Raw Material Handling Plant

Raw Material Handling Plant plays a very important role in an Integrated Steel Plant. It is the starting point of an integrated steel plant, where all kinds of raw materials (except coal) required for iron making/steel making are handled in a systematic manner e.g., unloading, stacking, screening, crushing, bedding, blending, reclaiming, etc.

ORGANISATION:

No. of executives : 51 No. of non executives : 348

Different types of materials handled in RMHP are-

- >Iron ore lump
- >Iron ore fines
- Lime stone
- >Dolomite
- Coke breeze
- Ferro alloys
- Finished sinter

- The main functions of raw material handling plant are :-
 - homogenize materials from different sources by means of blending
 - supply consistent quality raw materials uninterruptedly to different customers
 - maintain buffer stock
 - unloading of wagons/rakes within specified time norm
 - raw material preparation (like crushing , screening etc.).

Main Objectives of RMHP:

- Supply of 100 % blend mix to sinter plants through blenders.
- Supply of 100 % screened iron ore to blast furnace.
- >Unloading of wagons within free time.

FLOW DIAGRAM OF BLEND MIX PREPARATION







Quality Requirement Of Raw Materials

SI. No.	Material	Chemical	Physical
1	Iron Ore (Lump)	Fe SiO2 A12O3	-10 mm [.] 5 % Max
1	non ore (Lump)	64 % 2.5 % 2.5 %	+ 40 mm:5 % Max
2	Iron Ore (Fines)	Fe SiO2 Al2O3	+10 mm:5 % Max
		64 % 2.5 % 2.5 %	-1 mm: 30 % Max
3	L/Stone (BF Gr.)	CaO MgO SiO2	-5 mm : 5 % Max
		45 % 3 % 4%	+40mm :5 % max
4	Dolomite (BF Gr.)	CaO MgO SiO2	-5 mm : 5 % Max
		28 % 20 % 4%	+50mm :5 % max

Quality Requirement Of Raw Materials

Sl. No.	Material	Chemical	Physical
5	L/Stone (SMS Gr.)	CaO MgO SiO2 53 % 2 % 1.5 %	-40 mm :7 % Max +80mm :3 % Max
6	Dolomite (SMS Gr.)	MgO SiO2 20 % 2.5 %	-40 mm :5 % Max +70mm :5 % Max

Major Equipments & Functions

- > Wagon Tippler For mechanized unloading of wagons.
- Pusher Cars/ Side arm charger for pushing the loaded wagons inside the wagon tippler.
- > Track Hopper For manual unloading of mixed coke wagons.
- > Stackers For stacking material and bed formation.
- > Barrel / Blender reclaimers for reclaiming blend mix.
- Plough & Harrow type and SCRs for reclaiming iron ore, fluxes from the beds.
- > Transfer Car for shifting equipments from one bed to another.
- Crushers & Screens for crushing and screening of limestone, dolomite & coke.
- Network of belt conveyors for conveying materials to the various locations.

Raw Material Handling Plant (RMHP)

Major Equipments / Facilities	
≻Wagon Tipplers –	3 nos
≻Twin Boom Stackers –	3 nos
≻Stacker cum Reclaimer –	5 nos
Bucket wheel Reclaimer -	1 nos
≻Barrel Reclaimer -	1 nos
≻Plough & Harrow Reclaimer -	5 nos

→170 conveyors, totaling more than 45 Kms of belt length.

- \rightarrow 400 possible conveyor routes
- →250 transfer points

Storage facilities of raw materials

MATERIAL	NOS. OF BEDS	STORAGE CAPACITY (tons)
BASE MIX	2 beds in the new side &2beds in the old side	1,60,000
SCREENED IRON ORE	4 beds in the old side	60,000
UNSCREENED IRON ORE	1 bed in the new side	60, 000
IRON ORE FINES	1 bed in new side	90,000
FLUXES	3 beds in flux yard	60,000

TYPES OF WAGONS



TYPES OF WAGONS



TYPES OF WAGONS



WAGON UNLOADING FACILITIES





TRACK HOPPERS





2 PUSHER CARS – FOR Tip#1 & #2

RECLAIMING EQUIPMENTS

BARREL RECLAIMER



BLENDER RECLAIMER





STACKING EQUIPMENTS IN RMHP







SLEWABLE STACKER



STACKER CUM RECLAIMER AT FLUX YARD AND ORE YARD – 4 Nos

MAJOR EQUIPMENTS & MAIN FUNCTION

COKE CRUSHERS- 2 Primary and 4 secondary









STACKING OF RAW MATERIALS

Raw materials such as Iron Ore Lump, Iron Ore fines, Lime Stone, Dolomite, etc are unloaded in wagon tipplers and is conveyed through the series of belt conveyors to designated storage areas and stacked there with the help of stackers. Bed formation takes place by means of to and fro movement of stacker.

STACKING OF RAW MATERIALS

Number of layers in a bed determines the homogeneity of the bed and is reflected in standard deviation of final bed quality. Number of optimum layers in a bed is controlled by stacker speed. More is the number of layers, more is the bed homogeneity and lower the standard deviation.

SCREENING OF IRON ORE LUMPS

Iron ore lumps coming from mines contains undersize fraction (-10 mm.), which adversely affects the blast furnace operation. Therefore, this undersize fraction (fines) is screened out in RMHP and then stacked in the designated beds, from which this screened ore is supplied to blast furnace.

BASEMIX

Base mix is a near homogeneous mixture of iron ore fines, crushed flux, crushed coke, LD slag fines, mill scale & return sinter mixed at a particular proportion to achieve desired level of basicity of sinter. Base mix or sinter mix for sinter is prepared in the proportioning house through PLC controlled weigh-feeders and stacked in the sinter mix beds. This homogenised material is reclaimed and despatched to sinter plant to ensure consistent quality of sinter.

A TYPICAL BASE MIX PREPARATION

- ► Iron Ore Fines 64 %
- Lime stone
 8 %
- >Dolomite 7 %
- ► Coke Breeze 4 %
- ≻Millscale 1%
- ►BOF Slag 2 %
- ► Return Sinter 14 %

FLUX

The main function of flux is to take care of gangue in blast furnace and also to increase the rate of reaction for proper slag formation. Flux acts as a binder in sinter making to increase the sinter strength. Crushed limestone & dolomite are added in the base mix used for production of sinter. Impact hammer crushers are used for crushing Limestone & Dolomite. The required crushing index of fluxes to maintain sinter strength & quality is > 85 % (-3 mm).

COKE BREEZE

Mixed coke arising out of coke oven and blast furnace is unloaded at the track hoppers and crushed through a series of primary and secondary crushers. This crushed coke is added to base mix as a fuel for production of sinter. For proper quality of sinter the crushing index of coke should be >80 % (-3 mm).

SOLID WASTE UTILISATION

Solid wastes like, LD slag, SMS sludge, mill scale, are generated during various operations in an integrated steel plant. These wastes are also used in base mix preparation in a controlled manner to ensure solid waste recycling. Thus it helps in waste recycling , pollution control and revenue generation.

