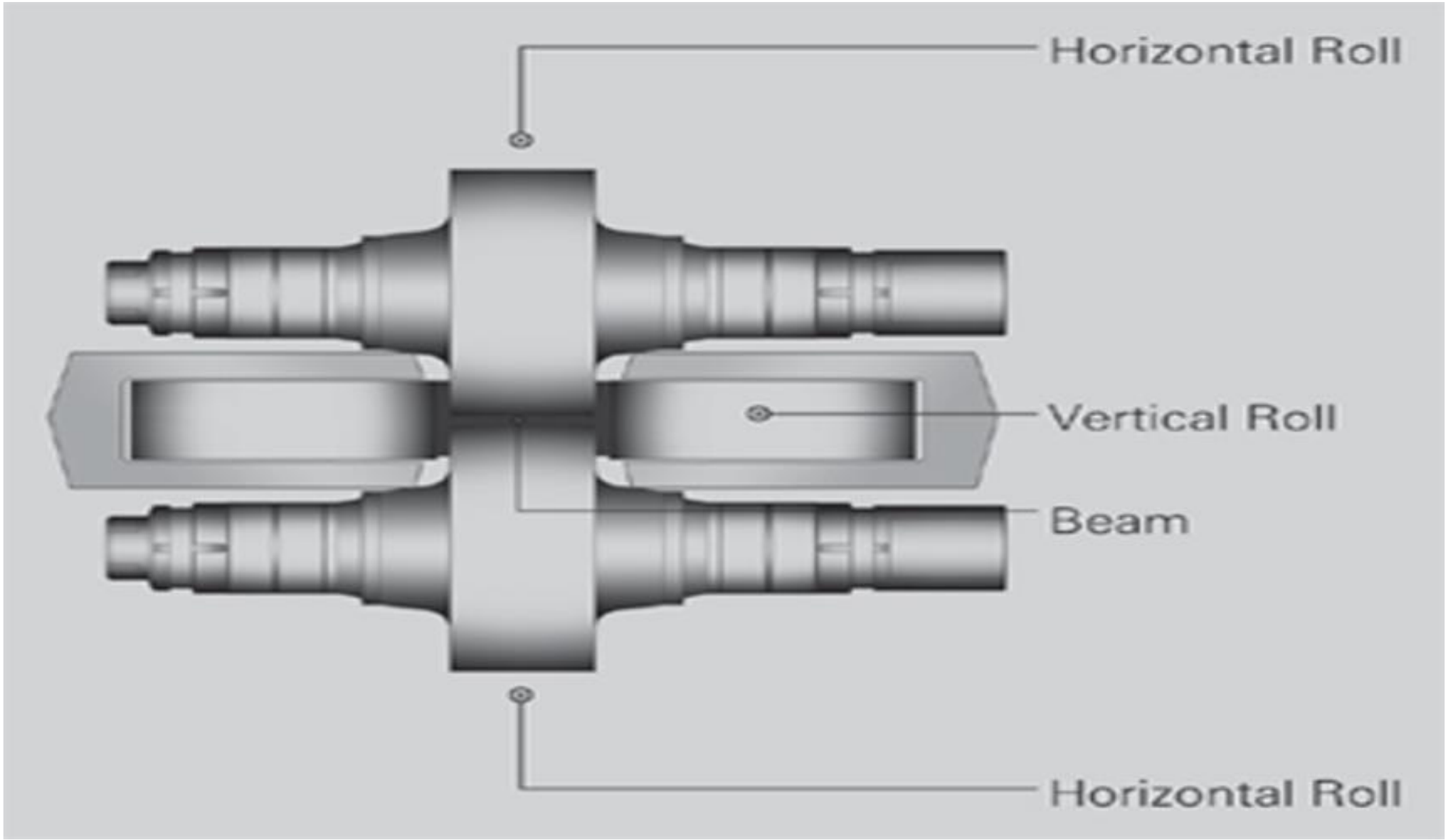
TECHNICAL PARAMETERS – REHEATING FURNACE (Contd.)

SL.	ITEM	DETAILS
11.	Mixed Gas Pressure At Top	700 -800 MM WC
12.	Nitrogen Pressure At Top	6-7 KG/CM^2
13.	Combustion System	Recuperative
14.	Burner Type	LOW NO_X BURNER (57 Nos.)
15.	Skids : 1. Main Furnace 2. Soak Zone	4 Nos. Fixed & 4 Nos. Moveable 5 Nos. of Fixed & 4 Nos. of Moveable
16.	Uniformity of Temperature in the Charge	Temperature Difference Between Hottest and Coldest Point of the Charge Less Than 20 ^0C
17.	Material Handling	Hydraulic System

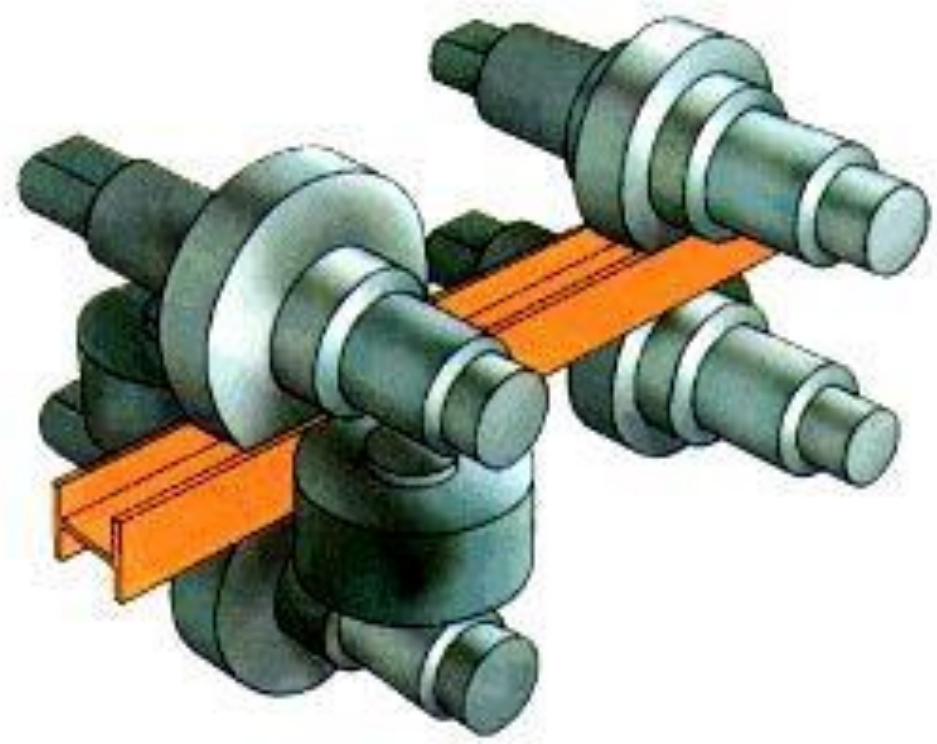
TECHNICAL PARAMETERS – MAIN MILL

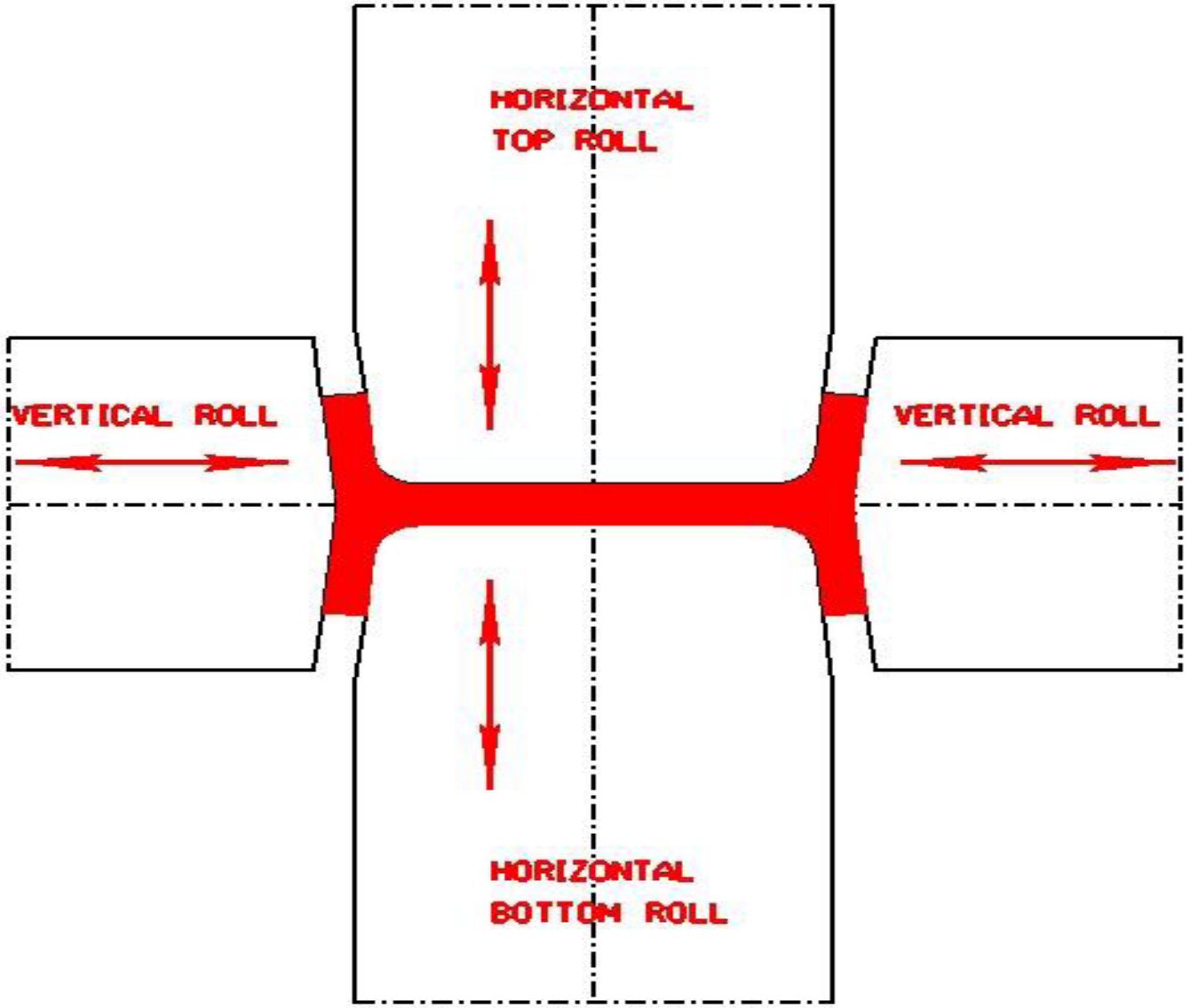
SL.	ITEM	DESCRIPTION
1.	De-scaler	High Pressure Water Type (23 MPA)
2.	Roughing Train	3 Horizontal And 3 Vertical
3.	Flying Crop Shear	Crank Type
4.	Finishing Train	7 Horizontal / Universal And 3 Convertible
5.	Dividing Shear	Flying Shear
6.	Sample Metallic Hot Saw	Pendulum Type
7.	Cooling Bed (Length x Width)	102 M x 17.5 M
8.	Straightening Machine	2 Nos., Cantilever Type, Top & Bottom Driven
9.	Disk Saw	3 Nos. Disk -Metallic Type (For Cutting into Commercial Length)
10.	Bar Stacker And Bundler (Length / Weight)	12 M / 3 To 6 Tonnes
11.	Strapping Machine	4 Nos.

