



SEAISI

Ironmaking Technology

Introduction

Ironmaking capability arguably determines the strength of the steel industry. This article is a summary of some papers presented at SEAISI Conferences and limited to a short description of the ironmaking technologies.

Direct Reduction

Direct reduction process is the only ironmaking technology currently adopted in South East Asia. Krakatau Steel of Indonesia, Perwaja Steel and Lion Group of Malaysia adopted the technology as they want to make use of inexpensive domestic natural gas as the reductant. The natural gas can be replaced by a coal gasifier to produce the reducing gas.

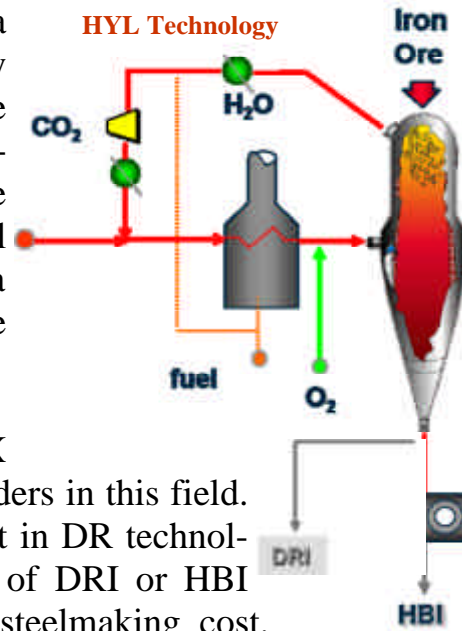
HYL and MIDREX technologies are the leaders in this field. One major advancement in DR technology is hot discharging of DRI or HBI which can reduce the steelmaking cost. MIDREX offers HOTLINK, hot conveyor, and hot container to transport the hot DRI to the EAF while Tenova (HYL)

offers HYTEMP system. Furthermore, a bigger DR ironmaking capacity is now available up to around 2 million tons per year. High carbon DRI (3-4%) also provides more chemical energy in EAF steelmaking.

Mini Blast Furnace

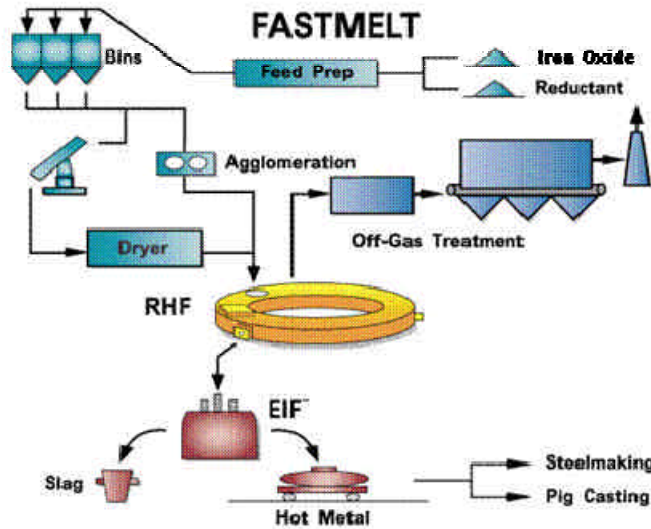
Blast Furnace is the most popular route to produce molten iron for steelmaking. Coke is utilized to reduce iron ore. A preheated air is blasted into the furnace and after a series of reaction, molten pig iron is produced. Several companies in the region have announced that they are going to construct their first blast furnace.

A mini blast furnace requires smaller capital and is more suitable for small companies. Typically it produces pig iron in the range of 370-880 tons per day. The technology is more flexible as it can utilize lump / iron ore and charcoal / coke.



FASMELT and ITmk3

FASMELT and ITmk3 ironmaking technologies give a different operation flexibility as they can utilize



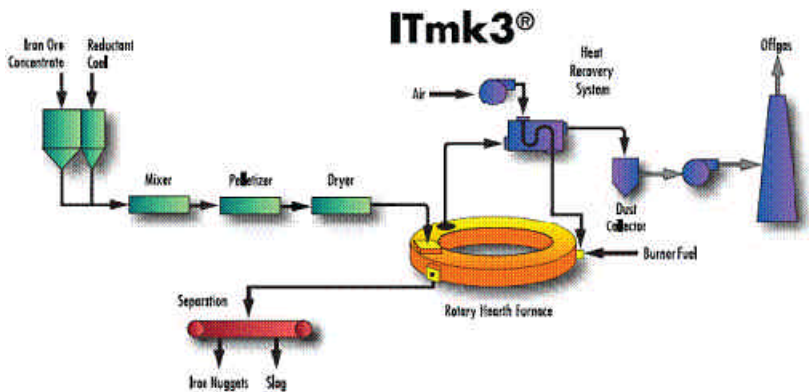
low grade iron ore and non-coking coal. Both also offer a more environmentally friendly operation compared to the conventional blast furnace.

