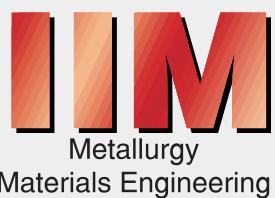


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K L Mehrotra - Chairman, Delhi Chapter | S C Suri - Editor-in-Chief (IIM-DC Newsletter)

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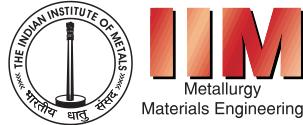
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MOODY'S UPGRADES ASIA STEEL INDUSTRY OUTLOOK TO STABLE FROM NEGATIVE

Moody's Investors Service has revised its outlook for the Asian steel industry from negative to stable on an expectation that profitability will remain steady. "We expect profitability of our rated Asian steel companies – measured by Ebitda (earnings before interest, tax, depreciation and amortisation) per tonne – to remain stable in the next 12 months, following a significant improvement that began in the second half of 2016," said Chris Park, an associate managing director. The removal of excess steel production capacity in China and the broadly steady steel demand in the region will be the main drivers of this profitability, explained Park. A stable outlook also reflects the state of China's Purchasing Managers' Index (PMI), which remains above 50, indicating a slight increase in manufacturing activity in China, the world's biggest steel market, said the ratings agency.

The Asian steel industry's profitability has increased since bottoming out in 2015 and the improvement in 2016 was led mainly by a recovery in industry fundamentals in China, resulting from a 2.3 per cent growth in apparent demand (production less net exports) and a higher-than-expected reduction in production capacity. Moody's notes that China's capacity will continue declining because the government's supply-side reforms and environmental protection measures are forcing inefficient mills to close and major producers to merge. Asian steel demand will also remain stable with robust growth in South and Southeast Asia, alongside GDP growth, and stable demand in China. We expect China's apparent steel demand (production less net exports) to increase around 2.5 per cent this year and be flat in 2018, said the release.

Contracted sales in China's property sector are expected to see a slowdown over the next 12 months because the government has tightened policies since September 2016

but the effect on steel demand will be fairly modest. This is because the strong contracted sales evident since 2016 will support robust growth in new construction starts and steel demand over the next several quarters. Among major steel-producing Asian countries, operating conditions in India will be the most supportive owing to robust domestic demand and protectionist measures. Regarding Japan and Korea, domestic demand will stay steady, which, along with steelmakers' moves to cut costs and boost production of premium products, should keep their profitability stable or slightly higher. On the other hand, Chinese steelmakers' profitability will decline slightly in 2017 following a strong second half in 2016.

Source: Business Standard

STAINLESS STEEL FOR LNG STORAGE TANKS: COST EFFECTIVE & LIGHTER WEIGHT: GRADE UNS S20153 (201LN)

Sandeep Maheshwari

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Brief



LNG is increasingly being used as Cleaner Fuel for Ships, Barges, Trucks & Buses on our National Highways and on upcoming National Waterways. Stainless Steel Grade UNS S20153(201LN) is a cost effective SS Grade suitable for making LNG Storage Tanks. The Grade is indigenously manufactured by Jindal Stainless and is already in commercial use for Marine Applications abroad. The Grade offers

Weight Reduction by about 37% as compared to Tank manufactured by SS Grade 304 and cost effectiveness upto 46% then conventional cryogenic Alloy Steel used for making LNG storage Tanks

Introduction

LNG usage is seeing an increasing trend in India. Current year imports are about 20 million Mt which are expected to go upto 22 million Mt next year and 25 million Mt in year 2019. This increased usage is sustained by Govt. of India's initiatives in increasing usage of gaseous fuels' content in our fuel basket. Ships and barges plying on National Waterways to run on LNG and efforts to introduce LNG powered trucks and buses plying on our National Highways would be key consumption points.

Tanks for Transporting LNG in Ships & Trucks



Over the years, LNG has as an alternate to conventional fossil fuels. Apart from economics, LNG provides a cleaner burning and hence is a natural answer to green-house and other pollution caused by conventional fuels. LNG (Liquefied Natural Gas) is natural gas, predominantly methane with some mixture of ethane C₂H₆ that has been converted to liquid form for ease of storage or transport. It takes about 1/600th the volume of natural gas in the gaseous state. It is odourless, colourless, non-toxic and non-corrosive. LNG, as it is formed by compression of natural gas, is denser and achieves a higher reduction in volume than CNG. This makes LNG cost efficient to transport over long distances where pipelines do not exist.

Need for cost-effective solutions

To enable availability of LNG in our National Waterways and as a fuel for trucks and buses, we need to put up an infra comprising storage and transportation tanks for LNG. To keep cost of tank construction down, the industry needs

to explore cost effective solutions which can be manufactured indigenously. One such solution is SS Grade UNS S20153 material.

Stainless Steel Grade UNS S20153, as per ASME SA240 & ASTM A240, is a proven material for usage in LNG & cryogenic storage tank applications. This Grade is approved for pressure & cryogenic usage as per API 620 and ASME Section VIII Part I & II. Apart from basic requirement of suitability for cryogenic usage, this grade also has higher yield strength thereby enabling lower tank weight and hence saving in initial capital. Innovative manufacturing with optimised usage of suitable raw materials has enabled Price of material to be lowest among all other alternate SS and Alloy Steel Grades used for LNG usage. It also shows corrosion resistance in wide ranging environments and has a PREN (Pitting Resistance Equivalent Number) almost similar to that of SS 304L. Being Austenitic SS, it is easy to weld as per standard welding processes adopted for grade SS304L and owing to low carbon level is free from sensitisation problem.

Characteristics of UNS S20153 (201LN)

*Remarks: As UNS S20153 is an austenitic stainless steel grade, no pre or post heat-treatment is required for welding.

Table 1 : Chemical Composition (Main Elements)

Grade	%C	%Mn	%Ni	%Cr	%N	%Cu
UNS S20153	0.03Max	6.40-7.50	4.0-5.0	16.0-17.5	0.10-0.25	1.00Max

Table 2. Mechanical Properties:

Material	UNS S 20153LN (201LN)	304L	9% Ni Steel (ASTM A553)
YS (Mpa) Min	310	205	585
UTS (Mpa) Min	655	515	690
%El Min	45	40	20
Hardness (HRB) Max	100	92	-
Impact Energy (J) at -196°C (Typical)	100	150	42
Design Stress (Mpa) As per API 620	218	129	219
Design Stress (Mpa) As per ASME section VIII Divisions 1&2	164	129	187

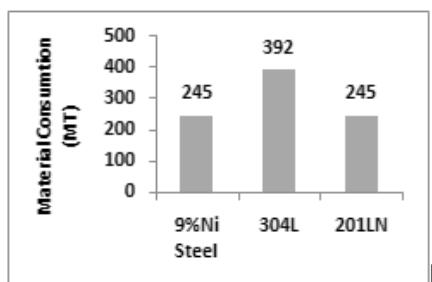
Table 3. Other Attributes:

Material	UNS S20153 (201LN)	304L	9% Ni Steel (ASTM A553)
Weldability*	V Good	V Good	Difficult
Fabricability	V Good	V Good	Poor
PREN	17	19	-

Cost Effectiveness of Grade UNS S20153: Material Cost for a Prototype Tank for LNG

Theoretical calculations for a prototype of LNG storage tank of 12,560cbm (Length 40meters and Diameter 20 meters) has been carried for bringing out comparison in material usage between 9%Ni Steel, 304L and UNS S20153 (201LN) showing the cost effectiveness as per API 620 and ASME Section VIII Divisions 1&2. Thereafter based on current prices the possible cost savings in tank material is worked out.

Material Consumption & Material Cost of LNG Tank as per API 620(Fig 1&2)



1: Comparison of Material Consumption (MT)

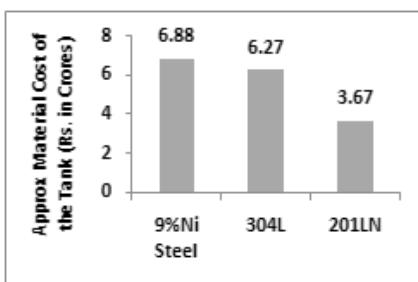


Fig 2: Comparison of Approx Material Cost of the Tank

Fig 1 & Fig2: Wt reduction by using UNS S20153 (201LN) from 304L is about 37% & a saving on material cost by about 46%. In comparison with 9%Ni Alloy Steel the Wt of the Tank remains same, however, Material Cost is down by about 46% as per API 620 norms.

ii) Material Consumption & Material Cost of LNG Tank as per ASME Section VIII Divisions 1&2(Fig 3&4)

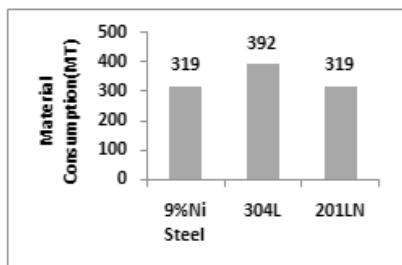


Fig 3: Comparison of Material Consumption (MT)

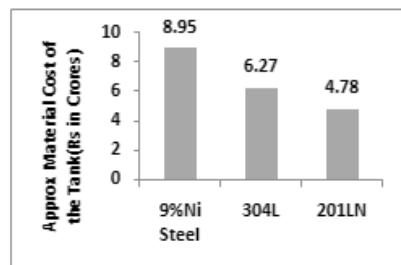


Fig 4: Comparison of Approx Material Cost of the Tank

Fig 3 &Fig4; Wt reduction by using UNS S20153 (201LN) from 304L is about 18.5% and a saving on material cost of about 24%. In comparison with 9%Ni Alloy Steel the Wt of the Tank remains same, however, Material Cost is down by about 46% as per ASME Sec VIII Div1 &2.

Conclusion

From the above cost and material consumption analysis, it is quite clear that UNS S20153 is a cost-effective solution to the expensive LNG and cryogenic storage tanks. The main features of the Grade are

- I) Cost Saving of upto 46% in material cost alone,
- II) Lighter weight construction, Ideal for Ships & transport Vessels, Trucks, Buses etc

III) Cryogenic Usage suitability and ease of welding and fabrication. Being austenitic, SS gives material suitability for cryogenic application including LNG usage, high elongation providing ease of bending, fabricability, punching etc. The Grade retains its Impact Strength to about 100J @ temp as low as -196 degC.

IV) The Grade is approved from usage as per API 620 and ASME Section VIII Divisions 1&2 and is already approved and is used in marine applications.

V) No provision for Corrosion Allowance is required.

The Grade is being manufactured at Jindal Stainless in their Plants at Hisar & Jajpur in India. The Jajpur Plant is also DNV Maine approved for

manufacturing of this Grade. The Tanks from this Grade are manufactured by Inox cv in their Plant at Vadodara. Jobs done in past include a major order for US Marine Application and a new Order from Europe for LNG Tanks for Ships is currently under execution.

