ZHENGZHOU GLOBAL GATEWAY TRADING CO,LTD

PRESENTATION ON
FLOW CONTROL REFRACTORY
(CCM CONSUMBLES & MECHANISM)

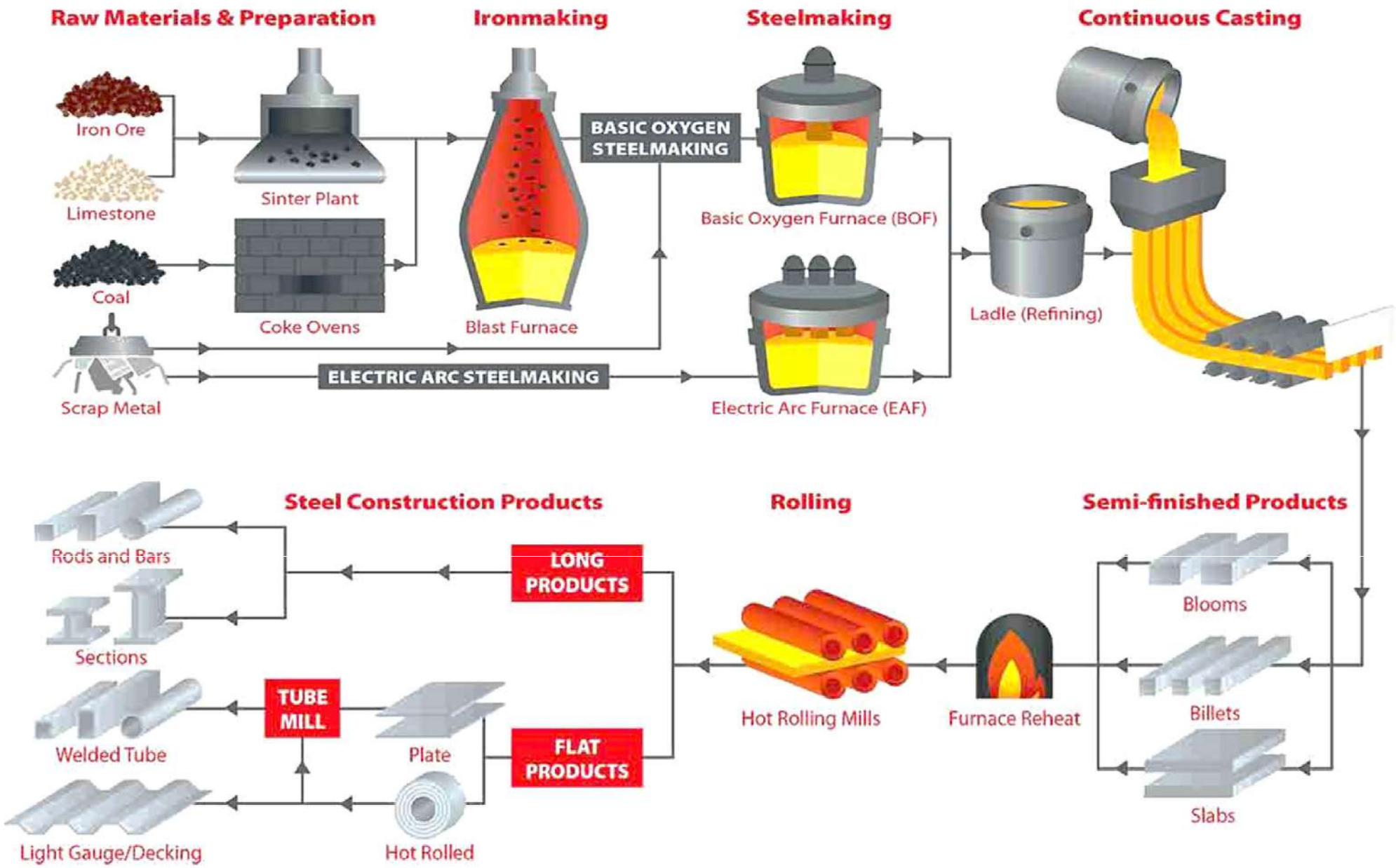
- ZGGT has been supporting the worldwide steel-making industry for nearly Decade and has grown to become a global, market and performance leader in ladle and Tundish slide gate refractory materials.

- IWTPL consistent, high performance materials and engineered assembly designs provide solutions and value added benefits for our customers:

  - Increased reliability and added safety
  - Steel plant operational efficiency
  - Improved downstream steel quality
  - Reduced refractory costs per tone of steel produced

- Our supply strategy is to offer consistent, high performance materials, utilizing innovative designs and to provide first-rate service and support. This approach assists our customers in achieving their safety, operational, productivity and commercial goals.

