

Technical Article-20

**JOURNEY OF IRON ORE TO STEEL,
ROLE OF LOGISTICS IN MINING AND STEEL INDUSTRY**

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IRON ORE MINING PROCESS

If we're going to speak that the logistics in the steel industry from start to finish, then we have to go to the origin, which is iron ore. Iron ore are rocks and minerals from which metallic iron can be extracted, so step one in the mining process is to find large iron ore deposits in the earth. When an ore deposit is initially discovered, the ground cover of surface vegetation, soil, and rock material is removed to reach the ore deposits. The overburden is continually removed throughout the iron ore mining process, and this continual cutting creates ore benches that resemble steps in the side of the pits.

DIRECT CUTTING

Iron ore are rocks and minerals from which metallic iron can be extracted so large machine like pocalne or excavator are employed to do this job. Then these materials are transported to nearest Crusher Plant or Screening Plant depends upon the nature of the material.

ROCK BREAKERS

A rock breaker is a machine designed to manipulate large rocks, including reducing large rocks into smaller rocks. They are typically used in the mining industry to remove oversize rocks that are too large or too hard to be reduced in size by a crusher. Rock breakers consist of two major components, a hydraulic hammer (used to break rocks) and a boom (the arm). There are two major types of rock breakers, mobile and stationary - typically placed on a pedestal or slew frame.

BLASTING

As the benches are formed, they become the site for blasting. Machinery is used to drill holes of suitable diameter, depth, and direction for explosives to be placed for what's called "blasting." This is where the process of converting iron to steel begins. Blasting is critical to the iron ore mining process and is used to expose the ore body and break it up for extraction. Blasting must create combustion without an external oxygen supply, and the most common explosives used to do so are a mixture of ammonium nitrate and fuel oil (ANFO).

TRANSPORTATION

Following blasting, the broken ore is ready for transport and loaded onto mine haul roads. Depending on the distance from the open pits to the blast Crusher or screening plants, large dump trucks used to transport the ore materials to the next phase of the iron ore mining process.

CRUSHING PLANTS

Since mined iron ore contains lumps of varied sizes, the biggest being more than 40 inches across and the smallest about 0.04 inches, it typically undergoes a crushing process to prepare it for the blast furnace which can handle lumps 0.27 - 0.98 inches in size. We have the plants like Premier-track 1,2,3,4,5&6 Metro track 21,22&7

SEPARATION BY SCREENING PLANTS

Once crushed, the separation process begins and the iron ore particles are divided into various sections by passing over sieves through which undersized material (or fines) will fall. We at Rungta Mines Limited have various plants like SP horizon 10, 12, 14 etc. SP SANDVIK 2, 3 &6 etc.

IRON ORE BENEFICATION PLANT (IOBP)

This plant is also called as Washing Plant where finished ore is washed to exact to pure form for getting the maximum benefits of the ore. The ore which is collected from this plant is concentrated.

ROLE OF LOGISTICS IN TRANSPORTATION FROM PRODUCTION TO DISPATCH

A Staff from Logistics Department present in the Weigh Bridge helps in feeding the data of Iron ore to various Crushing plants and Screening Plants of trucks where the material was being collected from

mines bench.

The finished products like Sc. Fines ,5-18,3-8 ,Conc. Fines Conc. 5-18 etc are stored in various stockyard in central stockyard. These product are now ready to dispatch to various Steel Plants. We at Rungta Sons Pvt. Ltd. have various Steel plants across the nation to meet the needs required by the nation.

ACTIVE ROLE OF LOGISTICS IN TRANSPORTATION OF FINES, CR 5-18,SR 5-18,CONC 3-8,CONC FINES TO VARIOUS STEEL PLANTS.

Initially a permission is taken from Government to lift the desired product like FINES,CR 5-18,SR 5-18,CONC 3-8,CONC FINES etc from stockyard to various steel plants thereby a permit number is generated. Logistics department plays a vital role in this scenario. Logistics shares the permit number, atrial and other important factors to the Weigh bridge operators And the weigh operators smoothly dispatches the materials to various steel plants by arranging necessary documents like Transits pass, GST paper and waybills also other document as required as per Govts. Demand, for verification.