UNIVERSAL SECTION ROLLING

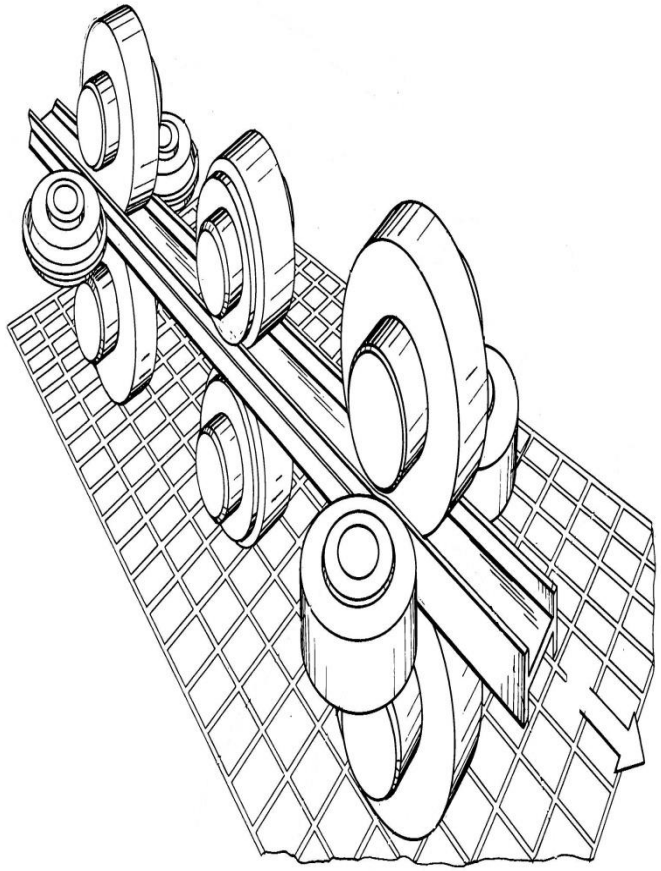


UNIVERSAL SECTION ROLLING





MAIN FEATURES OF MSM

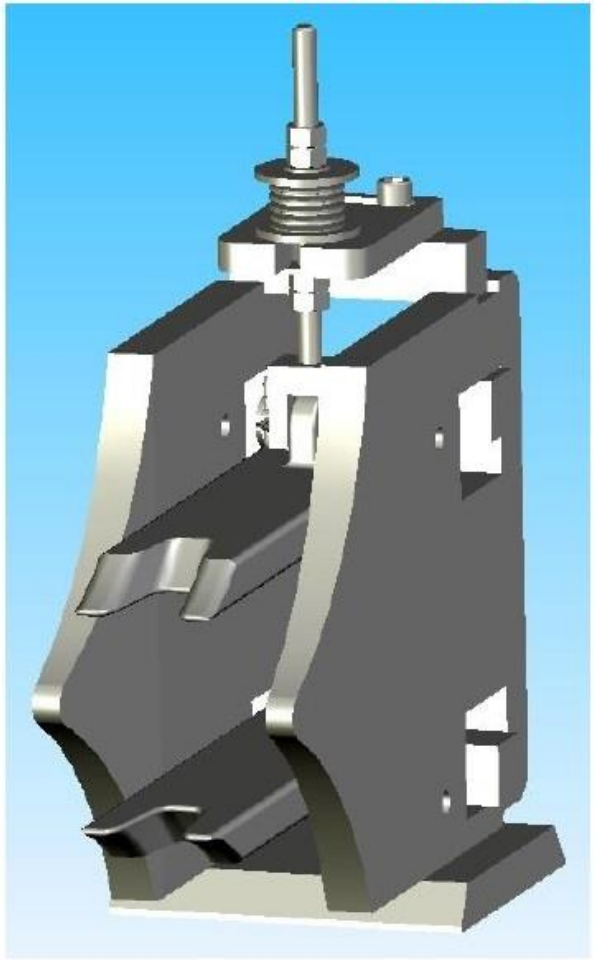


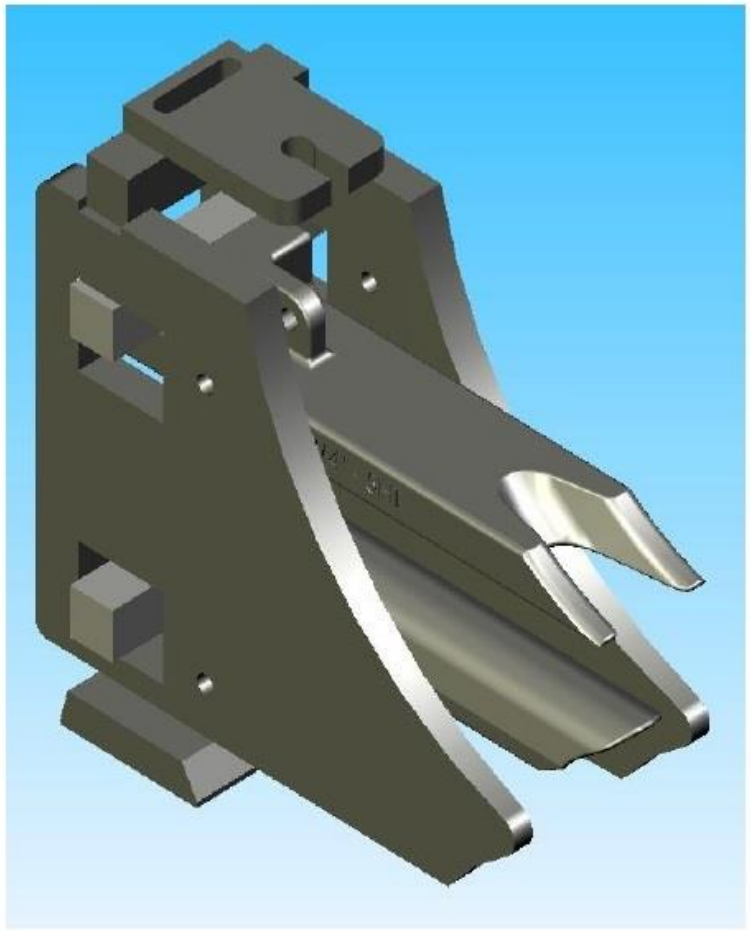
Schematic of Parallel Flange Beam rolling in Universal Mill