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JSW STEEL, PIRAMAL ENTERPRISES EYE JOINT BID FOR STRESSED ASSETS

Sajjan Jindal-controlled JSW Steel is in discussion with Piramal Enterprises for a partnership that could result in a joint bidding of assets currently going through the insolvency process. According to the contours of the arrangement, Piramal Enterprises would provide the funding and JSW Steel the management to the assets once they come up for bidding. JSW Steel is interested in bidding for stressed assets in the steel sector. Jindal's son, Parth Jindal, recently said in Kolkata, "We are very keen on Bhushan Steel and Monnet Ispat. At the right price, even Essar would be attractive."

Ajay Piramal, chairman, Piramal Enterprises, had told Business Standard a few days back that besides the joint venture with Bain Capital Credit India Investments for the asset reconstruction business, the company would get into a strategic partnership with other industry experts. "These partners would bring in the expertise as well as the funds. I can see that the Reserve Bank of India (RBI) and the government are determined to see that a resolution takes place. So, we will participate in this process. In some specific cases, we will also get into a partnership with the other industry experts. In this financial year (FY18), we can look at about two deals consummating, as they take a lot of time. You have to study them, turn them around and negotiate with the banks and the promoters," Piramal explained.

Piramal said he was interested in the steel, auto component, cement, pharma, chemical, and infrastructure sectors, but he did not specifically

mention any names to acquire or partner with. In response to a specific query on the proposed JSW-Piramal Enterprise tie-up, a Piramal group spokesperson said, "We do not comment on market speculation." An email sent to JSW Steel went unanswered. Before the insolvency process started for the 12 companies under the RBI directive, JSW Steel had bid for Monnet Ispat & Energy, one of the first companies in which lending banks had converted their debt into equity as part of the strategic debt restructuring. However, lenders found the haircut implicit in JSW Steel offer too steep and didn't take a call. For Bhushan Steel too, JSW had approached lenders with an offer for a debt takeover of Rs 20,000-22,000 crore, earlier this year.

These proposals, however, now stand null and void, as both companies are going through the insolvency process under the Insolvency and Bankruptcy Code. Once the information memorandum is prepared, the resolution professionals in the respective companies will be inviting bids for these companies. JSW would have to make a fresh attempt then. An acquisition would bring JSW Steel closer to its target of achieving an annual capacity of 40 million tonnes over the next decade. At present, JSW Steel's capacity is at 18 million tonnes a year. While Bhushan Steel has an annual capacity of around 5.6 million tonnes, Monnet has a capacity of 1.5 million tonnes, and Essar Steel 10 million tonnes.

Source: Metaljunction

SAIL LAUNCHES AWARENESS DRIVE TO BOOST RURAL STEEL CONSUMPTION

With an aim to boost domestic steel consumption, state-run SAIL has decided to hold a series of workshops in rural areas to create awareness among various stakeholders about use of quality steel products in construction activities, according to the company. At the first of the 100 proposed workshops held recently in Haryana's Rewari, SAIL officials urged masons and steel dealers to do quality check

to avoid use of low-grade steel in building houses. The country's largest steel maker Steel Authority of India (Sail) also encouraged elected representatives of villages such as gram pradhans and members of panchayats to raise awareness among villagers about the benefits of using steel in construction of homes. "This effort is in line with the government's push for increasing per capita steel consumption in the country and the role of rural India will play a vital role in increasing the domestic consumption of steel," Rakesh Kumar Singhal, executive director (corporate affairs) Sail, told PTI.

"We have decided to hold 100 workshops in our four regions. After Rewari, the second conference of the northern region will be held in Badlapur, near Jaunpur, in Uttar Pradesh. Two workshops will be held every month in all of the four regions," he said. The rural awareness workshop like this will help in increasing production and consumption of steel in the country and also pave the way for rapid growth and modernisation, the company said. India, the world's third largest steel producer, produced 100 million tons (MT) of crude steel in 2016 and is looking to overtake Japan to claim the second spot. In this regard, the government is taking lots of measures to treble the steel output to 300 million tons (MT) and also increase finished steel per capita consumption of 158 kg by 2030-31, as against the current 61 kg.

Source: Metaljunction

GOVERNMENT SPENDING TO DRIVE STEEL DEMAND

After a subdued trend so far this financial year, the country's steel consumption is likely to rise in the coming months with increase in public sector spending -- especially in roads, power, water and gas pipeline projects. Data compiled by the Joint Plant Committee of the steel ministry shows consumption at 26.2 million tonnes in April-July (first four months of this financial year), a marginal 0.5 per cent increase over the same period last year. Crude

steel production at 31.8 mt was five per cent higher. Anticipating the trend, primary steel producers have raised their product prices by Rs 3,000 a tonne, effective August. This reversal in consumption trend assumes significance in terms of government spending, which would drive all-round growth in this and allied sectors. "Steel demand is improving with increasing public sector spending, as reflected in increased activity in sectors like roads, power transmission and distribution, solar energy, earthmoving equipment, pre-engineered buildings, water and gas pipelines. Although, sluggish private capital expenditure remains a concern," steel major JSW said in an analyst presentation available on the BSE website.

A CARE Ratings study reported the prices of cold rolled coil and hot rolled (HR) coil in July stood at Rs 44,052 a tonne and Rs 41,656 a tonne respectively. These were up by Rs 929-1,580 a tonne from June, a sequential rise after five months. In January, the prices had increased by Rs 2,250-2,350 a tonne on a monthly basis.

Source: Metaljunction

STEEL DEMAND INCREASING IN INDIA, RIGHT SITUATION TO MAKE FUTURE INVESTMENT: T V NARENDRAN

Demand for steel is increasing in the country and the situation is right to make future investment, Tata Steel Managing Director (India and South East Asia) T V Narendran has said. Stability is being witnessed in the steel sector globally though it had faced some problem two years ago, Narendran told newsmen after unfurling the National Flag on the 71st Independence Day. There was an improvement in the economy in China and that country was not exporting much steel now which has in turn resulted in an improvement in the steel sector in India, he said. "Overall, the situation is now right for future investment and Tata Steel was also considering future investment," he said. We will discuss the issue in the next two to three months

-- about what and where to do and how much investment to be made," he said.

Narendran said Tata Sons chairman had also recently said that its focus would be India, particularly Jamshedpur and Kalinganagar (Odisha) plant. Asked about the 'Momentum Jharkhand' initiative of the state government to woo investors, the Tata Steel MD appreciated the effort, stating that each state should make an effort to attract investors as they have many choices when they come to invest in India. "We have been witnessing activities to attract investors in eastern India including Jharkhand, Odisha and West Bengal," he said. Hailing the endeavour of the Jharkhand government, the industrial sector and the CII to promote industries, he said it was not an easy task to achieve the goal but certainly not impossible either.

On the investment being made by the government, he said more and more investments were being made by the government and public sector units in infrastructure sector, which was necessary but not sufficient. However, for long-term sustainability, investment needs to be made by private sector, which it can do only when it earns profit, he said. Narendran suggested the private sector to be competitive and efficient to become profitable. He said, Tata Steel had invested about Rs 16,000 to 17,000 crore in the last five years in Jamshedpur and in the mining sector in the state only because it was a profitable company. Narendran said, the government should also address the NPA issue as the banking sector was apprehensive to lend due to NPA. Commenting on the GST, he said it has reduced transportation time and has improved efficiency.

Source: Metaljunction

VIZAG STEEL PLANT EYES PROFITS VIA COST CONTROL, IMPROVED PRODUCTIVITY

Rashtriya Ispat Nigam Ltd (RINL), or Vizag Steel Plant, is looking to turn EBITDA positive by the end of the current fiscal. According to P Madhusudan, CMD, RINL, while on a cumulative basis the company's margin is still negative, it has been able to register positive

EBITDA for July.

Improved margins

"We hope to turn EBITDA-positive by the end of current financial year," Madhusudan told a media gathering here recently. EBITDA losses have narrowed from ₹790 crore in 2015-16 to ₹264 crore in 2016-17. The company would have been able to turn EBITDA-positive in the last fiscal had there not been a spike in the price of coking coal, he said. The expansion and modernisation programme undertaken by the company will help achieve economies of scale, bring down costs and help the company return to profits in FY19, he said. RINL's losses narrowed to ₹1,236 crore in 2016-17 against a net loss of ₹1,421 crore in 2015-16. Post modernisation, its production capacity would increase to 5.4 million tonnes (mt) by the end of this fiscal, from the current 4.1 mt. The company plans to scale up its production capacity to 6.3 mt in 2018-19 and a little over 7 mt in 2019-2020.

Stable prices

Steel prices have been firming up globally and there is an upward trend in the domestic market also, he said. RINL raised prices of 4-5 per cent in the January-March quarter of FY17. However, prices were revised downwards in the first quarter of the current financial year on account of poor volume sales following a disruption in trade channels in the run-up to the implementation of GST. "The demand side looks encouraging as of now. Prices remained stable in July, and August onwards our realisations have improved by 4-5 per cent," he said.

Cost Control

Madhusudan said RINL would tread cautiously on adding manpower. The company currently employs around 18,000 people and this number is not expected to move up significantly even while it adds capacity and raises its production target to 7 mt in 2020. Employee cost accounts for nearly 19 per cent of total expenses, he said. The focus would be on improving productivity. "We might need frontline executives and some people in the technical field for our capacity addition. We want to bring down our employee cost to 12 per cent," he said.

Source: Metal junction

BRIEF REPORT ON SEMINAR ON PRE-FABRICATED STRUCTURES FOR URBAN & RURAL HOUSING AND WAREHOUSING/LOGISTICS SUPPORT

Indian Institute of Metals - Delhi Chapter organised a one Full day Seminar on 'Pre-fabricated Structures for Urban & Rural Housing and Warehousing/Logistics Support' at India International Centre, Max Mueller Marg, New Delhi on 16 August 2017.



At the outset, Shri K L Mehrotra Chairman Delhi Chapter welcomed the participants in the Seminar. He gave an overview about the Pre-fabricated Structures and introduced the Speakers at the Seminar.

Shri S C Suri, IIM-DC and Shri P K Bajaj Vice-Chairman IIM-DC spoke on the importance of Pre-fabricated structures in India's emerging Economy.

Six eminent Speakers from Construction and related Industries made their presentations on the topic.

Mr. E Suresh Raj GM (Engineering) Tata Bluescope Steel, in his presentation, highlighted various activities & capabilities of Tata Bluescope and focussed on **Durable and Aesthetic Light Gauge Framing System in Industrial Warehousing and Residential Buildings.** He outlined the activities of his company in design and manufacture of special components required for Prefab structures. He indicated that owing to their collaboration with Bluescope (an Australian

Company), most of the design codes followed by them were of Australia/New Zealand origin. They have installed various types of buildings viz. residential, recreational, schools, farm houses, hospitals, office buildings, warehouses, factories etc. The Company has also developed ZINCALUME coatings (comprising Al, Zn & Sn) for steel structures for providing excellent barrier coating protection. He also mentioned about COLORBOND color coatings of structures.