QUICK DISPATCH SYSTEM

This Quick dispatch system helps in transporting materials to various steel plants from stockyard. As soon as trucks enters into weigh bridge a Pocaline machine operator adjusts the material in the truck which may be overweight or underweight. And thereby the weigh bridge operator capture the weight of the materials in I3MS software of Odisha Government site for Government records which the vehicle deems to be fit as per RTO guidelines. For example a 6 wheeler vehicle is allowed to take gross weight of 18500 kg irrespective of its Tare weight.

PROBLEMS WHILE TRANSPORTING THE MATERIALS FROM MINES TO PLANTS

A huge problems arises when the material are being transported from Mines to respective plants being Logistics dept acts as problem solver solves all the problems that comes on the way. A few are being described below:

The trucks loaded with iron ore are facing underweight and overweight after reaching their destination it is due to rain water mixed while travelling or the material which was being flow away by the wind so the solution was to cover the material with thick plastic cover.

MAKING PELLETS

Finally, the iron ore is made into pellets by combining iron ore with other products to create easily transportable materials. The range of additional ingredients used in pellet-making varies. However, it is not unusual for each pellet to contain some type of clay or limestone and elements such as dolo stone and olivine as part of the mix.

THE STEELMAKING PROCESS BEGINS WITH SMELTING IRON ORE

Iron Smelting Now that the iron ore is in pellet form ready for processing, the steel-making process begins. The first step is iron smelting, which is an industrial process used to extract usable iron from raw ore with heat and chemical agents. Iron smelting takes place in a blast furnace for intense heating, along with limestone and coke, and converted to molten iron. The molten iron is then tapped from the bottom of the furnace into molds known as pigs and allowed to solidify into pig iron. After smelting, the iron can be further processed and alloyed with other materials to produce steel. Here are some of the different methods of steel production.

SHAPING STEEL

Steel Shaping Before steel transport and use can happen, the steel needs shaping. Several different methods for shaping steel are available in steel making, and they largely depend on the desired steel application.

ROLL FORMING

Roll forming involves gradually bending flat sheet metal into a long, uniform shape by passing it through a series of tool dies. It is highly economical for mass production of angles, channels, long

components with holes, and complex shapes with multiple bends

EXTRUSION

- Extrusion is a process in which metal is confined in a closed cavity and then allowed to flow through only one opening so that the metal takes the form of the opening, much like squeezing toothpaste out of a tube

PRESS BRAKING

When a piece of sheet metal is formed along a straight axis, this is press braking. This process can be accomplished by a v-shaped, u-shaped, or channel-shaped punch and die set. Although press braking appears to be a simple concept, maintaining accuracy can often be quite difficult.

STAMPING

Metal stamping converts flat metal sheets into specific shapes or cuts out a piece of metal. This complex process can include several metal forming techniques, such as blanking, punching, bending, or piercing.

FORGING

Steel forging shapes metal using localized compressive forces, or blows, delivered with a hammer or a die. The temperature at which it is performed determines the classification: cold forging, warm forging, or hot forging. Forged steel is commonly used to create:

CASTING

Steel casting involves pouring liquid metal into a mold that contains a hollow cavity of the desired shape. These items are typically made with forged steel:

STEEL TRANSPORT

Steel Transportation Steel is commonly transported using trucks, trains, or ships. The type of transportation used will depend on the size and amount of steel in transport and the distance it must be transported. The transportation process requires extreme care and precision, as steel is heavy and can cause accidents and mishaps if not appropriately handled.

ORGANIZING STEEL STOCK & STORAGE

Steel Organization Steel stock is stored in different classes, sizes, and lengths. It should be stored above ground level on platforms, skids, or any other suitable supports to avoid distortion of sections. In coastal areas or cases of extended storage, it's good practice to apply a protective coating of primer to prevent scaling and rusting. We at Rungta Family have a highly knowledgeable staff to help you navigate our extensive steel stock, making it easy to acquire even hard-to-find items. We are committed to ensuring smooth transactions and make it easy and quick for you to find what you need, purchase it, and load it.