Universal Mill Stand

MAIN FEATURES OF MSM

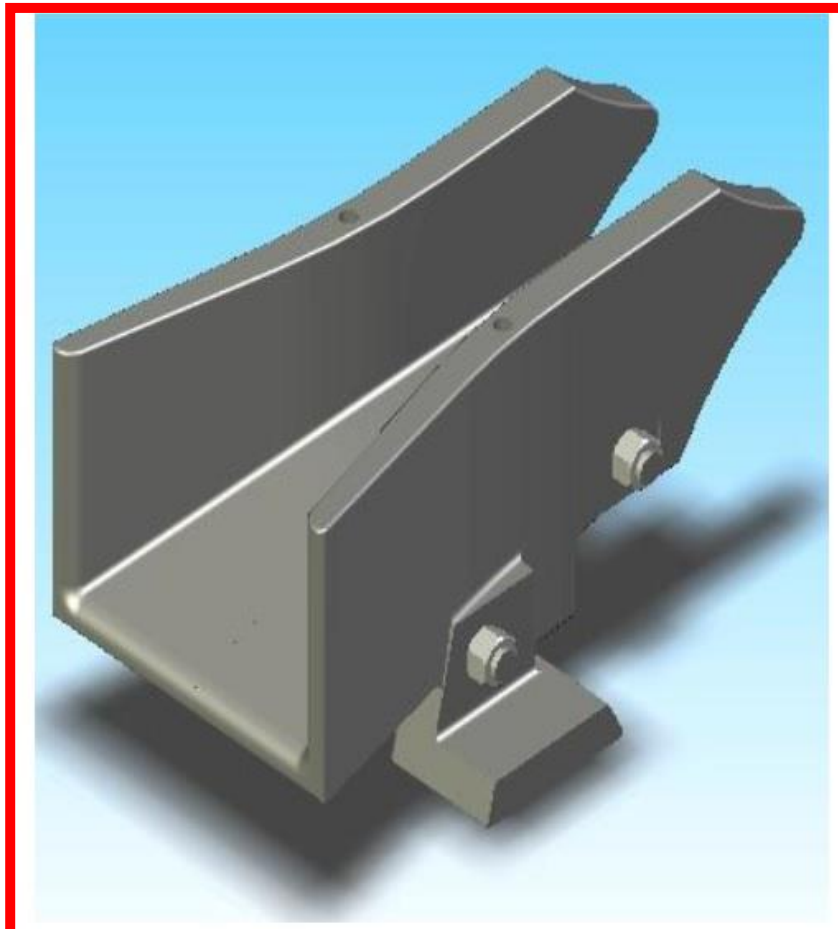
TYPICAL GUIDE LAYOUT FOR 2-HIGH STANDS



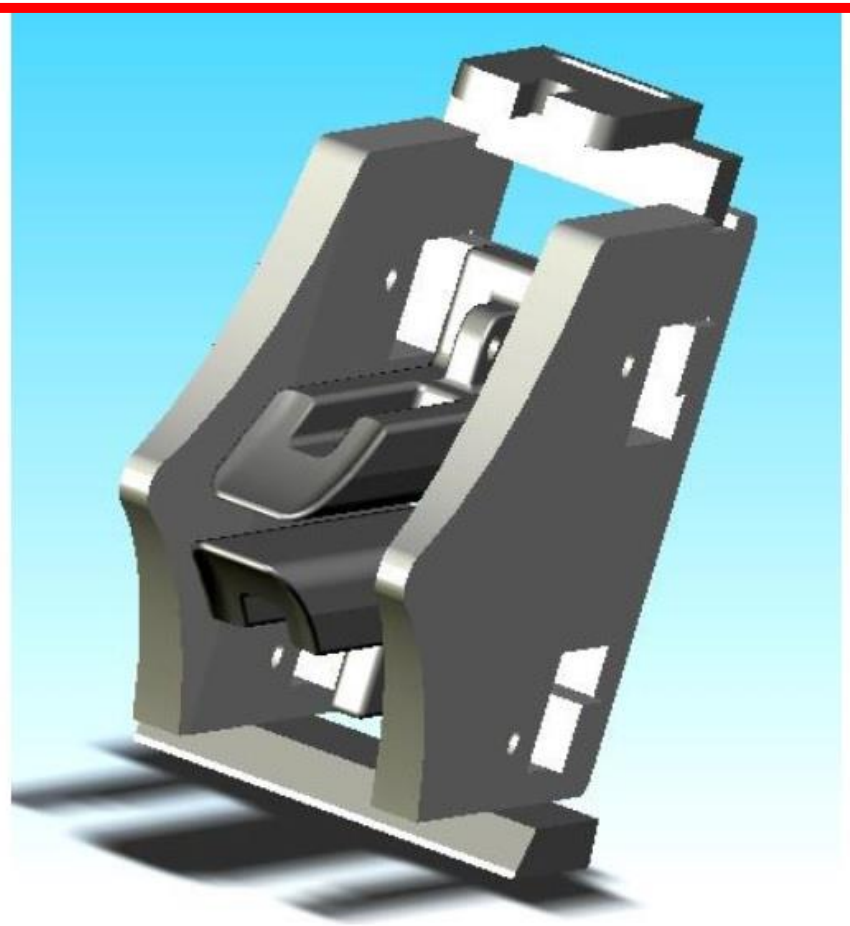


Roller Guide

MAIN FEATURES OF MSM



Entry



Delivery

Entry and Delivery Guide

CRITICAL EQUIPMENTS AND MACHINES FOR ROLLING

- Rolling Stands
- Tilters, manipulators, repeaters
- Chain transfer / Rope Transfer
- Roller tables
- Motors
- Rotating mechanisms
- Hot Saw / Cold saws or Flying shear
- Cooling beds and Transfer Mechanism
- Cranes
- Straighteners

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FURNACE CHARGING

REHEATING FURNACE

FURNACE DELIVERY

ROUGHING TRAIN

FINISHING TRAIN

COOLING BED

STRAIGHTENER

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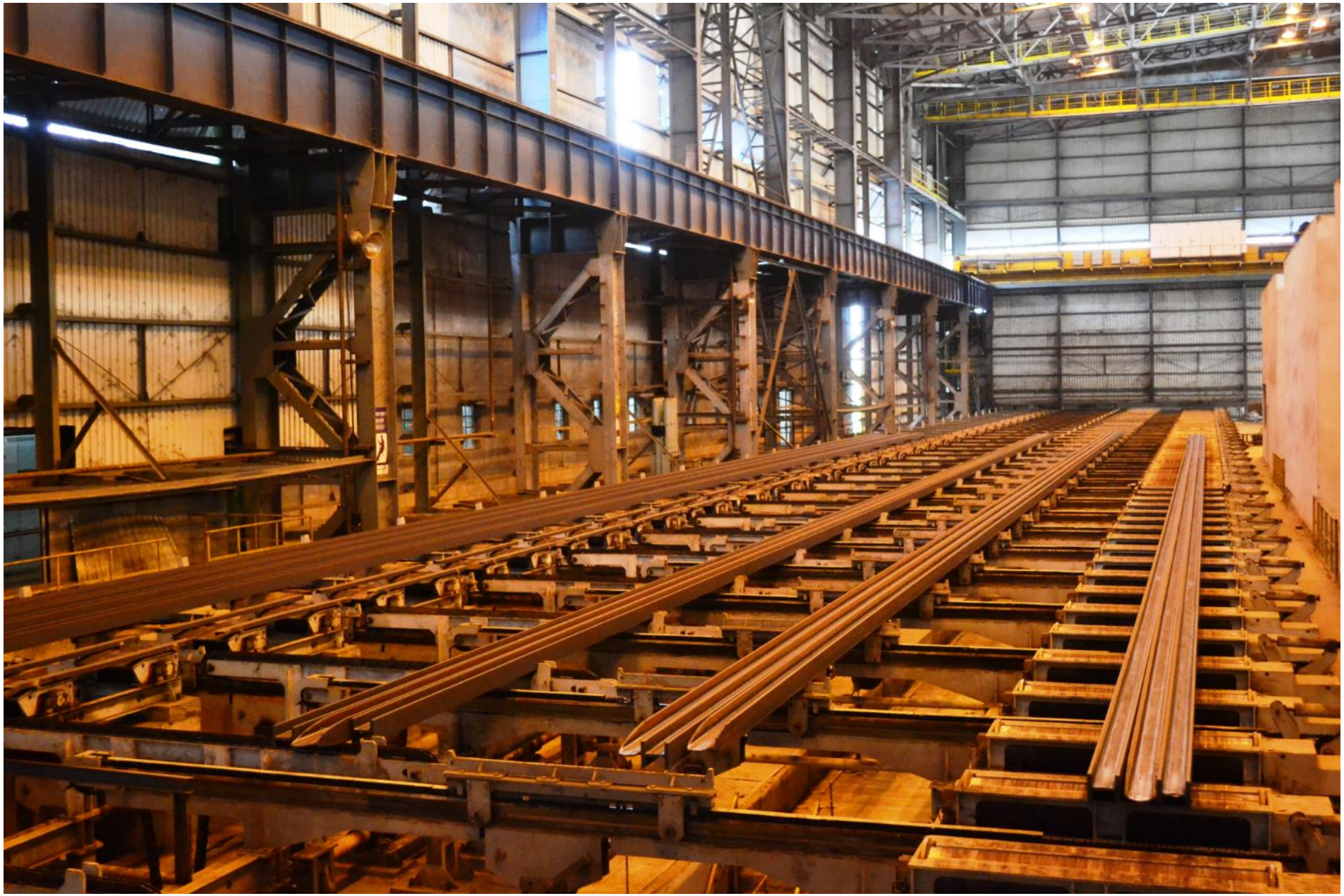
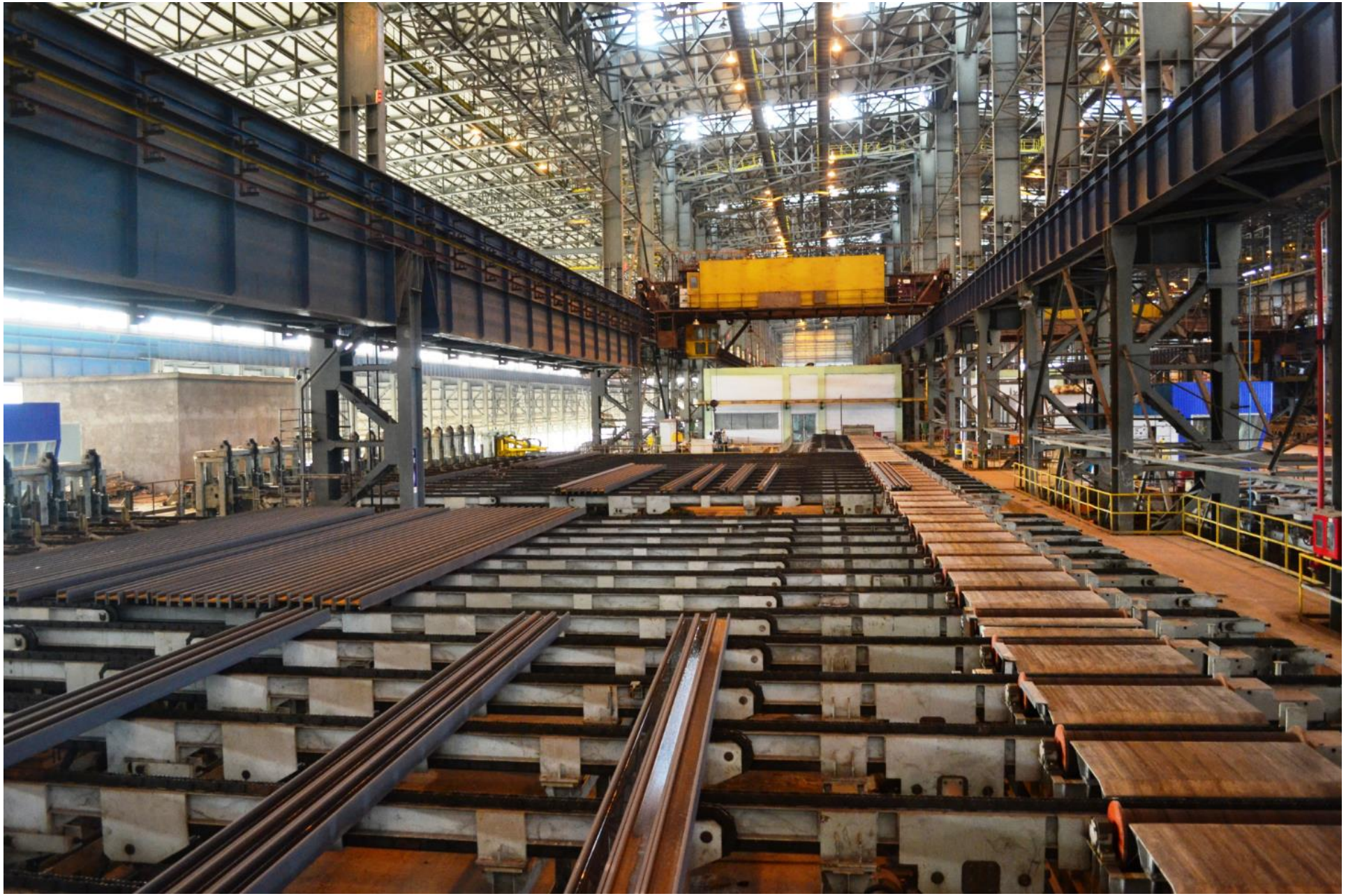