Ms Sonia Khanna Dy. General Manager Central Marketing Organisation, Steel Authority of India, in her presentation focussed on **Products in SAIL for Pre-fabricated Structures.** She was supported by her colleague **Mr. Sanchit Soni** from CMO, SAIL. Ms Khanna gave a brief synopsis of current and upcoming facilities in SAIL steel plants. She highlighted the products from newly commissioned facilities which are/would be suitable for Pre-fabricated Structures. Some of these are:

- Different types of TMT bars (Corrosion Resistant for coastal areas, Earthquake resistant for seismic zones and Rock & Roof bolt for mining areas) from Durgapur, Burnpur and Bhilai
- Structures (Parallel Flange Beams, Channels, Equal Angles, Special Sections etc.)

- Wide range of Plates
- High Strength Formable Quality grade products etc.

She also highlighted various initiatives taken by SAIL to create awareness and understanding of SAIL products

Mr. Yatinder Suri MD & Country Head, Outokumpu, New Delhi, focussed on Global activities of OUTOKUMTU and spoke on **Sustainable Infrastructure – Build to Last**. Mr. Suri highlighted the historic development of Stainless steel and contributions of Outokumpu in same. Owing to significant development in this area, there are ~ 400 grades of stainless steel available at present. In order to derive maximum benefit, he recommended choice of correct grade. He offered full technical support of Outokumpu for the same. He showed a number of prestigious structures, which have used Stainless steel. Such structures, especially SS rebars have a great potential in Prefab structures. The initial cost may be higher, but long term maintenance free service is assured.



Mr. L Pugazenthy Past President Indian Institute of Metals and Executive Director India Lead & Zinc Development Association made a presentation on **Hot Dip Galvanising for Pre-fabs – Twelve Inherent Advantages**. He highlighted inherent advantages of Hot Dip Galvanising for Prefab structures. He highlighted usage of Zn in corrosion prevention. He suggested that Hot Dip galvanising provide maintenance free long term protection owing to metallurgical

bonding. An additional advantage of galvanised products is that they can be easily color painted.



Col. S M Adsar (Retd.) Manager, B G Shirke Construction Ltd., made a presentation on **3 S Construction Technology**. Col. Adsar highlighted the achievements of his Company in design, erection & commissioning of ~ 2 lakh residential apartments, Technology Parks, multi-storied Prefab buildings etc. in the last 4 decades. They pioneered 3 S pre-fab technology in 1972. Col. Adsar also showed a documentary indicating the construction of various prefab structures in their factories.



Mr. K K Mehrotra Former CMD, MECON Ranchi, made a presentation on **Pre-fab Engineered Buildings – A new Approach in Construction Sector**. He discussed various merits in using prefabricated structures and related issues. The advantages of using steel in residential buildings were highlighted. He mentioned that presently

PEBs (Prefabricated Engineered Building) are just 1% of \$ 100 b market in country. A staggering growth (up to 30-35%) is expected in next 5 years, owing to faster implementation of projects. Govt.'s decisions to allow 100% FDI in real estate and an ambitious aim of providing Housing for All by 2022, would be the main growth drivers for PEBS.



During each presentation, there were lively question and answers interactions with the audience.

All Presenters were honoured with mementos by Sh. K L Mehrotra, Shri S C Suri and Shri P K Bajaj on behalf of IIM Delhi Chapter.

Shri Bajaj, Vice-Chairman, IIM-DC, proposed vote of thanks.



About 50 persons participated in the programme.

The programme concluded with Tea.

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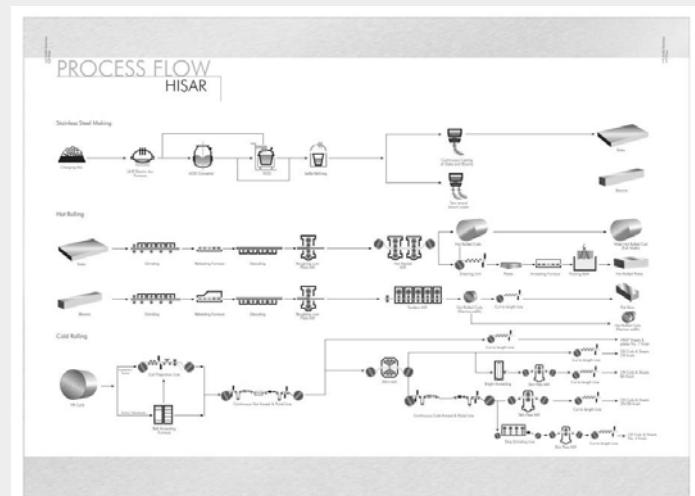


VISIT TO JINDAL STAINLESS, HISAR (5.8.2017) – A BRIEF REVIEW

The Indian Institute of Metals – Delhi Chapter regularly organizes visits to eminent industries in and around NCR, for benefit of its members. In this series, a team of IIM DC members visited Jindal Stainless Ltd., Hisar on 05Aug.2017, on invitation of IIM Hisar Chapter. The visiting



members went around state of art facilities of JSL Stainless and had extensive deliberations with the office bearers of IIM Hisar Chapter.



Founded by Shri O P Jindal in 1970, Jindal Stainless Ltd. is one of the largest stainless steel conglomerates in India and ranks amongst top

10 stainless steel makers in world, producing stainless steels flat products in Austenitic, Ferritic, Martensitic and Duplex grades. The product range comprises different grades of stainless steels including Slabs & Blooms, Hot Rolled Coils, Plates, Cold Rolled Coils and Special products like Razor Blade Steel, Precision Strip and Coin blanks. Its market share in India is ~ 45%. With the commissioning of its forthcoming integrated Orissa project at Jajpur, JSL Stainless will achieve a capacity of 2.5 MTPA (from present installed capacity of 1.8 MTPA), further consolidating its position as the largest producer in the country with wide product mix covering austenitic, Ferritic, Martensitic, dual phase and super-dual phase quality steels catering to critical requirements of defence, nuclear energy, automobile sector in domestic markets and exports.

At the outset a presentation of facilities available in Hisar Unit and its various functions was made jointly by Dr. Arifit S. Podder, Head-HRD & Mr. Manoj Gupta, DGM, Quality Assurance. Thereafter IIM DC members were taken around all the facilities of the Plant

MANUFACTURING UNIT

The plant at Hisar has state-of-the-art facilities for manufacture of high quality Stainless Steel. Steel is melted in ultra-high powered Electric Arc Furnaces with co-jet facility. For refining, it utilizes top and bottom blown Argon-Oxygen Decarburization (AOD) Converter. In addition, it is also endowed with Vacuum-Oxygen Decarburizing (VOD) unit for achieving very low contents of Carbon, Hydrogen and Nitrogen.



De-oxidation is carried out by high speed multiple wire-injection units and refined steel is continuously cast in slab and bloom caster.

Cast slabs are Grit-Blasted/Ground using constant power grinding machine. Hot rolling of slabs is carried out in a unique Steckel mill provided with Walking Beam Reheating furnace, Roughing Stand and Twin Steckel Stands. Blooms are hot rolled in a 5-stand Semi-continuous Hot Strip Mill.

Hot Rolled coils are annealed & pickled in continuous Annealing-Pickling lines having scale breaker, shot blasting unit, Electrolytic Sulphuric Acid and Mixed Acid bath. Annealed and Pickled coils are cold rolled in Sendzimer cold rolling mills provided with shape meter for high degree of flatness.

Annealing & Pickling of cold rolled coils is carried out utilizing Neutral Electrolytic Salt Bath followed by Electrolytic Nitric Acid and Mixed Acid Baths. There is provision of online/offline Skin Pass Mills and Tension Leveller to produce world class lustrous products. Other facilities include Bright Annealing units in cracked ammonia atmosphere and Strip Grinding line to produce desired surface finishes.

Batteries of Bell Annealing furnaces for annealing ferritics & martensitic grades and Slitting & Shearing lines are provided for finishing the products.

A dedicated facility for manufacture of very thin gauge, narrow precision strips with very high flatness, close tolerances and excellent surface



finish exists in Hisar unit with large no of rolling mills, bright annealing lines, tension leveller & precision slitters enabling Hisar unit to produce cold rolled products in the wide range of 0.05 to 4 mm thickness.

Hisar Unit of Jindal steel has unique facilities for making blanks for Stainless steel & bi-metal coins (10,000 tpy) for India & France and Stainless Steel razor blades steel (12,000 tpy)

R & D

The R & D division plays a pivotal role in retaining and consolidating company's leadership position in the Stainless Steel industry. This is achieved through continuous up-gradation of quality, processes, services and through product innovation to develop new products at competitive costs. Cross-fertilization of knowledge between production, quality control and commercial units in order to maintain global standards has been the guiding principle of the R&D function at Jindal Stainless. Some of the focus areas are:



- Development of high value products to serve niche markets
- Quality up-gradation of existing products to enable enhanced global acceptance
- Cost reduction by process development,

optimization and refinement to provide a consistent competitive edge



- Technology enhancement to increase quality production
- Foster growth and develop new market segments through knowledge sharing with customers and to assist them in their operations and applications of Company products

In addition to the above, the R&D division closely interacts with reputed national and international laboratories/scientific institutions/ Universities to avail expert services & knowledge for critical investigations.

Understanding customer requirements and supplying products as per their requirements is ensured with the help of Quality Assurance and Quality Control groups. Across the entire business chain of supplies, operations and marketing, appropriate quality assurance systems are in place to ensure correctness at each step of the cycle. ISO 9001-2000 Certification of the plant is a testimony to this. ISO 14001 and OHSAS 18001 Systems Certification of the plant assure environment protection and for providing a safe workplace for employees. Other Unit Certifications are AD 2000-Merkblatt W0 for Pressure Equipment Certification (EU); ISO/IEC 17025:2005 for Chemical Lab accreditation in

accordance with ISO/IEC by NABL; PED/97/23/EC for Pressure Equipment Directive (EU); MD00/3110/0004/1 for Approved Manufacturer in accordance with Lloyds's Register for SS Plates; CPR/89/106/EEC for (CE Marking) Manufacturing in accordance with Directive 93/68/EEC of the Council the European Communities for the Products to be used in construction industries etc.

For ensuring quality at every step, the production processes are constantly monitored and controlled to ensure that the finished products are as per customer's requirements. The plant has well equipped laboratories with a battery of modern equipment viz. Optical Emission Spectrometers, X-Ray Fluorescence Analyser, Carbon Sulphur Analyser, Hydrogen Analyser, Nitrogen and Oxygen Analyser, Corrosion & Stress Corrosion Testing facilities, Universal Testing Machine, Ultrasonic Testing Unit, Impact Testing machine, various types of Hardness testers, Surface Roughness tester, Optical & Scanning electron microscope, Dilatometer, Ferritoscope, Reflectometer, Profile projector and E-cupping testing machine, etc. Well documented procedures ensure correctness in testing and certification of the products.