The FASMELT technology utilizes iron ore fines or BF/BOF/EAF dust and non-coking coal to produce molten iron which can be processed further in EAF or BOF. It uses a ro-

tary hearth furnace where after the reduction of the iron oxide feed, the DRI pellet or briquette product will be melted in the furnace. Ideally a FASMELT plant should be located next to a steelmaking plant.

The ITmk3 process is similar to FASMELT except that there is no melting process and therefore the product will be in the form of pig iron nugget. An ITmk3 plant can be placed either at the

iron mine site or near steelmaking facilities. The iron nugget is an excellent raw ma-



terial for EAF or BOF steelmaking.

COREX and FINEX

COREX technology is another alternative ironmaking technology.

Globally, more than 30 million tons of hot metal are produced annually using this new route of ironmaking technology.

Like FASMELT and ITmk3, this technology can use low grade iron ore and non-coking coal as raw materials.

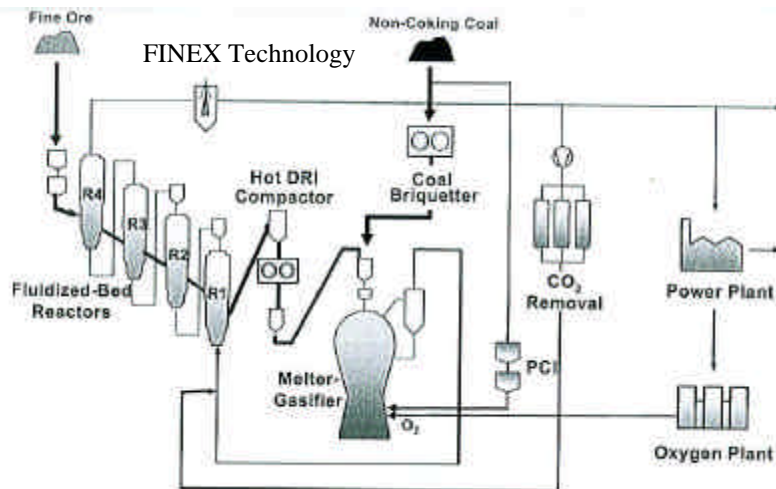
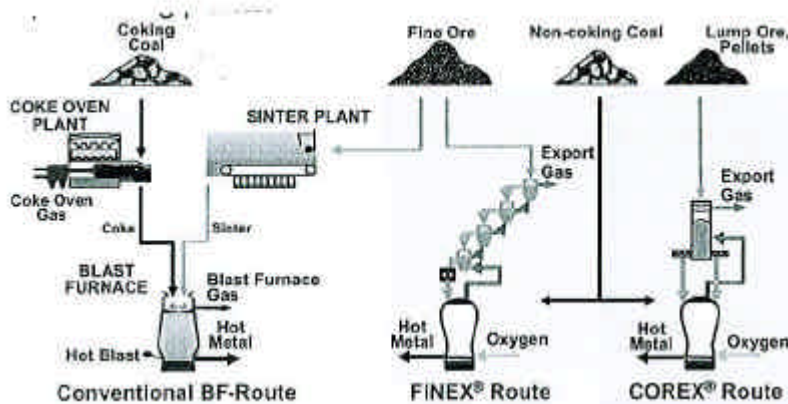
COREX takes lump iron ore or iron ore pellet while FINEX uses fine ore. Fluidised-bed reactors of FINEX are where the fines are preheated and reduced.

The ability to utilise fines means there is no need to install sintering

facility. Therefore, lower investment and production costs are expected.

A DRI compactor then transforms the reduced iron into lump iron. A melter gasifier will turn the lump ore into hot metal and at the same time the re-

ducing gas is produced and piped back to the fluidized-bed reactors. Briquetted or pulverized coal is



charged into the melter-gasifier.

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