TRANSFER CARRIAGE

BAR CUTTING



BAR STACKING

STRAPPING


MADE IN INDIA
स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
दुर्गापुर इस्पात संयंत्र
DURGAPUR STEEL PLANT
CHANNEL
Batch Number
DCH0106284-10
Heat No
24311582
CM/L-0057635
Dimension (mm)
100X50X5
Length (mm)
12000
Grade
IS2062 E250BR
Weight (MT)
4.6 Aprox
Product Description
CHANNEL IS2062 E250BR 100*50*5
HSN
72163100
Manufactured at
Medium Structural Mill
* Invoice Wt is final


MADE IN INDIA
स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
दुर्गापुर इस्पात संयंत्र
DURGAPUR STEEL PLANT
CHANNEL
Batch Number
DCH0106284-11
Heat No
24311582
Length (mm)
12000
Dimension (mm)
100X50X5
Weight (MT)
4.6 Aprox
Grade
IS2062 E250BR
Product Description
CHANNEL IS2062 E250BR 100*50*5
HSN
72163100
Manufactured at
Medium Structural Mill
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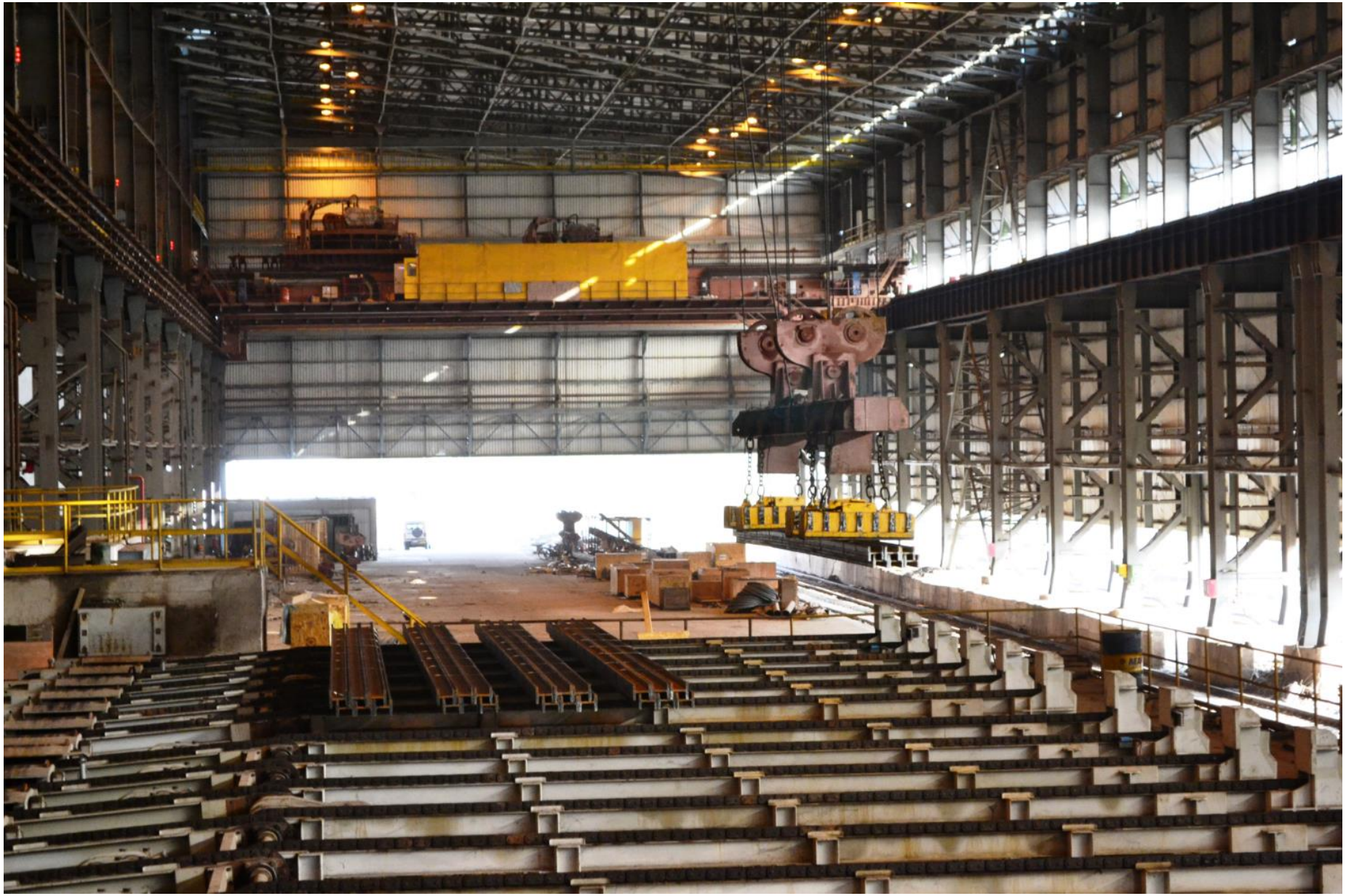
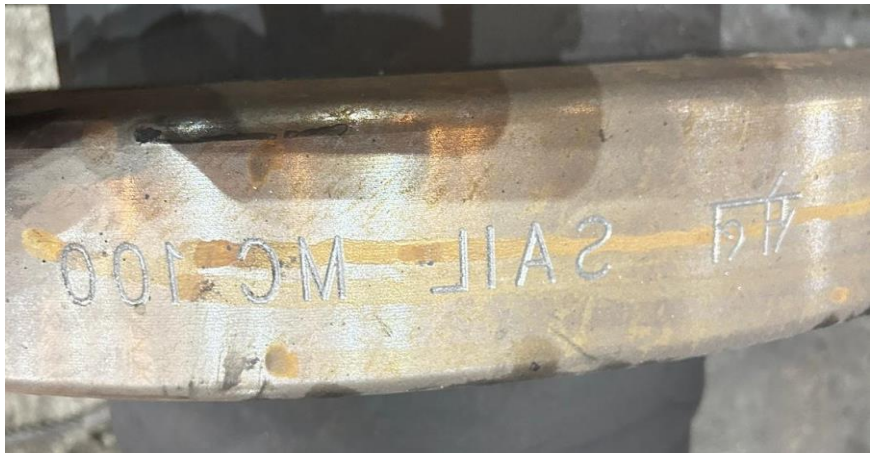
LABELLING



PRODUCT DISCHARGE

सेल SAIL

MC100 ROLL



NPB200 ROLL

ENGRAVING ON ROLLS THROUGH CNC MACHINE

सेल SAIL

MC125

MC100

BRANDING OF ROLLED PRODUCTS OF MSM

TABLE 1 - DURGAPUR MEDIUM STRUCTURAL MILL - DETAILED PRODUCT MIX

NARROW PARALLEL FLANGE BEAMS (IS: 12778-2004)

