

Promotion of Research & Development in Iron & Steel Sector

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Potential of Indian Steel sector

In 2016-17, India produced 97.44 MT crude steel and continued to be the 3rd largest steel producer in the world, after China and Japan. However, the Per Capita steel consumption in India is low at around 63 kg as against the world average of around 208 kg. India is the world's largest producer of Direct Reduced Iron (DRI) or Sponge Iron. This justifies the need for a rapid increase in capacity and production of steel in the years to come. As per the present projections, it is expected that India will emerge as the 2nd largest steel producer soon. India has accordingly, fixed a target of 300 million tonne production capacity by 2030.

R&D efforts by Indian Steel Companies

The R&D efforts by the Indian steel companies out of their own corpus have mainly concentrated on improving internal processes related to saving costs and improving efficiency. Process improvements such as beneficiation and pelletization of iron ore have received good response in the industry. Adoption of continuous casting together with thin slab casting as well as dedicated technologies for harnessing waste heat are drawing the attention of the steel companies

Status of R&D in Iron & Steel Sector

- **The first R&D Laboratory in the steel sector in India was set up in 1936 at Tata Iron & Steel Company (TISCO).**

- SAIL set up their Corporate R&D Centre in 1972 at Ranchi.
- R&D facilities in newer plants of JSW Steel and Essar Steel came into being in 2000's.
- Government has also set up several National / Regional Laboratories / Institutes under CSIR. Amongst them;
 - National Metallurgical Laboratory (NML)
 - Jamshedpur and Institute of Minerals and Materials Technology (IMMT), Bhubaneswar are associated with R&D in iron and steel including minerals and fuels.
- In addition, some academic institutes, like IITs and NITs, are also engaged in carrying out sponsored research work in the area of iron and steel.

The energy efficient and environment friendly technologies adopted by steel industry as part of technological up-gradation/ modernisation/ expansion programme/ projects include the following:-

- **Coke Dry Quenching (CDQ)** – Power generation from the waste heat from CDQ.
- **Sinter Plant Heat Recovery** (Power generation from Sinter Cooler Waste Heat).
- Bell Less Top Equipment (BLT) in Blast Furnace.
- Top Pressure Recovery Turbine (TRT) in Blast Furnace.
- Pulverized Coal Injection (PCI) system in Blast Furnace.
- Hot stove waste heat recovery in Blast Furnace.
- Dry type Gas Cleaning Plant (GCP) in Blast Furnace.
- Cast House/ Stock House Dedusting system.
- Converter Gas Recovery in BOF.
- Energy Monitoring & Management System.
- Secondary Fume Extraction System in Steel Melting Shop.
- Regenerative Burners in Reheating Furnaces of Rolling Mills.
- Hot charging process of continuously cast products at higher temperature directly to Rolling Mills.

- Direct Rolling Process eliminating the need for Reheating furnaces.
- Energy efficient technology for Hot Strip Mill: Flexible Thin Slab casting & Rolling.
- Near Net Shape casting: Bloom cum Beam Blank caster, Bloom cum Round caster etc.
- Adoption of Variable Voltage Variable Frequency (VVVF) Drives for high capacity electric motors.

The wastes generated are recycled back within the steel plants. Solid wastes such as Blast Furnace slag are granulated within the steel plant and sold to the cement industry. Gaseous wastes generated from the processes are further used in downstream processes in the plant such as in the reheating furnaces and power generation. Further, Research & Development projects have also been undertaken for utilization of steel slag in road making, construction, agriculture etc.

R&D scenario in Steel companies abroad

The R & D scenario in Steel companies abroad, particularly, in China, Japan and South Korea is quite different. They have a large outlay of funds earmarked for R&D and also have visible tie-up with external laboratories and academic institutions. Annual R&D investment in these companies is high which is upto 1% of their sales turnover

Government of India policy Framework on R&D

As per the Department of Public Enterprises guidelines, Maharatna & Navaratna category of CPSEs are required to invest in R&D @1% of PAT and @ 0.5% of PAT in case of Miniratna companies. This guideline is being adhered to by the CPSEs steel companies viz. SAIL & RINL. However, these guidelines are the minimum guidelines and also provide that CPSEs should make an attempt to benchmark R&D spending with internationally prevalent best practices in the sector. Ministry of Steel has published 'A Roadmap for Research & Development and Technology

for Indian Iron & Steel Industry' in Sept 2011 with as aim to sensitize the Indian steel industry to improve its technological face through R&D and technology intervention

Further, the report of the Working Group on 3 Steel Industry for the 12th Five Year Plan (2012-2017) has called for aggressive R&D initiatives in steel sector

Government Initiatives to Promote R&D in Steel Sector

Promoting R&D with financial assistance from Steel Development Fund

- **R&D Scheme pursued with Steel Development Fund (SDF)**
- **Centre of Excellence**
- **Chair Professor & Scholarships Scheme**

Steel Research & Technology Mission of India

The Ministry of Steel constituted a Task Force under the Chairmanship of Dr. Baldev Raj, former Director, IGCAR, for suggesting a blueprint for an institutional mechanism to spearhead the R&D efforts in the Iron & Steel Sector in India. The said Task Force, in its report inter-alia recommended setting up of a new institutional mechanism namely, Steel Research & Technology Mission of India (SRTMI) for taking up research projects of national importance. The proposal has been accepted by the Ministry of Steel. The salient features of SRTMI are as under:

- SRTMI will be an industry driven initiative which will be setup as a registered society wherein the Ministry of Steel will be a facilitator as one of the members of the society.
- SRTMI will be governed and administered by a Governing Body comprising the steel CEOs, domain experts and a representative of Ministry of Steel.
- The participating companies shall pay an initial entry

fee @ Rs 25/tonne of crude steel produced during 2013-14, or, Rs 5 Cr, whichever is higher, to facilitate the creation of SRTMI.

- Ministry of Steel will also provide part fund to facilitate the creation of SRTMI