Steel Making Process:-



FLOW CONTROL REFRACTORY:-

- The major roles of the Slide Gate Refractories and Ladle Gate Systems are:

1. To adjust the steel flow from ladle to Tundish
2. To minimize the risk of steel re-oxidation

- Utilising IWTPL' high performance materials and engineered design solutions, our products can reduce ladle turn-around time and enable more efficient ladle management, which will reduce overall ladle refractory, labour and energy costs.

QC 1 & QC 2 Refractory:-

Slide Gate Plates	Tundish Nozzles	Porous Plug Well Blocks
90 K Mortar	Nozzle Filling Compound	Casting Powder
Radex Powder	Tundish Board	Castable & Mortar

Slide Gate Plate:-

- Ladle Slide Gate Systems With several Ladle Gate Systems available, Imperial can cover all steel producers needs, including some niche applications

- Ladle Gate selection criteria cover:

1. Ladle size from 20 tons up to 350 tons and ove
2. Casting process requirement
3. Steel grades cast / cleanness

- **Application:** A combination of two slide gate plates, one ladle nozzle and one collector nozzle form a set. This entire set is fixed on to the ladle. The ladle nozzle also known as inner nozzle or fixed nozzle is placed in a well block which is embedded in the silica ramming mass lining of the ladle. The slide plates are fitted outside the ladle in a mechanism which is hydraulically operated. The collector nozzle also known as outer nozzle is fitted to the bottom slide gate plate. This system is used for operating and controlling the flow of the molten steel from the ladle to the Tundish.

Tundish Metering Nozzle:-

- There are various types of Tundish nozzles like for up to 2 hours, 5 to 6 hours and long sequence casting of 12 to 18 hours. Based on the operating time, the type of the nozzle can be selected. There are different types nozzles like co-moulded into a well block, zirconia insert co-moulded in an alumina carbon body.

- The Tundish nozzles are also known as metering nozzles as it has a very specific diameter. These nozzles are fixed in the Tundish through which the molten metal flows into the continuous casting machine and molten metal gets casted in a rectangular section known as billets.

- The Long sequence metering nozzle bore diameter of the nozzle is selected based on the section of the billet to be casted and also the casting speed. Life: Life of the Tundish nozzle is one continuous campaign of cast. Based on the casting time, the nozzle can be selected.

Porous Plug Well Blocks:-

- Chemistry: Porous plugs and well blocks come under the category of precast shapes. These are high purity and high alumina content formulations using high alumina cement as binders.

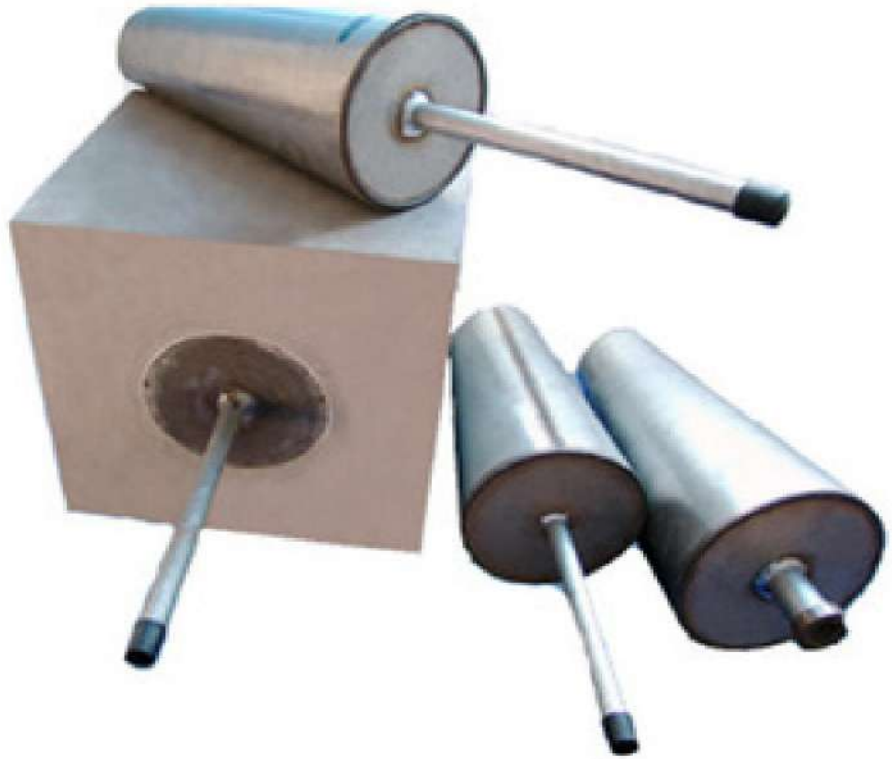
- The casting of the shapes is done under controlled conditions of temperature and water addition.