#	Type	Dimension mm.	L/W kg/m	Section mm2
1	NPB	100x55x	8.10	1032
2	NPB	120x60x	10.37	1321
3	NPB	140x70x	12.89	1642
4	NPB	160x80x	15.77	2009
5	NPB	180x90x	15.37	1958
6	NPB	180x90x	18.80	2395
7	NPB	180x90x	21.27	2710
8	NPB	200x100x	18.42	2346
9	NPB	200x100x	22.36	2848
10	NPB	200x100x	25.09	3196
11	NPB	200x130x	27.37	3487
12	NPB	200x130x	31.55	4019
13	NPB	200x150x	30.45	3879
14	NPB	200x165x	35.68	4545
15	NPB	200x165x	42.47	5410
16	NPB	200x165x	48.00	6115
17	NPB	220x110x	22.18	2825
18	NPB	220x110x	26.20	3338
19	NPB	220x110x	29.35	3739
20	NPB	240x120x	26.15	3331
21	NPB	240x120x	30.71	3912
22	NPB	240x120x	34.31	4371
23	NPB	250x125x	30.11	3836
24	NPB	250x150x	34.08	4341
25	NPB	250x150x	39.78	5068
26	NPB	250x150x	46.48	5921
27	NPB	250x175x	43.94	5597
28	NPB	270x135x	30.73	3915
29	NPB	270x135x	36.07	4595
30	NPB	270x135x	42.26	5383
31	NPB	300x150x	36.52	4652
32	NPB	300x150x	42.24	5381
33	NPB	300x150x	49.32	6283
34	NPB	300x165x	39.88	5080
35	NPB	300x165x	45.76	5829
36	NPB	300x165x	53.46	6810
37	NPB	300x200x	59.56	7587
38	NPB	300x200x	66.75	8503
39	NPB	300x200x	75.37	9601

WIDE PARALLEL FLANGE BEAMS (IS: 12778-2004 & ASTM A6)

#	Type	Dimension mm.	L/W kg/m	Section mm2
40	WPB	100x100x	12.24	1559
41	WPB	100x100x	16.67	2124
42	WPB	100x100x	20.44	2604
43	WPB	100x100x	41.79	5324
44	WPB	120x120x	14.56	1855
45	WPB	120x120x	19.89	2534
46	WPB	120x120x	26.69	3400
47	WPB	120x120x	52.13	6641
48	WPB	140x140x	18.07	2302
49	WPB	140x140x	24.66	3141
50	WPB	140x140x	33.72	4296
51	WPB	140x140x	63.24	8056
52	WPB	150x150x	22.96	2925
53	WPB	150x150x	30.04	3827
54	WPB	150x150x	36.98	4711
55	WPB	160x160x	23.83	3036
56	WPB	160x160x	30.44	3878
57	WPB	160x160x	42.59	5425
58	WPB	160x160x	76.19	9706
59	W	100 x 19,3	19.3	2470
60	W	130 x 23,8	23.8	3040
61	W	130 x 28,1	28.1	3590
62	W	150 x 13,0	13.0	1630
63	W	150 x 13,5	13.5	1730
64	W	150 x 18	18.0	2290
65	W	150 x 24	24.0	3060
66	W	150 x 22,5	22.5	2860
67	W	150 x 29,8	29.8	3790
68	W	150 x 37,1	37.1	4740

TAPER FLANGE BEAMS (IS: 808-1989)

#	Type	Dimension mm.	L/W kg/m	Section mm2
69	MB	100	8.9	1140
70	MB	125	13.3	1700
71	MB	150	15.0	1910
72	MB	175	19.6	2500
73	MB	200	24.2	3080
74	MB	225	31.1	3970
75	MB	250	37.3	4750
76	MB	300	46.0	5860

CHANNELS (IS: 808-1989)

#	Type	Dimension mm.	L/W kg/m	Section mm2
77	MC	100	9.6	1220
78	MC	125	13.1	1670
79	MC	125	13.7	1750
80	MC	150	16.8	2130
81	MC	150	17.7	2260
82	MC	175	19.6	2490
83	MC	175	22.7	2760
84	MC	200	22.3	2850
85	MC	200	24.3	3100
86	MC	225	26.1	3330
87	MC	225	30.7	3900
88	MC	250	30.6	3900
89	MC	250	34.2	4350
90	MC	250	38.1	4850
91	MC	300	36.3	4630
92	MC	300	41.5	5280
93	MC	300	46.2	5880

EQUAL ANGLES (IS: 808-1989)

#	Type	Dimension mm.	L/W kg/m	Section mm2
94	A	90X6	8.2	1050
95	A	90X8	10.8	1380
96	A	90X10	13.4	1700
97	A	90X12	15.8	2020
98	A	100X6	9.2	1170
99	A	100X8	12.1	1540
100	A	100X10	14.9	1900
101	A	100X12	17.7	2260
102	A	110X8	13.4	1710
103	A	110X10	16.6	2110
104	A	110X12	19.7	2510
105	A	110X16	25.7	3280
106	A	130X8	15.9	2030
107	A	130X10	19.7	2510
108	A	130X12	23.5	2990
109	A	130X16	30.7	3920
110	A	150X10	22.9	2920
111	A	150X12	27.3	3480
112	A	150X16	35.8	4560
113	A	150X20	44.1	5620
114	A	200X12	36.8	4690
115	A	200x16	48.5	6180
116	A	200X20	60.0	7640
117	A	200X25	73.9	9410

ROUNDS (IS: 1732)

#	Type	Dimension mm.	L/W kg/m	Section mm2
118	R	60	22.2	2827
119	R	65	26.0	3318
120	R	70	30.2	3848
121	R	75	34.7	4418
122	R	80	39.5	5027
123	R	90	49.9	6362
124	R	100	61.7	7854
125	R	110	74.6	9503
126	R	120	88.8	11310

RCS (IS: 1732)

#	Type	Dimension mm.	L/W kg/m	Section mm2
127	RCS	60	28.3	3600
128	RCS	70	38.5	4900
129	RCS	80	50.2	6400
130	RCS	100	78.5	10000
131	RCS	120	113.0	14400

STABILIZED & REGULAR PRODUCTS MIX OF MSM (till Feb'25)

SL. NO.	PRODUCTION TYPE	TYPE	DIMENSION (MM)	VARIANTS CHANNELS & BEAMS - LINEAR WEIGHT (KG/M) ANGLES - LEG THICKNESS (MM)	SECTION COUNT (31)
1	NARROW PARALLEL FLANGE BEAM	NPB	100x55	8.1	1
2	NARROW PARALLEL FLANGE BEAM	NPB	200x100	18.42, 22.36, 25.09	3
3	NARROW PARALLEL FLANGE BEAM	NPB	250x125	30.11	1
4	WIDE PARALLEL FLANGE BEAM	WPB	160x160	23.83, 30.44, 42.59, 76.16	4
5	TAPER FLANGE BEAM	MB	100x50	8.9	1
6	TAPER FLANGE BEAM	MB	150x75	15.0	1
7	TAPER FLANGE BEAM	MB	250x125	37.3	1
8	TAPER FLANGE BEAM	MB	300x140	46.0	1
9	CHANNEL	MC	100x50	9.6	1
10	CHANNEL	MC	125x65	13.1, 13.7	2
11	CHANNEL	MC	150x75	16.8, 17.7	2
12	CHANNEL	MC	200x75	22.3, 24.3	2
13	CHANNEL	MC	300x75	36.3, 41.5, 46.2	3
14	EQUAL ANGLE	A	90x90	6, 8, 10, 12	4
15	EQUAL ANGLE	A	100x100	6, 8, 10, 12	4

DEVELOPMENT OF NEW SECTIONS

	SECTION ACHIEVED	STABILIZED ON
	ANGLE	
1.	Angle-90 (90 X 8)	09.01.2017
	Angle-90 (90 X 6)	14.04.2017
	Angle-100 (100 X 8)	27.04.2019
	Angle-100 (100 X 10)	18.04.2019
	Angle-100 (100 X 12)	26.04.2019
	NARROW PARALLEL BEAM	
2.	NPB-100 (100 X 55 X 4.1)	12.01.2016
	NPB-250 (250 X 125 X 6)	27.11.2017
	NPB-200 (200 X 100 X 25.09)	02.08.2018
	NPB-200 (200 X 100 X 22.36)	06.08.2018
	MEDIUM BEAMS	
3.	MB-100 (100 X 50 X 4.7)	25.03.2016
	MB-150 (150 X 75 X 5)	21.08.2017
	MB-250 (250 X 125 X 6.9)	17.02.2018
	MB-300 (300 X 140 X 7.7)	28.09.2018
	WIDE PARALLEL BEAMS	
4.	WPB-160 (76.19 Kg/m)	13.04.2016
	WPB-160 (42.59 Kg/m)	17.05.2017
	WPB-160 (30.44 Kg/m)	18.05.2017
	WPB-160 (23.83 Kg/m)	19.05.2017
	MEDIUM CHANNELS	
5.	MC-100 (100 X 50)	04.02.2016
	MC-125 (125 X 65)	10.07.2019
	MC-150 (150 X 75)	21.09.2019
	MC-300 (300 X 90)	19.08.2022
	MC-200 (200 X 75)	17.11.2022

REGULAR PRODUCTS MIX OF SECTION MILL

SL. NO.	PRODUCTION TYPE	DIMENSION (MM)
1	CHANNEL	150x75
2	CHANNEL	200x75
3	BEAM	200x100
4	EQUAL ANGLE	110x110
5	EQUAL ANGLE	130x130

REGULAR PRODUCTS MIX OF MERCHANT MILL

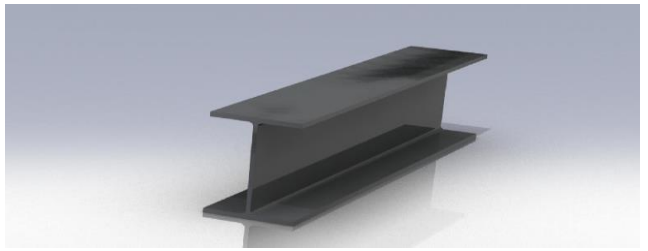
SL. NO.	PRODUCTION TYPE	DIMENSION (MM)
1	TMT BAR	20
2	TMT BAR	25

ADVANTAGES OF UNIVERSAL MILL

- New MSM with universal rolling facility can produce parallel flange beams and along with conventional structural like channel, angle, rounded corner square (RCS) and rounds.
- Optimum setting of roll gap upon changing rolling programme.
- Ability to easily compensate the varying lateral spread and shrinkage behavior of different steel grades.
- Better dimensional control and surface finish.
- Pre-setting system of the mill stands.
- Parallel flange beams can be rolled.
- Beams of wider flange and thinner webs can be rolled.
- Wide range of product mix possible.