Interaction with Office bearers of IIM Hisar Chapter



Detailed discussions were held with the office bearers of IIM Hisar Chapter. Mr. Sandeep

Maheshwari, Chairman IIM Hisar Chapter welcomed regular interactions with IIM Delhi Chapter

The issue of regular participation of Hisar Chapter members in the activities of IIM Delhi Chapter was discussed in detail.

JSL Hisar was invited to participate in the exhibition of forthcoming MMMM-2018 Event during Aug. 2018 in Pragati Maidan, New Delhi. Adequate interest was shown by officials of JSL and the same would be followed up jointly by ITEI and IIM Delhi Chapter.

The visit to JSL Stainless Ltd. Hisar ended with thanks to JSL Stainless Ltd. and IIM Hisar Chapter for facilitating this visit.

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STEEL

Amid consolidation in China, prices recover: India standing tall

Demand in China, which produces half the world's steel, has been surprisingly strong recently and the country closed some plants to ease a glut that had spread across the globe. That led to a steep drop in exports, helping steel prices extend a recovery. Even the crumbling US steel industry is doing better. The month of July witnessed higher prices and volumes and if the US steel market continues going as it is currently, it could earn better share prices for the US steel companies. However, according to experts, the US market may not continue in the same manner for the rest of the year. Some US steel sector share prices were boosted earlier this year by the hope President Trump would pump billions into infrastructure. Then, as hopes faded for that outcome, there was the prospect of trade measures to curb imports of foreign steel. However, the president went on

to say that instead of imposing sanctions "very soon", as the steel industry was hoping, his staff will need to do "statutory studies... addressing the steel dumping" issue. On the other side of the market, Japanese steelmakers are upbeat on their earnings as they are passing heavier raw materials costs on to customers by raising product prices, betting on solid demand at home and abroad. However, the main risks to their earnings outlook would be the impact, if any, on the Chinese economy, the world's biggest steel producer and consumer, from policy changes after the 19th National Congress of the Chinese Communist Party later this year, or any action taken by the US government to curb its steel imports.

According to Keiju Kurosaka, senior analyst at Mitsubishi UFJ Morgan Stanley Securities, Japanese steel makers will enjoy good results as their margins will improve after their price hikes. Nippon Steel & Sumitomo Metal Corp, Japan's biggest steelmaker, forecasts a 72 percent jump in its recurring profit for the year to March 31, 2018. Second-ranked JFE Holdings predicted a 136 percent jump "Domestic steel demand is solid, driven by projects related to the 2020 Tokyo Olympics and other infrastructure projects, while overseas steel markets have stabilized as China's exports are capped as its products are consumed locally," says JFE executive vice president Shinichi Okada. As far as the iron ore prices – rise through July to over \$70/dry metric tonne – are concerned, experts believe that it is likely due to a temporary steel restocking cycle in China, and prices will fall to the mid-\$50s/dmt CFR China level or below in the fourth quarter of 2017, Barclays investment bank said in a report recently. Restocking trend has boosted iron ore prices, on top of supportive macroeconomic conditions in China which had been aiding demand, Barclays said in a report.

"Good demand conditions alone are not sufficient to explain the recent price movements," Barclays analyst Dane Davis in New York said in the report. "We think that a steel restocking cycle is currently taking place, supporting the rally for the bulk material. As a result, iron ore priced at \$70/dmt looks unsupported, and we think that a reversion to a mid-to-low \$50/dmt handle by fourth-quarter 2017 is increasingly likely," he added. However, the iron ore price rise has affected the profit margins of Indian steelmakers. India's second largest steel producer, JSW Steel reported a sharp fall of 43% on a year-on-year basis in its consolidated net profit to Rs 624 crore during the April-June quarter due to cost pressure from high iron-ore and coking coal prices even as steel prices declined. JSW reported a 44.3% drop in consolidated net profit to Rs 626 crore with Ebitda (earnings before interest, taxes, depreciation and amortization) margin shrinking by over 10 percentage points -17.9%. The company's management said the main reason for such a big drop in Ebitda margin was the fact that while domestic steel prices corrected in sync with the rest of the world, domestic ore prices didn't. The company also suffered due to high fuel cost despite coking coal prices trending down during the quarter since it had high cost inventory from the preceding quarter.

Seshagiri Rao, JSW Steel's joint managing director and CFO said that despite such headwinds, the company managed to ensure flat blended realizations by increasing the sales of coated products and other high-value products. "We have done quite well in changing our product mix to address the issues that had prevailed during the quarter," Rao said. However, given the current stage of development and the likely growth path for India's economy in the next decade, steel demand in India will witness significant growth in

future. This could be the reason why other steel giant Tata Steel plans to focus more on India as it expects global markets to face headwinds due to geopolitical issues.

N Chandrasekaran, Chairman, Tata Steel said the global steel industry continues to witness challenging times though the performance of the industry has been better this fiscal. According to the World Steel Association, global steel output would taper next year and the slowdown is expected to continue through 2035 as countries around the world start to rein in output while demand retreats. On the production front, the India's crude steel production declined marginally by 1.1 percent to 7.9 million tonne (MT) in June, according to the latest report by World Steel Association. The steel output stood at 8 MT in the same month last year, it said. However, the domestic production in the first six months of 2017 increased by 5.3 percent to 49.48 MT over 46.9 MT in the same period of 2016, the data said. Global steel production for the 67 countries reporting to World Steel Association (worldsteel) was 141 MT in June this year, registering an increase of 3.2 percent over 136.6 MT in June 2016.

Though the Indian steel sector faces new sets of challenges, it is gearing for a new growth trajectory. Thanks to the prompt trade measures undertaken by the government the unabated flow of cheap steel imports into the country that seriously threatened the survival of steel producers, big or small, were stopped. Fortunately, it was not India alone, many other major steel producing countries like the US, Canada, EU, Japan, South Korea, Turkey and Vietnam were fighting the challenge of low priced imports from China, Ukraine, Russia by adopting anti-dumping and countervailing duty

measures and could successfully block these imports.

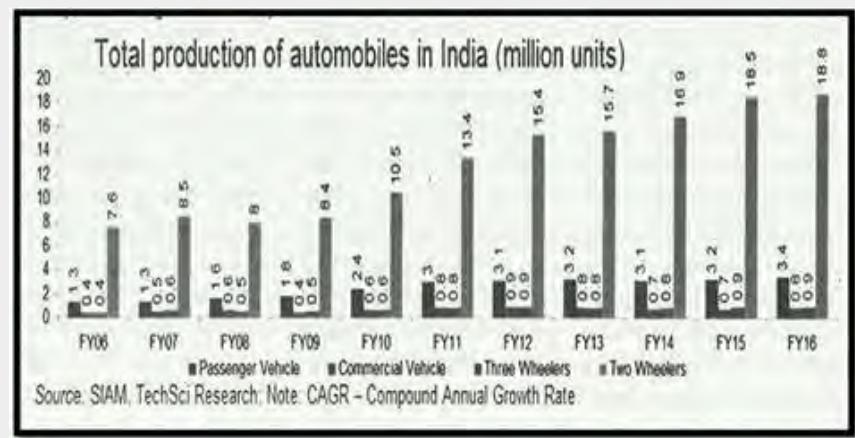
Source: MMR

LIGHT WEIGHTING OF AUTOMOTIVE THROUGH ALUMINIUM

Vehicle light weighting has been high on the agenda of the automotive industry for many years, and there have been many successes in terms of individual components and systems that weigh less than their predecessors. However, the issue has now been bought further into focus by a combination of conditions:

- The imposition of increasingly stringent greenhouse gas regulation;
- The reduction in opportunity for further fuel efficiency gains through other more cost effective means;
- The continuing and relentless demand for additional systems and features that add to vehicle mass;
- The enhanced importance of light weighting to vehicles with alternative powertrains (non-ICE); and
- The reduction in engineering and commercial risk associated with developing alternative materials technologies.

The automotive sector has become a pillar of



economic growth for our nation. India's move up the global automotive manufacturing rank from 14 to six in the last 15 years points to the country's coming of age as a manufacturing destination of choice, with practically all major global original equipment manufacturers (OEMs) setting up India operations, India development centres and increasing sourcing from India. India is also a prominent auto exporter and has strong export growth expectations for the near future.

In addition, several initiatives by the Government of India and the major automobile players in the Indian market are expected to make India a leader in the 2W and Four Wheeler (4W) market in the world by 2020. The Government of India encourages foreign investment in the automobile sector and allows 100 percent FDI under the automatic route.

Some of the major initiatives taken by the Government of India are:

- The Government of India plans to introduce a new Green Urban Transport Scheme with a central assistance of about Rs 25,000 crore (US \$3.75 billion), aimed at boosting the growth of urban transport along low carbon path for substantial reduction in pollution, and providing a framework for funding urban mobility projects at National, State and City level with minimum recourse to budgetary support by encouraging innovative financing of projects.
- Government of India aims to make automobiles manufacturing the main driver of 'Make in India' initiative, as it expects passenger vehicles market to triple to 9.4 million units by 2026, as highlighted in the Auto Mission Plan (AMP) 2016-26.
- The vision for AMP 2026 is to ensure that the Indian automotive industry is among the top three globally in engineering,

manufacturing and export of vehicles and components, encompassing safe, efficient and environment-friendly conditions for affordable mobility of people and transportation of goods, comparable with global standards. With a target to contribute 12 percent of India's GDP, and generate an additional 65 million jobs, AMP 2026 shows a lot of promise for our industry.

- The Government plans to promote eco-friendly cars in the country i.e. CNG based vehicle, hybrid vehicle, and electric vehicle and also made mandatory of 5 percent ethanol blending in petrol.
- The government has formulated a scheme for faster adoption and manufacturing of electric and hybrid vehicles in India, under the National Electric Mobility Mission 2020 to encourage the progressive induction of reliable, affordable and efficient electric and hybrid vehicles in the country.

Aluminium in automotive industry

Aluminium is the second-most used material in automobiles. It has the potential to become the most-used, as new aluminium alloys are made to deliver more value than steel. At the end of a vehicle's life nearly 90 percent of the aluminium, on average, is recycled. The usage of aluminium in automobiles has been gradually increasing as it improves vehicle performance; reduced CO₂ emissions and boosts fuel economy. Pound for pound, aluminium can absorb twice the crash energy of mild steel and it can provide a weight savings of up to 50 percent compared with the traditional mild steel structure. AHSS evolution in the last years was impressive and the metal is economic competitive.

An asset for lightweighting

Aluminium is an asset for the 'lightweighting'

in transportation. For instance in cars, 1 kg of aluminium replacing conventional materials eliminates 20 kg of CO₂ over the vehicle's life. Railway wagons can use upto 5 tonne of aluminium / wagon; investment recovered through fuel efficiencies in 2.5 years. Aluminium already accounts for 60-80% of aircraft weight; its use deepening further.