- **Application:**

❖ **Ladle well block** and porous plug well block are used for housing/holding the ladle nozzle and porous plug respectively.

❖ **Porous plugs** are sintered high alumina ceramics that have controlled porosity to allow for gas flow. are used in desulfurization of high sulfur base irons for ductile iron production and in steel desulfurization. Argon gas injection through porous plugs is used in ladle metallurgy for inclusion flotation, temperature homogenization, and degassing of steel melts.

- Life: The life of the well blocks varies between 30 to 100 cycles depending upon the timely repairs. The porous plug life is generally in minutes which can be converted into heats depending upon the purging time during each heat.



Mortar 90K:-

- Application: This is a very special mortar with very high melting point such that it sustains the temperature of molten steel. The mortar has a high sintering temperature which property gets developed on account of chrome oxide added into the composition.

- Life: Every time the refractories are changed, the new mortar needs to be applied. Therefore there is no specific life for this that can be quantified

Castable :-

- Application: Castable is also known as unshaped refractory. In the steel industry it is used for backup lining of the vessel. And also for maintenance of the ladle, Tundish, furnace launder etc. by way of patching/lining.

- Life: For back up lining application the life is substantially high. However for repairs application life is not predictable as proper application methods cannot be followed

Nozzle Filling Compound :-

- NFC well filler is a free-flowing refractory particular material used in the ladle or Tundish sliding gate to prevent skulling and steel freeze-off and ensure easy opening at the start of casting.

- As it posses selected granulometry and high refractoriness, it does not sinter when in contact with molten steel around 1600 °C temperature with high ferrostatic head when kept in ladle nozzle-well cavity. when slide gate is opened and it comes out freely or with minor oxygen lancing establishing a very smooth stream from the ladle. Depending on nozzle diameter as well as holding time of molten metal in ladle, granulometry of nozzle filling compound and chemical composition of refractory filler change.

Available in three types

1. Chromite Base-Recommended for Mild Steel Production

2. Zircon Base-Recommended for Mild Steel Production

3. Quartz Base

Casting Powder :-

- Casting Powder contains low melting constituents that instantly generate liquid slag, which penetrates into the gap between the Mould and the solidifying shell of the billet. Casting Powder is added in small amounts and continuously over the casting duration. The melting of the Casting Powder occurs slowly in layers. Hence, the top surface of the liquid metal in the billet / slab / bloom always remains protected from the atmosphere.

- **Uses :** Traditionally Casting Powder is used for bloom and slab casting. Now, it is used for billet (open) casting also as an alternative to Mould oil for some plants.

- **Benefits:** Casting Powder forms a good lubricating film on the surface of Mould not allowing solidifying metal adhesion to the Mould.

- Casting Powder provides easy and fast solidification of metal by providing high rate heat removal from metal.

- Casting Powder gives very good performance at elevated temperatures with the aid of its well selected additives.

- Casting Powder increases the quality of metal surface.

- Casting Powder is cheaper than Rapeseed/Casting Oil.

Casting Powder

Radex – Ladle Covering Compound :-

- Radex made from rice husk ash / rice hull ash. Its also called Ladle Covering Compound & used in steel mills for insulation of molten metal in ladle and Tundish.

- The temperature of molten metal in the ladle is around 1650 degrees centigrade (3000 degrees F) and above. When this metal flows from ladle to Tundish the temperature drops considerably. Without the use of insulation cover material, there may be breakdown in caster due to loss of temperature.

- When Radex is spread as coating over the molten metal (about 1 inch to 2 inches thick blanket on the hot molten metal) in the ladle and Tundish, it acts as a very good insulator and the temperature does not come down quickly in the Tundish and ladle.

Application of Radex prevents radiation heat losses, Also its self-spreading and does not form a heap over the molten metal. This leads to better insulation of the metal saving energy. Skull formation is reduced to a large extent making the operations easier in the process of steel making in concast area.

Tundish Board :-

- Disposable boards used to form a inner lining for continuous casting tundishes.
- Avoids the lengthy preheating process & Helps in significant energy saving.
- Reduces consumption of refractory in tundishes & Improves quality of steel by providing fresh ISOLIN lining every time the Tundish board is changed.
- Easy deskulling of Tundish boards at completion of casting, Improves turn around time significantly and in turn improves productivity.