MSM PRODUCT IMAGES

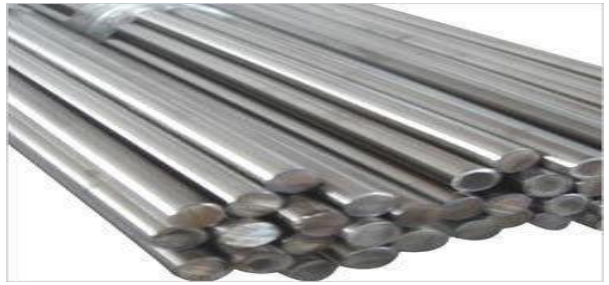
Tapered Flange Beams



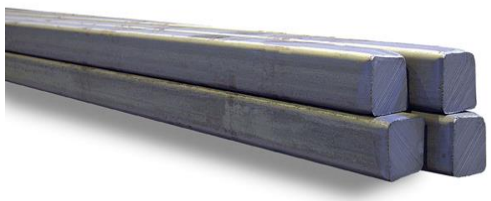
Universal Beams

Equal Angles

Channels



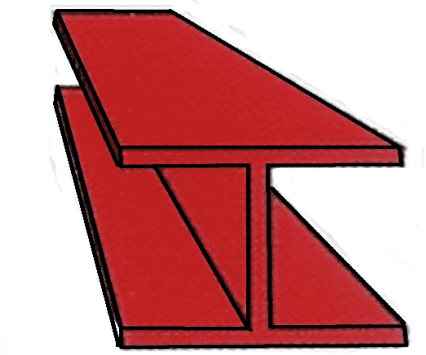
Rounds



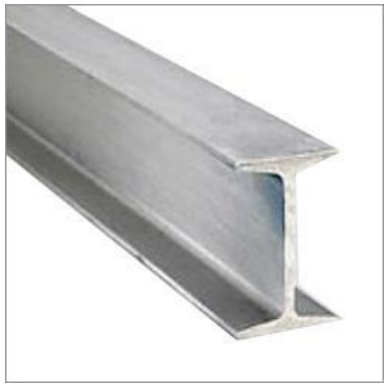
Rounded Cornered Square

ADVANTAGES OF PARALLEL FLANGE BEAMS (NPB & WPB) OVER TAPERED FLANGE BEAMS (MEDIUM BEAMS)

- **Better geometrical properties for the same weight, stronger, more rigid and stiffer than conventional joists**
- **Saving of steel of about 10-15% due to inherent superior properties**
- **Extra beam length per Tonne when compared to conventional beams**
- **Provides better support conditions for floors**
- **Gusset connections are possible in both inner and outer faces of the flanges**



Parallel Flange Beam



Tapered Flange Beam

ACHIEVEMENTS : MSM

- **BEST EVER YEARLY PRODUCTION 2024-25: 5,56,738 T**
- **BEST EVER MONTHLY PRODUCTION: 57,000 T in May'25**
- **BEST EVER DAY PRODUCTION: 2,700 T**
- **BEST EVER SHIFT PRODUCTION: 1,060 T**
- **BEST EVER YEARLY DESPATCH 2024-25: 5,58,873 T**
- **DEVELOPMENT OF 15 SECTIONS (31 Nos. of Variants)**

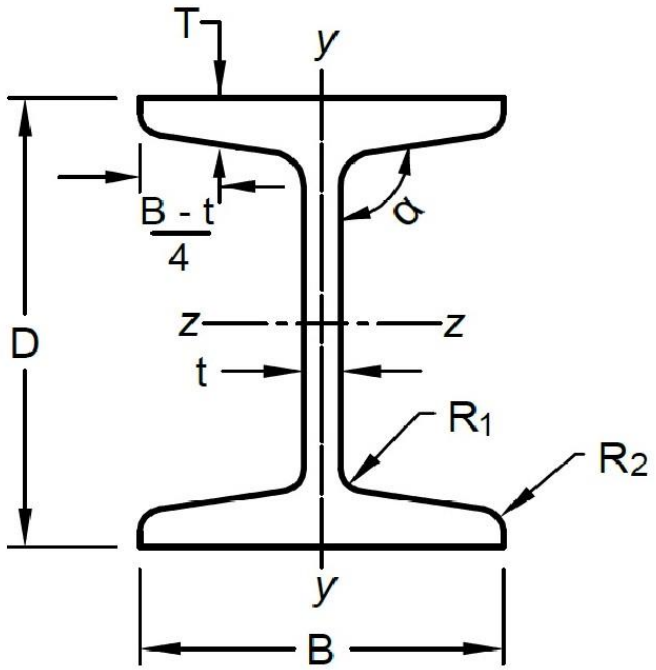
ACHIEVEMENTS : MSM

- QUALITY MANAGEMENT SYSTEM, QMS (ISO 9001:2015) CERTIFIED
- ENVIRONMENT MANAGEMENT SYSTEM, EMS (ISO 14001:2015) CERTIFIED
- ENERGY MANAGEMENT SYSTEM, EnMS (50001:2018) CERTIFIED
- CE CERTIFIED (HOT ROLLED PRODUCTS AS PER STANDARD EN 10025-1 : 2004)
- CII GreenPro CERTIFICATION FOR STRUCTURALS (FIRST MILL IN INDIA)
- ANTI-BRIBERY MANAGEMENT SYSTEM, ABMS (ISO 37001:2016) CERTIFIED
- SA8000 AND OHSAS (ISO 18001:2007) COMPLIANT

QUALITY ISSUES IN LONG PRODUCTS

Conventional Beam Rolling:

- Depth of Beam (+ / -)
- Short flange height
- Waviness of web
- Off-Centre of Web (in Section Mill Products)
- Control of unit mass (Kg/m)

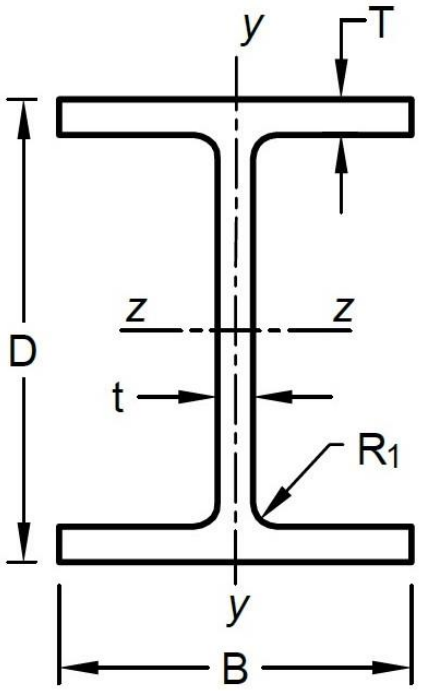


Sloping Flange Beam
(IS 808:2021)

QUALITY ISSUES IN LONG PRODUCTS

Beam Rolling in Universal Mill:

- Depth of Beam (+ / -)
- Non-uniform flange thickness
- Control of flange height
- Waviness of Web / Flange

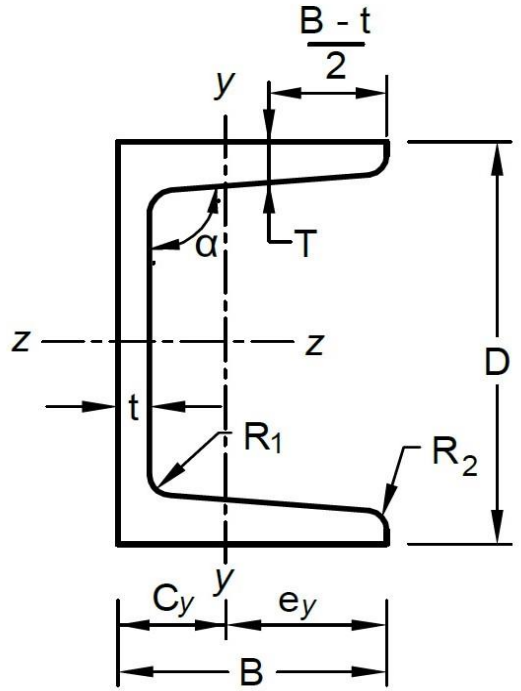


Parallel Flange Beam
(IS 808:2021)

QUALITY ISSUES IN LONG PRODUCTS

Channel Rolling :

- Depth of Channel (+ / -)
- Difference in flange thickness
- Control of flange height
- Waviness of Web / Flange
- Corner underfill / overfill