Special alloys and tempers have been developed and are in use that provides the properties needed to meet the specific quality requirements of the various parts. Sheet products are provided with special surface topographies, claddings as well as with pre-treatments for lubrication, joining and painting by coil coating processes. In hot rolled, the sheet can be processed directly to final gauge by hot rolling. This process is very economical, but available alloys and tempers are limited. Dimensional tolerances: typically ±0.30 to ±0.40 mm. And in structural parts it can be used in wheel stock, suspension components and body reinforcements. In addition, the cold rolled products are sheet or plate, where the final gauge is processed by cold rolling. Often additional annealing treatments are necessary to adjust the properties specified by customers. Some of the characteristics of using aluminium include: Narrow tolerances on shape and dimensions; thickness tolerances-depend on the type of alloy, sheet or strip thickness range and rolling width, and are listed in standards EN-485-4.

Cast & extruded aluminium

Casting is a simple, inexpensive and versatile way of forming aluminium into a wide array of products. The automotive industry is the largest market for aluminium casting. Cast products make up more than half of the aluminium used in cars. Over 95% of the aluminium die-casting produced in the US is made from post-consumer

recycled aluminium. Automobile makers are now focusing on collaborating with the part die casting manufacturers in order to produce fuel-efficient and lightweight automobiles.

Future directions

The lightweight technology is not against any other technology in energy saving or emission. Lightweight is one of the core basic technologies that involve all the vehicles. It is one of the major future directions for the automotive industry globally. The industrialization of new energy vehicles is further highlighted. The current indication of good performance in existing models, clearly shows the importance for the future of aluminium use in automobiles. So far, results have been excellent – every aluminium intensive car and truck crash tested has earned the highest 5-star safety rating. Consumers are satisfied, not just in terms of fuel economy, but with overall performance, durability and safety.

Source: MMR

JSW STEEL TAKES A BEATING ON HIGHER INPUT COST

Sajjan Jindal's JSW Steel should soon have two factors working to mitigate its rising expenses, amid volatile coking coal and relatively higher domestic iron ore prices. Reduction in cost due to implementation of the goods and services tax (GST) and 25 per cent of captive ore supply expected this financial year are likely to bring down expenses in the coming quarters. "There will be reduction in cost by Rs 500-700 a tonne due to GST. We already passed on the benefit of GST to our customers in July and assuming our suppliers will reduce their cost for us, we will continue to pass this on to our clients," Seshagiri Rao, group chief financial officer, told reporters at the June quarter earnings conference. The Mumbai-based company took a hit on

its operating profit and net profit for the June quarter. Higher raw material prices of both iron ore and coking coal ate into the margins. The company reported a consolidated net profit of Rs 624 crore, down 43 percent from the same period last year. Operating profit declined 41 per cent to Rs 894 crore. Coking coal prices doubled to \$199 a tonne, year-on-year. Iron ore prices remained higher in Karnataka, said the management. Despite lower realisations, net sales rose 24 per cent to Rs 15,977 crore, mainly due to a change in product mix, it added. Total expenses jumped 32 per cent, the cost of raw material being the highest contributor.

Source: Metaljunction

GOVT. PLANS STRATEGIC DISINVESTMENT OF SALEM STEEL PLANT

The government is planning strategic disinvestment of the Salem steel plant (SSP) in Tamil Nadu and not total disinvestment, the Lok Sabha was informed a few days back. Steel Minister Chaudhary Birender Singh said the financial reports of the SSP in the last few years showed a "dismal" picture of the once most-reputed steel plant in the country. "There is a proposal for strategic disinvestment of the Salem steel plant, not total disinvestment," he said during Question Hour. The minister said legal advisors and surveyors have been deployed to make a detailed analysis of the plant and a decision on the future of the plant would be taken after receiving their reports. Mr. Singh said the plant, which produced 3.39 lakh metric tonnes per annum of steel, was considered to be the country's best plant producing stainless steel. The minister said it has come to light that the plant's 46 per cent loss has happened due to high power tariff and the Tamil Nadu government has been requested

to provide power at reasonable rates. Replying to another question, Mr. Singh said India has a crude steel capacity of 126 million tonnes as on March 2017. "The national steel policy 2017 envisages enhancing the domestic crude steel capacity to 300 million tonnes by 2030-31," he said. The minister said the crude steel capacity added 2007-08 to 2016-17 was 66.49 million tonnes. During this period, domestic finished steel consumption grew by six per cent compounded annual growth rate and hence the reason for the financial health of the steel sector cannot be attributed to stagnant steel demand. However, the financials of steel companies were adversely affected due to significant price fall of steel commodities and increase in imports of total finished steel (71 per cent) during 2014-15, he said.

Source: Metaljunction

TATA STEEL EYES COMMERCIALISATION OF ADVANCED MATERIAL GRAPHENE

Tata Steel is working on commercialisation of graphene, an advanced material and considered to be a superb conductor. The first product is in the market. The company has launched ready-made graphene-coated stirrups, named Tiscon Superlinks+. Peeyush Gupta, vice-president (steel & marketing), said when four columns are built, the support link is normally supplied by a local mason, which is made of steel. "But, it usually rusts. We have changed that by coating it with graphene." Superlink+ has enhanced corrosion resistance and better bonding strength than other stirrups in the market. Tata Steel has filed seven patent applications in this area of work. Graphene can have a number of applications; we are searching for the right products, Gupta said.

A graphene development cell has been set up at Jamshedpur to identify applications and establish new businesses (production units, supply chain and markets). Two advanced material research centres of excellence have been established. One is at Chennai, in collaboration with the Indian Institute of Technology there. The other is at Bengaluru, with the Centre for Nano and Soft Matter Sciences. Graphene is believed to be the world's first two-dimensional material. It is ultra-light, 200 times stronger than steel and yet incredibly flexible. It is a superb conductor and can act as a perfect barrier; it is also transparent. Graphene research is focused on applications in energy, membranes, composites and coatings, biomedical, sensors and electronics.

Gupta said that as long as graphene is used as a value-add in steel, Tata Steel could work on it. For other applications, it would have to approach other companies. For instance, graphene could be supplied to the glass industry. If coated with graphene, it will not fog at the centre. At the same time, it's colourless. An application would have to make economic sense. The lowest kind of graphene is priced at around Rs 100 a gramme; the high-end is around Rs 5,000 a gm. According to Tata Steel's latest annual report, the Indian graphene market is currently pegged at around Rs 80 crore.

Apart from graphene, Tata Steel has got a patent for another product, iron powder. Gupta said, "Kellogg's uses iron powder to feed in cornflakes, pharma companies use it, health departments use it for building iron potency, among many of its applications." The good quality iron powder is imported into the country. "We can make better quality iron powder. We are now approaching companies. We have just moved from research and development to lab. Then, we will set up a commercial plant,"

he said. It would, he felt, be a relatively easier territory to break into. "Unlike graphene, people have been using iron powder."

Source: Metaljunction

SAIL TO FOCUS ON CUTTING COSTS

Steel Authority of India Ltd (SAIL) has charted a roadmap to turn around. In an official statement, the public sector undertaking said it will set an Earnings before interest, tax, depreciation and amortisation (EBITDA) target for the next two to three years. The turnaround goals were spelled out by SAIL Chairman PK Singh to company employees. He said: "Market conditions are volatile and we have to adapt to them fast, matching the world standards." The goals highlighted by Singh include reducing procurement and finance costs. The company will also focus on reducing the operating cost of old and new assets and overhead costs. In addition to these, the company will work on improved marketing, branding and distribution. Ramping up production from new and modernised units and completing pending projects at the earliest have also been listed for the turnaround.

Source: Metaljunction

SAIL NEEDS TO REALISE POTENTIAL OF TECH AT PLANTS: CHAIRMAN

Potential of new-age technologies at SAIL plants must be realised and utilised in order to tap the growing opportunities in the sector, a top official of the steel PSU said. Interacting with workers at the Bhilai plant yesterday, Steel Authority of India Ltd (SAIL) Chairman P K Singh said, "Market conditions are volatile and we have to adapt to them fast matching the

world standards." "Bhilai and all plants of the company have newer and better technologies at their disposal which must be judiciously utilised and its full potential should be realised," he added. SAIL top management has been visiting company units and offices across the country as it aims at clearly conveying its top priorities and identifying main issues at plant level. The chairman had earlier visited SAIL's Bokaro Steel Plant where he held a group interaction with a cross section of more than 600 plant employees. Steel Authority of India (SAIL) saw its standalone net loss widening to Rs 801.38 crore for the June quarter due to higher coal prices and expenses. The state-run steel major had clocked a net loss after tax of Rs 535.52 crore in the corresponding quarter of 2016- 17.

Source: Metaljunction

RISING DEMAND ALLOWS STEEP RISE IN STEEL PRICES

Flat steel producers have raised prices (effective August 1) up to Rs 3,000 a tonne, one of the steepest in recent times.

Last month prices were raised by about Rs 1,500 a tonne. With improving demand, these have moved ahead of raw material prices, signalling the industry's stronger grip over the market. In the past 30 days, the latter have increased by about \$100 a tonne; China has raised by 4.4 per cent this year, as opposed to 0.1 per cent last year.

Domestic steel demand

Months	(in mt)	(rise in %) y-o-y
Apr	6.015	3.4
Apr-May	13.78	4.2
Apr-Jun	20.99	4.6

Source: Joint Plant Committee; mt: million tonne

A steel producer said there was also a strong demand revival in the domestic market, partly due to the approaching festive season and due to restocking after clearing of uncertainties in the post-goods and services tax scenario. Producers do not rule out another increase towards the middle of the month. "We see domestic demand for steel continuing to rise, as government spending has moved up in areas such as solar energy, water and transmission pipes. Due to this, domestic prices have the scope to move up by seven-eight per cent," said Jayant Acharya, director (commercial) at JSW Steel.

However, it remains to be seen if the demand-pull at home is sustainable. "With the landed cost of imported hot rolled coil reaching almost \$510 a tonne, the (present) anti-dumping duty or safeguard duty will not be applicable. The only protection for the domestic industry at this level is the basic customs duty. Raising domestic prices beyond this level will have to be supported by either a further increase in international prices and/or a significant improvement in local demand," says Jayanta Roy, senior vice-president at ratings agency Icra. Earlier, to protect the domestic industry from an onslaught of cheaper import, the government had imposed anti-dumping duties of \$478 to \$489 a tonne on hot rolled alloy and non-alloy coils (HRC) and \$561 a tonne on hot rolled steel plates from China, Japan, Russia, Indonesia, Brazil and South Korea. Domestic HRC before this round of price increase was Rs 36,800 a tonne. On the cost side, iron ore prices which had tapered to \$50 a tonne are now around \$75. Coking coal has moved from \$145 a tonne to about \$180. These two together accounts for about 75 per cent of steel's input cost.

Source: Business Standard

STAINLESS STEEL COACHES CAN LOWER IMPACT OF MUZAFFARNAGAR-LIKE TRAIN ACCIDENTS'

Rail coaches made of stainless steel instead of carbon steel can minimise the impact of train accidents, an industry body has said. "If all the railway coaches in the country could be made of stainless steel instead of carbon steel, it can bring down the number of lives lost in train accidents significantly," the Indian Stainless Steel Development Association (ISSDA) said referring to recent train accident in Muzaffarnagar district of Uttar Pradesh that claimed 22 lives. The ISSDA is the apex association of leading stainless steel producers in the country. It said the use of stainless steel in passenger coaches is a common practice in developed economies such as the US, Canada, Brazil, Japan, Korea and Australia and in many East Asian countries.