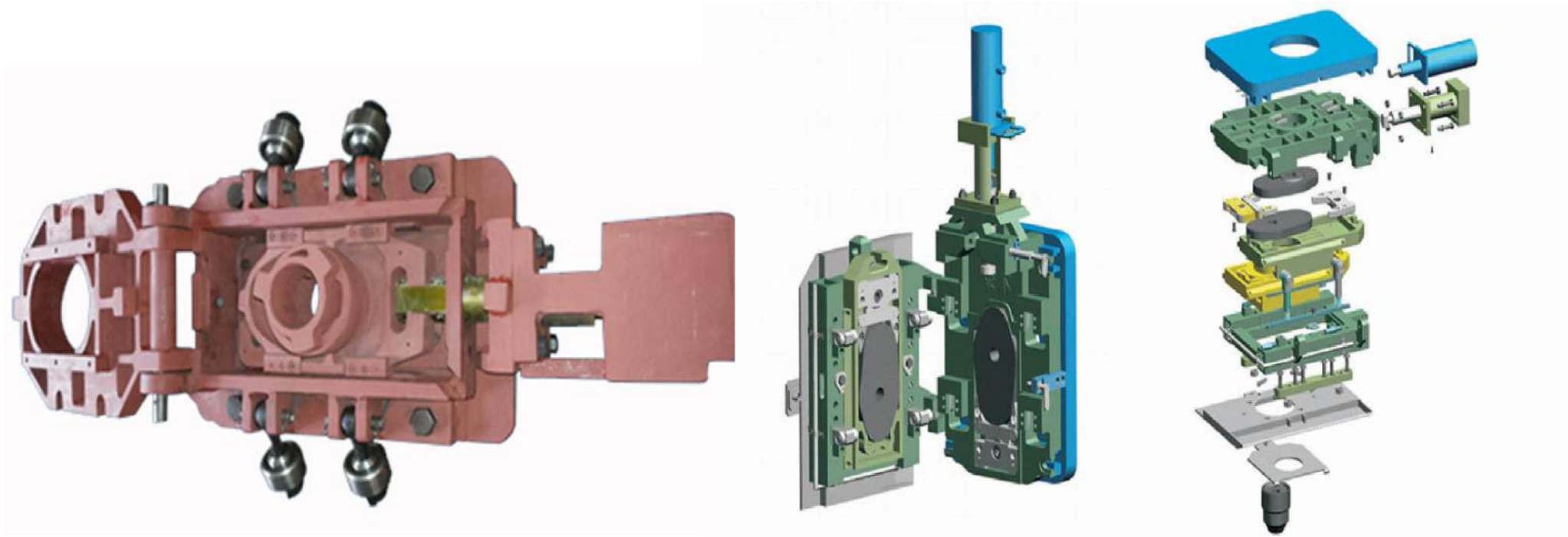
Advantages Of Using Tundish Boards

- REDUCED REFRACTORY CONSUMPTION-Minimises the need to patch and repair of Tundish boards refractory lining thus ISOLIN system reduce refractory consumption.
- CONSISTENT METAL TEMPERATURE-Insulating properties of the Tundish system results in consistent temperature of the liquid steel.
- EASY DUMPING-After casting a disposable soft residue left by Tundish boards helps in easy dumping on turnover station. Hence use of oxygen lance or pneumatic hammers is eliminated.
- HIGH YIELDS-TUNDISH system minimizes skull formation thus improves the yield of cast steel.
- BETTER ENVIROMENT-Lower Tundish shell temperatures help to have cooler surrounding for the operation.

Slide Gate Mechanisms (QC 1 & QC 2) :-

- The combination of the upper and slider plate is a boundary, housing is fixed on the base of the bottom of the ladle, support is opening part, and slider is active part. Ladle nozzle and upper plate are fixed in the housing and slider plate and exchangeable nozzle are fixed in the slider, slider component can slide in the support component.

- A uniform and constant interfacial pressure is established through the spring component in the plate boundary. Under the working condition, support and housing are hinged together through the safety pin hinge. Pressure is transmitted to plate boundary through the support slide bar and the slider slide bar. Driven by the hydraulic cylinder, thereby achieving the flow control.



Slide Gate Mechanisms Spares:-


Frame-016


Housing-017


Protection-018


Bearing-014


Lock Plate-019


Frame Bracket-020


Complete Slide Gate-021


Hydrolic Powar Pack-005


Dish Nut-028


Hydraulic Cylinder-029


Bush Ring-030


Spray Noser-009


Cylinder Cupling-031


S B Lock-032


Helicoil-033


CCM Ledle-036

THANK YOU

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