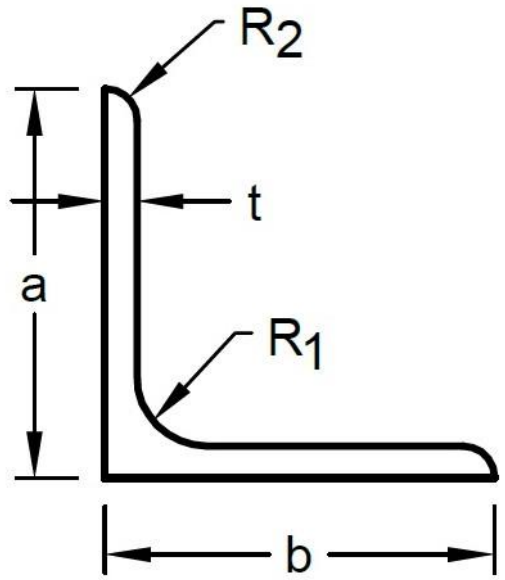


Sloping Flange Channel (IS 808:2021)

QUALITY ISSUES IN LONG PRODUCTS

Angle Rolling :

- Control of leg length
- Difference in leg length
- Difference in flange thickness
- Underfill Apex
- Toe formation



Equal Leg Angles
(IS 808:2021)

OTHER DEFECTS IN LONG PRODUCTS

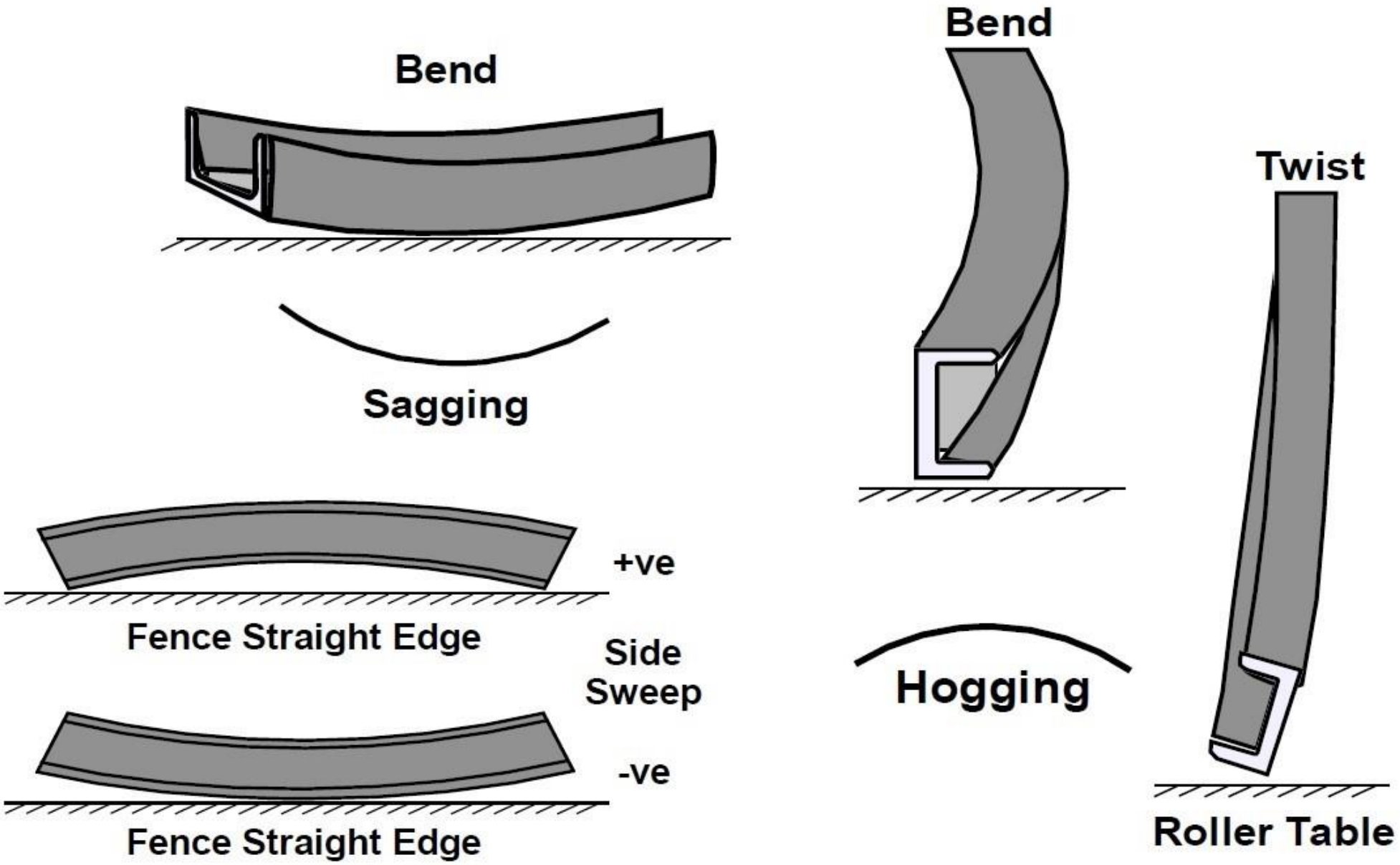
Rolling Defects :

- **Fins :** When a groove is overfilled during the rolling process
- **Lap :** When a corner or fin is folded over and rolled but not welded into the metal
- **Roll Marks :** A depression mark that repeats at a consistent interval caused by debris stuck to the rolls.

Steel Defects :

- **Scabs :** These are long patches of loose metal / debris that have been rolled into the surface of the metal.
- **Holes :** Casting defect caused by gas bubbles that get trapped in the liquid metal
- **Cuts & Tears :** Physical defect in input stock during handling / processing

DISTORTION IN LONG STRUCTURALS



QUALITY CONTROLS IN LONG PRODUCTS

- Good roll quality and proper rolling schedule.
- Effective roll cooling to prevent wear & failures.
- On-line monitoring of rolled material through profile gauge machine (ProScan).
- Corrective actions in mill based on periodic physical inspection.
- Mill setting adjustments as per feeding at downstream.

CHALLENGES IN PRODUCTION : MSM

- Cobble formation leading to operational hazards and inefficiencies
- Branding inconsistency with fading impressions and visibility issues under poor lighting
- Lubrication inadequacies leading to bearing breakage and equipment seizing.
- Frequent section change
- Soaking of Blooms
  - Improper soaking of the blooms
  - No provision for measuring and predicting the core temperature

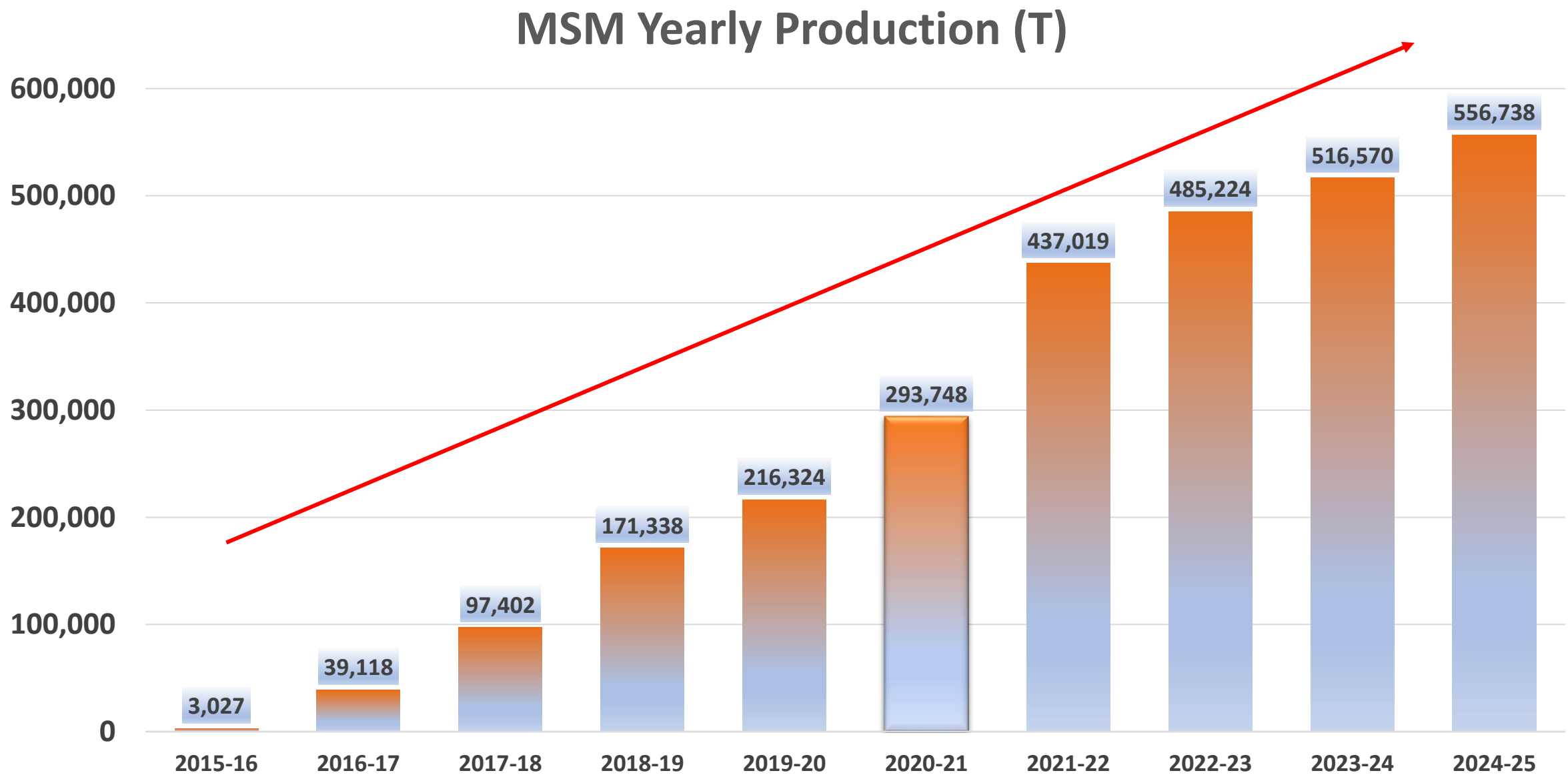
CONSTRAINTS IN PRODUCTION : MSM

- Crop Shear Chute Jamming.
- Stabilization of MTC (for Beams).
- Improper Transfer of bars from aprons to rakes.
- Lifting of 350 x 240 mm^2 blooms at charging bed.
- Dividing Shear : Sampling, Head and Tail cut.
- Down stream speed not commensurate with mill speed.
- Short Bars generation, segregation and removal.
- Evacuation of bins for head & tail cut at Cold Saw.
- Multi Bar feeding for straightening at straightener.
- Space constraint at Roll Shop and Dispatch yard.