Stainless steel coaches also ensure safety and reliability through super fire and corrosion resistance, the association said, adding that the intrinsic weight of vehicle decreases, thereby increasing its load carrying capacity and fuel efficiency. In case of accidents, stainless steel undergoes lesser deformation, which further helps in rescue operations, it said. "Over 23 million people commute through trains in India on a daily basis. There is an urgent need to migrate to stainless steel coaches to improve safety of rail passengers ... Indian Railways are already seized of the matter and taken up programme for increasing manufacture of LHB stainless steel coaches," said K K Pahuja, President, ISSDA. The association said Indian Railways, at present, is using stainless steel coaches in LHB designs only for Rajdhani, Shatabdi and other premium trains.

LHB coaches are designed to be anti-telescopic, which means that they do not pile up over each other in the event of derailment, it said. Stainless steel coaches are stronger and absorb more energy during collision and they can withstand considerable impact without fracturing, it said.

Source: Metal junction

STRESSED FINANCES PUT NINL'S FUTURE OPERATIONS AT STAKE

A roadmap has been charted for NINL to catapult to a steel making capacity of five million tonnes per annum (mtpa), up from one mtpa now. The capacity ramp up needs investments of the order of INR 250-300 billion.

Neelachal Ispat Nigam Limited (NINL), a public sector steel maker and the largest producer

NINL'S FINANCIALS AT A GLANCE		
	Gross Sales/ Income (in crore)	
2012-13	INR 1625.61	2012-13
2013-14	INR 1595.41	2013-14
2014-15	INR 1315.64	2014-15
2015-16	INR 1190.25	2015-16
	Total Expenditure (in crore)	
2012-13	INR 1395.31	2012-13
2013-14	INR 1486.87	2013-14
2014-15	INR 1207.68	2014-15
2015-16	INR 1085.45	2015-16
	Net Loss (in crore)	
2012-13	INR 79.14	2012-13
2013-14	INR 147.22	2013-14
2014-15	INR 232.67	2014-15
2015-16	INR 334.51	2015-16

Source: NINL Annual Reports

cum exporter of pig iron is staring at a bleak future. Despite being a proven asset with consistent production parameters and a captive iron ore mine in its kitty, the integrated steel unit at Duburi in Odisha's Kalinganagar steel complex has been let down by weak financials. Depressed market conditions have seen the steel company posting losses since 2012-13. NINL, where state run trading firm MMTC is the largest equity holder, has a chequered history of operations. The strategic location of

the steel plant coupled with its high grade iron ore deposits at the back end has lured bigger steel makers like Steel Authority of India Ltd (SAIL) and Rashtriya Ispat Nigam Ltd (RINL) to have controlling stakes in the project. Both SAIL and RINL have made hostile but unsuccessful bids to acquire this asset, purportedly with an eye on the captive iron ore mines.

With 49.78 percent stake, MMTC is the biggest shareholder in NINL. Two Odisha government PSUs- Odisha Mining Corporation (OMC) and Industrial Promotion & Investment Corporation Ltd (Ipicol) between them have combined equity of 27.61 percent. A roadmap has been charted for NINL to catapult to a steelmaking capacity of five million tonnes per annum (mtnpa), up from one mtnpa now. The capacity ramp up needs investments of the order of INR 250-300 billion. Apart from debt financing by banks, the expansion needs substantial equity infusion by the lead promoters in NINL. But given NINL's stressed balance sheet, bankers would be hesitant to advance credit. MMTC for long has been dithering on this equity infusion in the steel PSU. This has jeopardised NINL's future operations. Lack of equity infusion by MMTC has prompted none less than the Odisha chief minister Naveen Patnaik to escalate the matter to Union commerce and industry minister Nirmala Sitharaman. Patnaik has underscored the need for additional equity support of INR 3 billion to NINL by the promoters to help the steel maker wriggle out of an acute financial crisis.

To come out of the financial rut, NINL has taken a string of measures such as refinancing its existing project loan under RBI's 5/25 scheme. While stipulating the scheme, the bankers have put forward a pre-condition that the promoters have to infuse additional equity of INR 3 billion. The Odisha government has already approved the infusion of INR 0.8 billion equity by OMC in

the past two years as pro-rata share by OMC. However, such an equity infusion is subject to MMTC contributing INR 149.34 crore as its share. NINL's growth and survival is pivotally linked to its 3700 employees. Earlier, in January this year, the Odisha government has also executed a mining lease for iron ore in NINL's favour to provide assured supply of iron ore. Steel PSU NINL's plan to expand steel capacity from 1.1 million tonne per annum (mtnpa) to five mtnpa has been marred by slump in the steel market. NINL, the biggest producer and exporter of pig iron was finding exports unviable due to cheaper supplies from China and Ukraine. The company has been posting losses since 2012-13 and closed 2015-16 with a steep loss of Rs 334.53 crore.

SAIL's bid to acquire stake in NINL dates back to July 2005 when a committee of secretaries (CoS) had recommended the merger of NINL with SAIL as per a proposal by the steel ministry. Alternatively, the ministry had suggested inducting another PSU Rashtriya Ispat Nigam Ltd (RINL) as a strategic investor in NINL. In May 2009, the ministry revised its proposal, suggesting that RINL should purchase 51 percent equity in NINL from MMTC and other PSUs. But, the proposed merger of NINL with RINL fell through as MMTC failed to get the fair value of its share. For the future, Mecon has prepared a techno-economic feasibility report on NINL's expansion. As per the rough estimates of Mecon, the fund for NINL's first phase expansion has been worked out at INR 56 billion. Out of this, the promoters' contribution comes to nearly INR 10 billion. MMTC's share would be in the range of INR 4-5 billion and the rest equity would come from other promoters. NINL has chalked out a plan to achieve steel output of five mtpa in two phases. Full capacity expansion estimated to cost INR 250-300 billion, is slated to be achieved

by 2025. Already, INR 36 billion has been invested on the NINL steel plant at Kalinganagar. Investment banker SBI Caps has projected that NINL would turn profitable in 2016-17 with stabilisation of its steel melting shop (SMS) and commissioning of its captive iron ore mines at Koida. The captive mine has 110 million tonnes of iron ore deposits and promises to save INR 2.5 billion every year for NINL. The NINL plant has a capacity to produce 0.5 million tonne (mnt) of basic pig iron, 0.3 mnt of steel billets and also, 0.3 mnt of steel wire rods per annum. Instead of exports, NINL is selling more of its pig iron in the domestic market and is able to recover cost of production and stay EBITDA positive.

Source: Steel 360

GOVERNMENT OF INDIA'S PREFERENTIAL STEEL POLICY BEGINS TO PAY OFF

In what comes as a major push towards Government of India's (GOI) Make in India vision and the policy of providing preference to domestically manufactured steel in government procurement, GAIL reportedly cancelled a major tender for procurement of steel for its Jagdishpur-Haldia pipeline to give preference to domestic producers. The tender floated for a 700 km pipeline has a steel component of 170,000 tonnes and the project was valued at around INR 12 billion. A similar tender for the Vijaipur-Auraiya pipeline project was also affected by the government notification issued on May 8 and was re floated within 10 days. Sources revealed that the combined value of tender cancelled or affected is above INR 30 billion.

Union Cabinet issued a notification in May approving the policy for providing preference to domestically manufactured steel in

government buying and thus reinforcing its protectionist stance for the steel industry. Steel minister Chaudhary Birender Singh was quoted as saying that tenders from central as well as state governments and state firms, where the project is worth more than INR 500 million, will give preference to domestic firms unless the quality or quantity is not locally available, or if there is a 15% value addition in India. However the Steel minister was also clear in stating that the preference was only to counter cheap imports and if foreign firms are willing to set up manufacturing in India on a technology sharing agreement, they would also be benefited equally by the new policy. The policy notifications clearly states, "The policy is envisaged to promote growth and development of domestic steel industry and reduce the inclination to use low quality low cost imported steel in Government funded projects. It shall be the responsibility of every Government Agency to ensure implementation of the policy".

According to official sources the estimated benefit to Domestic steel players is likely to be in several billion as they would not be competing with Chinese suppliers who have been pricing their products at an unrealistic rate. The policy along with Anti-dumping measures are likely to play a major role in resurgence of the Indian steel industry. The government has been stressing on domestic production since the two years and has wielded its measures widely through major PSUs. It may be recalled here that GAIL in December 2016 was forced to cancel a USD 7 billion tender for hiring ships after the bidders did not agree to the Make in India terms.

Meanwhile, within a month since the notification was issued PSUs have shunned cheaper foreign imports for locally made steel products but only at the cost of increased project expenditure.

The Government has remained cautious about unreasonable increase in prices. Experts believe these protectionist measures such as anti-dumping and preferential procurement may grant an undue pricing power to domestic players, which may even lead to cartelization. The increased prices may also lead to a direct rise in cost of public projects thus affecting infrastructure development.

The Government has taken due stock of this possibility following which Joint Secretary of Ministry of Steel Syedain Abbasi recently hinted that unreasonable rise in prices of steel would compel GOI to withdraw its support for the domestic industry along with protectionist measures such as anti-dumping and priority in government procurement. He stated that "While we are willing to give protection, it comes with a sense of responsibility so please be responsible, otherwise charges of cartelization become very difficult to fend off as prices start rising dramatically." "It would become untenable for us to continue if you suddenly find that the prices in the next tender for GAIL pipeline have gone up by 30 percent", he further added. Abbasi stated that it is not in the government's interest to buy steel at prices which are very high. It still remains to be seen what impact is the policy to have on project cost and tender value. Though the government has provided a permissible value addition of up to 15 percent it is still not clear if the domestic bidders submit tenders at a higher rate or take a more responsible approach.

Source: Steel 360

CAN STEEL SECTOR BEAT THE 'STRESS'?

The beleaguered steel industry was in for a shocker when things were looking up.

Government's interventions in the form of duty protection measures and imposition of Minimum Import Tariff (MIP) to save the domestic producers from the deluge of imports gave a huge bout of relief. Imports saw a drastic fall; exports overshot imported volumes and margins shored up for the steel makers. However, the steel industry's mammoth exposure to bank's bad loans played spoilsport. When the Reserve Bank of India (RBI) identified the list of 12 hugely stressed steel accounts with unsustainable NPAs (non-performing assets), the rot was out in the open.

The gross bad debt of the Indian banking system as of March was at Rs 7.11 lakh crore, which means the 12 accounts would be responsible for about Rs 1.78 lakh crore. Total exposure of the country's iron and steel sector in the banking sector stood at Rs 3.13 lakh crore (as on March 31, 2016).