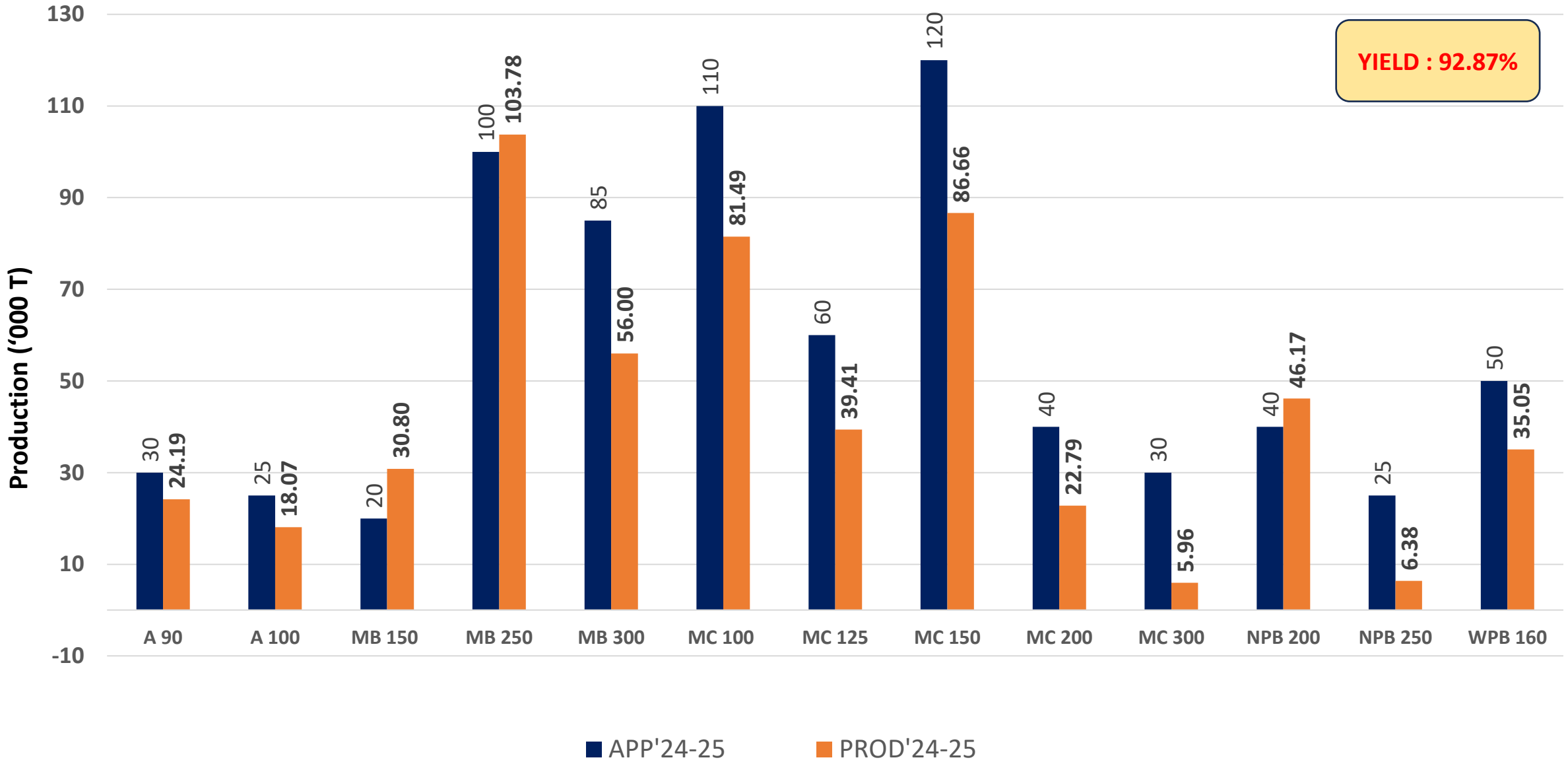
UPGRADATIONS FOR PRODUCTION : MSM

- New Proposal for Hot Profile Measurement - In process
- Procurement of New CNC Machine - Order placed
- New Storage Bay for Roll Shop - TS finalization stage
- Vibration Sensors in Motors & Gear Box - Completed
- Revival of Encoders & Load Cells of Mill Stands - In process
- Enhanced roll cooling for rolling stand #7 to 11 - Completed
- Installation of CV Analyzer - Completed
- Trial of new sections WPB 150x150 and A200 - Scheduled in FY'25-26

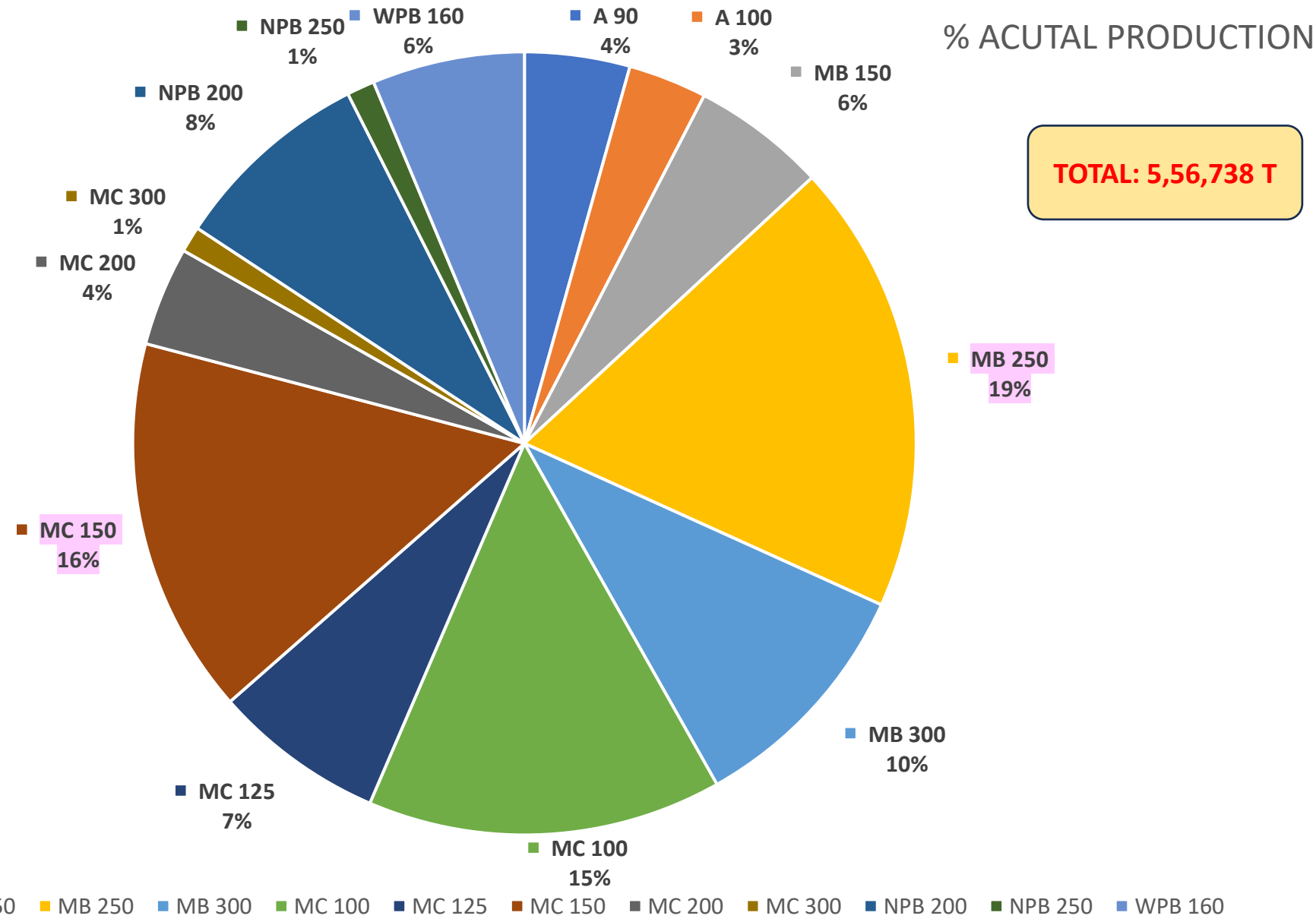
PRODUCTION TREND



MSM SECTIONWISE PRODUCTION 2024-25



MSM SECTION DISTRIBUTION 2024-25



HIGHLIGHTS OF FY 2024-25

1. Installation of IoT sensors
2. Installation of CV Analyzer
3. Replacement of Recuperator in RHF
4. Highest ever monthly Yield 93.94% in Feb’25
5. Highest ever yearly production 5,56,738 T
6. Highest ever yearly despatch 5,58,873 T

VIRTUAL TOUR : MSM

सेल SAIL

THANK YOU