But due to weak demand, surge in cheaper imports and sharp price correction across geographies, the domestic steel sector witnessed a significant rise in stressed accounts during this period with gross NPAs of about Rs 1.15 lakh crore by the end of March 2016 which is about 37 percent of its total exposure to the banking sector. The 12 accounts contribute 25 percent to the gross NPAs of the banking system and qualify for immediate reference under Insolvency & Bankruptcy Code (IBC).

The first list of six stressed accounts released by the RBI features companies with a combined debt of Rs 1.6 lakh crore-Essar Steel, Bhushan Steel, Bhushan Power & Steel, Monnet Ispat, Alok Industries and Electrosteel Steels. These stressed accounts need to be resolved as per the Insolvency & Bankruptcy Code (IBC), 2016. These are accounts to which lenders have an exposure of more than Rs 5,000 crore and

more than 60 percent of which have been recognised as NPAs. With a gross debt of Rs 44,477.93 crore as on March 31, 2016, Bhushan Steel is probably the single largest exposure that banks have on their books. The Essar Steel account too is fairly large, with lenders having disbursed some Rs 37,284 crore. Bhushan Power & Steel, which owes banks around Rs 37,248.26 crore, is another account that is in trouble. Lenders have a slightly smaller exposure to Alok Industries (Rs 22,075.15 crore), Monnet Ispat and Energy (Rs 12,115 crore) and Electrosteel (Rs 10,273.59 crore). Once these cases are referred to IBC, the lenders to these companies would need to set up a committee that will come up with a plan for resolution. If that cannot be done in a period of 180 days – this can be extended to 270 days – the borrowing entity will go into liquidation. But, steel firms' promoters have the option of challenging the insolvency proceedings in the High Courts. Essar Steel is the first firm to do it in the Gujarat High Court. Cases mired in litigations can potentially delay and cripple the process of resolution of stressed assets.

The identified stressed companies together constitute about 16 percent to India's installed steel production capacity. Profitability and coverage indicators of these accounts hit a rock bottom in 2015-16 as a result of commodity price meltdown and onslaught of cheaper imports. Though the operating profitability of most of these accounts improved in 2016-17, net profitability remained in the negative territory due to significant interest burden. Interest coverage ratio for most of these accounts and total debt to operating profit ratios remained under stress even as financial performance of steel players improved on the back of favourable government policies. The operating margins of 18 large and mid-sized

steel companies in the country accounting for around 60 percent of the domestic installed capacity improved to 14.4 percent in Q4 of 2016-17 from the low of 6.1 percent in Q3 of 2015-16. Nonetheless, the steel sector remained leveraged even at the end of FY17.

The rated capacity of the domestic steel industry stood at 128 million tonnes but actual operational capacity was lower given that capacity utilisation of stressed players are lower than the industry average of 75-80 percent in 2016-17. To address the problem of stressed assets in the banking sector, several steps were taken like Strategic Debt Restructuring (SDR) and Scheme for Sustainable Structuring of Stressed Assets (S4A). But, it was only after an amendment of the Banking Regulation Act, 1949 through an Ordinance and the enforcement of the IBC that the resolution of stressed steel accounts appears more realistic and achievable.

What's needed is a swift resolution of these stressed assets – its impact on the domestic steel industry depends on the actual implementation of the IBC proceedings. The ongoing insolvency proceedings have the potential to spell consolidation in the steel industry. Stronger steel players with healthy financials stand a chance to increase their market share by bidding for these assets at attractive valuation. But, it is tough to find takers to absorb all the stressed steel companies as there are not many peers with deep pockets to snap them up. Overall, the post insolvency scenario looks positive as the steel industry hamstrung by weak demand and oversupply can expect to benefit in the long run.

Source: Steel 360

STEEL THE BUILDING BLOCK FOR A STRONG ECONOMY

India, the third largest producer as well as consumer of steel, as an industry accounts for almost 2 percent of India's GDP. This industry also has the highest debt exposure with local financial institutions. Steel industry is important for the country because it has one of the highest economic linkages in overall GDP. Steel has an output-multiplier effect of around 1.4 times on GDP, so if steel industry grows by 1 percent, its proportionate impact on GDP would be 1.4%.

In 2016, India retained its position as the fastest growing major steel economy in the world. Now India envisions doubling the capacity to 300 million tonnes. The Government of India has come up with the new National Steel Policy with an aim to support the domestic steel industry. The policy projects crude steel capacity of 300 million tonnes (mnt), production of 255 mnt and a robust finished steel per capita consumption of 158 Kgs by 2030-31. The key features aim for development of globally competitive steel manufacturing capabilities; cost-efficient production as well as domestic availability of iron ore, coking coal and natural gas.

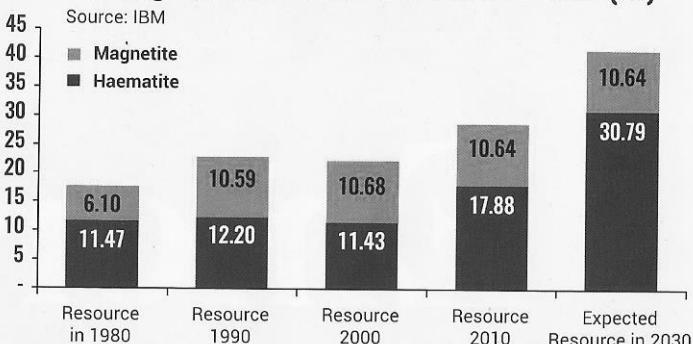
To make steel affordable and to revive the steel industry the below roadblocks have to be eliminated:

- Restrictions on iron ore mining in some states
- High dependence on coking coal import
- High tax burden on raw material
- High transportation cost
- Lack of investment in R&D and innovation

The governments of India and Karnataka would require solving the issue of mining cap with honourable Supreme Court to permit the mines in Karnataka to return to their full capacity which had been reduced as a result of the honourable

SC imposing a cap on the same. With the new

Growing Iron Ore Resource Addition in India (Bt)



electronic monitoring system, satellite based Mining Surveillance System and transparent system like TAMRA (Transparency, Auction Monitoring and Resource Augmentation) issues like over exploitation and illegality in mining have been mitigated.

Further, the government is now well equipped with a huge corpus to the tune of INR 11,800 crores (in the Karnataka region as a result of CEPMIZ(SPV)) levied in the mining districts meant for environment and related activities towards the damage caused during the hey days of the industry. With such huge cash pile in position the fund can very well lead to restoring environment and improving mining infrastructure in the state which will support increased iron ore availability to the steel mills. Iron ore prices in both domestic as well international markets have buckled down and are likely to continue in a downward trend due to oversupply in the global iron ore market. Miners across the globe are trying to reduce costs to remain competitive. An impetus to mutually benefit both the industries is, to allow miners to operate to their full capacity in all states across India to benefit from economies of scale to reduce fixed cost.

Secondly, as far as coking coal is concerned, the government is already looking to expand the domestic coking coal production tackling

the supply side of the equation in the longer term. While the new steel policy talks about setting up more coal washeries and investing in exploration of coking coal, research and development should progress to make use of all grades of iron ore available in the national. The steel industry therefore should look at enhancing and adopting latest technology in the plants to consume all grades available domestically.

States	Source: IBM, In-house estimate capacity					
	Haematite Resource (Mnt)	Magnetite Resource (Mnt)	Total Resource (Mnt)	Production (FY15-16, Mnt)	Resource Life (Haematite, Years)	Resource Life (Total, Years)
Andhra Pradesh	381	1,464	1,845	0.49	779	3,765
Chhattisgarh	3,292	-	3,292	24.6	134	134
Goa	927	223	1,150	20*	46	57
Jharkhand	4,597	11	4,607	19.1	241	241
Karnataka	2,159	7,802	9,960	30*	72	332
Madhya Pradesh	231	-	231	2.46	94	94
Maharashtra	283	1	285	1.42	199	200
Odisha	5,930	0	5,930	79.9	74	74
Rajasthan	31	527	557	1.14	27	489
Others	51	617	668	-	-	-
Total	17,882	10,644	28,526			

*current production

India has really competitive advantages in steel and the new policy recommendation to source raw material from secondary markets such as scrap, many believe, will to some extent fritter the industry. Few manufacturers have even expressed concern that by doing this we will be throwing away the scope of creating employment opportunities, while impacting the environment and providing a route to any unregulated / hazardous scrap to find its way to our soil.

With India being a mineral rich country having large reserves of iron ore, the question that should we be resorting to scrap as feed for the steel industry, has also been raised.

India has a similar geology to that of Australia which produces over 850 Mt of iron ore while our production of iron ore is only 155 million tonnes. What disappoints is that the share of

mining in the country's gross domestic product (GDP) is a little over one percent. In fact, the sector's contribution to GDP has fallen in the past decade, in the face of growing domestic demand for minerals. A McKinsey



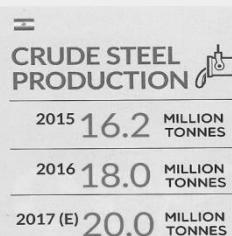
SCRAP IMPORT



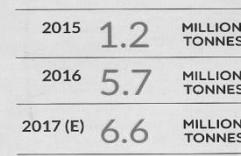
With per capita consumption of steel at 26 kg, the country's domestic steel industry stands an immense opportunity to flourish. The government projects account for nearly 40% of total steel consumption.

report says mining has the potential to create six million new jobs and contribute an additional USD 47 billion to GDP by 2025. Mining jobs get created in the most backward districts of India's poorest states.

India has the fourth largest reserve of iron ore. As per Indian Minerals Year book 2014 published by Indian Bureau of Mines, India has 28.5 billion tonne of iron ore resource. From 2000 to 2010, India has added 6.5 billion tonne of resources which



SEMI FINISH & FINISH STEEL EXPORT



Quantity in MnT | E-Estimated Figure
Source: WSA, SteelMint



translates into 650 mnt each year. Assuming we take the same rate of growth in resource addition, India's total resource base will reach an estimated level of 40 billion tonne by 2030. If we consider state-wise resources, at the current production rate if we can exploit the Magnetite resources efficiently our iron ore resource can last for 600 years on an average. Even if we consider only the Haematite resource, the average resource life for each state comes at 185 years at current

mining rate. The other aspect that has to be looked into for making steel "affordable" to common public, is to reduce the tax burden on the raw material (both Centre and State).

Coking coal is taxed at 2.5% Import duty, this coupled with the Rs 400 per ton of Clean Energy Cess imposes a substantial burden on the Coal cost for steel companies. Further to this, the cascading impact of taxes imposed on Iron Ore in the form of royalty, SPV Fund (in Karnataka), Goa Permanent Fund (in Goa) impose further cost on steel industry. The cumulative cost of these taxes is approx. Rs 2,000 per ton (based on the fluctuating prices), almost equal to the conversion cost of RM to Hot metal in a blast furnace. These taxes

But there are drawbacks too. For example, at JSW Steel, it was found that for a plant to be viable the Corex process still needed about 15 percent coke. Furthermore, it has also been found that Corex plants require large amounts of oxygen which can be expensive.

are not permitted to be set off even under GST, thereby doubling the effective cost of making steel from the raw material. Removal of these costs alone will turn around a number of steel companies in the red currently.

A point to ponder is when countries like Japan and Korea and to a great extent China which are dependent on imported iron ore and coking coal can sell cheap but quality steel products to India why is it that Indian steel companies which can buy iron ore at much cheaper prices in the domestic market need protectionist measures from the government. Hence, Government policy should be more oriented towards making the steel industry inherently competitive by making them invest in R&D and less dependent on controlling domestic iron ore price. Investment in R&D by our steel producers is less than 0.5% of sales as compared to 1-1.5% by the Japanese and Korean steel makers.

Source: Steel 360

AUTOMOTIVE STEEL & CRGO SHOULD BE TOP PRIORITY

- Q. How modern is our steel-making technology in relation to the western world in terms of the gamut – mining, iron ore beneficiation, steel manufacturing etc? Have we been able to keep pace with evolving technologies in the west or are we majorly lagging behind?

Most Indian Steel Majors are definitely lagging in the areas of R&D in developing high-end products which can compete in developed geographies such as Europe, Japan, the US and Korea. Where in indigenous production of CRGO steel is concerned, there is still a long way to go. Extensive adaption of technologies like Finex and ITmk3 should be beneficial in iron ore because these processes can use fines and non-coking coal to produce liquid iron or high-grade iron nuggets, Sanat Bhaumk, Director, Sales Marketing, Steel Plantech India, tells Tamajit Pain.

Excerpts:

- A. Selection of steel-making technology is determined based on techno-economic considerations. However, such technology should be conducive to effective and efficient utilisation of domestic resources with minimum damage to environment. While the leading integrated steel plants like JSW Steel, Tata Steel, SAIL, RINL, Essar Steel, NMDC Nagarnar, etc put maximum effort in adopting modern technology for production of steel, many small and medium-sized steel plants are not able to keep pace with such evolving technologies, mainly due to economic considerations and low production volumes.
- Q. Where in India lagging behind in particular and in which areas do Indian steel majors and technologies providers need to put stress on, going forward?
- A. Most of the Indian steel majors are definitely lagging in the areas of research and development (R&D) in developing high-end products which can compete in developed geographies such as Europe, Japan, the US and Korea.

The only way to remain competitive will be to reduce cost of production which is possible if plants use the latest technology and automation. For production of hot rolled (HR) coils or long products, combining processes like casting and rolling will definitely reduce both capex and opex.

In construction and engineering applications, Indian steel majors are gradually making a mark to establish their branded products but for high-end applications like automotive, electrical appliances and electrical steel (CRGO), consumers prefer to use imported steel.

- Q. Since growth prospect in demand does not

look too bright, companies are stressing on cost optimisation. In that case, which areas should companies look at?

- A. With cost of input raw materials increasing every day and due to high competition, the selling price is not showing an upward trend. The only way to remain competitive will be to reduce cost of production which is possible if plants use the latest technology and automation. For production of hot rolled (HR) coils or long products, combining processes like casting and rolling will definitely reduce both capex and opex.
- Q. What sort of innovations is your company looking to bring to India and how cost-effective are they likely to be?
- A. Our company, JP Steel Plantech Co (SPCO) is a joint venture of 4 Japanese companies – JFE Engineering, Kawasaki Heavy Industries, Hitachi Zosen and Sumitomo Heavy Industries. SPCO makes full use of the experience and knowledge accumulated by each of these companies to promote its future development. Japan is an earthquake-prone country and designing of lighter structures through use of higher strength steel is their basic requirement. Use of HSS, AHSS and UHSS in automobiles has become compulsory to meet the norms of fuel efficiency and reduce emission. But, in

Japan, use of high strength steel is prevalent everywhere because they need to design earthquake-resistant buildings, bridges, flyovers, roads, etc. This drives companies like JFE Steel and Nippon Steel Sumitomo Metals to thrive for development and production of higher strength steels.

There are many advantages to the Corex process. For example, carbon dioxide emissions are up to 20 percent lower than with the conventional blast furnace and Corex produces far less SO₂ and dust than the blast furnace. In addition, Corex plants do not release as many phenols or sulfides, limiting water contamination .

- Q. Use of robotics and other highly mechanised methods, on the other hand, could result in lesser manual involvement and lower employment level/generation. How can these two aspects be tackled?
- A. In a country like India, impact on employment is definitely a major factor in the steel industry but many activities may not be possible without use of robotics, particularly in hazardous areas where health and safety is a point of concern. Moreover, with use of robotics you are confident of 100 percent compliance and repeatability of activities. So, automation and robotics are must for a modern steel plant.
- Q. Where should present R&D focus be on?
- A. I think high-end automotive steel and production of CRGO steel in the country should be the top priority area.
- Q. Where iron ore is concerned, where does India stand? What needs to be done in terms of beneficiation, making the most of low grade ore etc?
- A. Extensive adaption of technologies like Finex and ITmk3 should be beneficial in iron ore because these processes will use iron ore fines and non-coking coal to produce liquid iron or high-grade iron nuggets.
- Q. In the recent National Steel Policy, India has put stress on production of valued-added steel and CRGO/CRNO. How do you see the technologies evolving in our country?
- A. With major producers like CSCI (Dahej), JSW (Torangallu), POSCO (Maharashtra) and SAIL (Rourkela), CRNO steel production presently in India is much more than its demand. But there is no production facility in the country for CRGO steel and the full requirement is met through imports.

Rashtriya Ispat Nigam Limited (RINL) tried to install a plant but could not be successful in getting the process know-how provider. Presently, Tata Steel and National Metallurgical Laboratory (NML) are trying to develop the process indigenously and establish production through a pilot plant.

But there is still a long way to go where indigenous production of CRGO steel in the country is concerned.

- Q. What sort of a progress do you see in a technology like COREX which can make use of low quality coal and iron ore for steel-making?
- A. The Corex process is a smelting reduction one created by Siemens VAI as a more environmentally-friendly alternative to the blast furnace. At present, the majority of steel production is through the blast furnace route which has to rely on ever-decreasing amounts of coking coal. Unlike the BF, the smelting reduction process uses coal and oxygen directly to reduce iron ore into a usable product. The smelting reduction process comes in 2 basic varieties, 2 stages or single-stage.

In a single-stage system, the iron ore is both reduced and melted in the same container. Meanwhile, in a 2-stage process, like Corex, the ore is reduced in one shaft and melted and purified in another. Plants often using the Corex process are located in South Africa, India and China.

There are many advantages to the Corex process. For example, carbon dioxide emissions are up to 20 percent lower than with the conventional blast furnace and Corex produces far less SO₂ and dust than the blast furnace. In addition, Corex plants do not release as many phenols or sulfides, limiting water contamination.

But there are drawbacks too. For example, at JSW Steel, it was found that for a plant to be viable the Corex process still needed about 15 percent coke. Furthermore, it has also been found that Corex plants require large amounts of oxygen which can be

expensive.

Also the export gas can make the process highly inefficient. However, this particular problem can be mitigated by using export gas in electricity production.

Q. What are the costs involved in both BOF and EAF technologies?

A. In BOF steel-making, the main raw material inputs are iron ore and coal. Currently, these raw materials account for just over 50 percent of BOF steel costs. In electric arc furnace (EAF) steel-making, the main raw material is ferrous scrap.

At present, scrap represents around 75 percent of EAF steel cost. Differences between the total cost of BOF and EAF steel tend to be determined by relative differences between the cost of iron ore and the cost of scrap; but tend over time to broadly even out.

A big difference between the two steel-making processes, however, is in the capital investment costs involved. Whilst a typical integrated (ie, BOF route) steel mill today costs approximately US\$ 1,100 per metric ton of installed capacity, a medium-size EAF-route mini-mill today costs under US\$ 300 per metric ton in terms of the initial capital outlay. For operational cost, electric power tariff plays a major role and in countries like India, EAF is less popular because of high power cost.

Source: Steel Insight

FOCUS ON DUPLEX STAINLESS STEEL REQUIRED

Q. Why is India's steel-making technology in the primary segment mainly borrowed?

A. India is a late entrant in steel-making technology. We borrowed right from Bessemer's technology in the 1860s till the Linz-Donawitz (LD) process. In fact, SAIL's Rourkela Steel Plant was set up based on the LD technology. The basic oxygen (BoF) steel-making process was borrowed from Russia and plants like Bhilai and Bokaro

were set up adopting these technologies. Durgapur Steel Plant was, of course, set up using British technology.

India being a late entrant in steel-making, in the initial years, when its steel industry was taking shape, most of the technology had to be imported. Today, however, needs have changed. There is a demand for steels other than those of standard grade. Hence, the industry should be in sync with the market's demand needs for value-added steel, Sushim Banerjee, Director General, Institute for Steel Development & Growth (INSDAG), tells Madhumita Mookerji and Tamajit Pain.

The steel-making process was primarily borrowed from overseas because these countries were advanced in making cost-effective steel. We borrowed and successfully internalised these technologies. In the 1950s and 60s, when the major growth in the steel industry was taking shape in India, the steel technology here, thus, was at par with that available in internationally. Indigenisation of such technology at that juncture would have taken a lot of time, because fundamental research in steel takes a lot of time.

Our steel requirement was increasing and so one option was importing the entire volume. That was not a very good option and so the government thought it would be better to import the technology and internalise the same to make India's own steel. That's how German and "Soviet" steel technologists came to India, stayed for a few years and imparted their prowess to us.

Q. What is the drawback of the induction furnace technology?

A. Induction furnace technology, if you can call it a technology, was also a well-established one but its only problem was that it needed further refining. That is, when the basic steel is produced, it needs further refining. Unless this is done, we cannot have a good quality end-product. Most induction furnace units in India did not invest in such a secondary refining facility. Had they done so, they could have matched the product of the main producers. There are 950 sponge iron units in India in which the larger, more established ones are not more than of 500 tons capacity. The balance number of units start production when the market is up and shut shop when the market is down.

An advantage is that most of these sponge iron units are also makers of alloys and special steel. But, as a result, the larger stainless steel producers are facing stiff competition from the former, who are producing at a lower cost with low grade raw material and low quality stainless steel scrap.

- Q. In which areas, thus, should the technology focus be on for Indian steel-makers?
- A. Value-added steel is an area where a lot of technology transfer has taken place. The Steel Research & Technology Mission of India's (SRTMI's) main focus is on CRGO steel which is not produced in India and is being totally imported with volumes at 2-2.50 lakh tons per annum.
- Q. Where does CRGO steel find application?
- A. It is used in electric transformers. As and when new power plants will come up, demand for CRGO steel will also go up.
- Q. Where are the gaps in the technology for the steel industry in India at present?
- A. In stainless steel, there are gaps in high quality duplex grade steel which no one produces in India. The Indian Space Research Organisation (ISRO), the Defence sector etc require this kind of steel. There is demand in Defence for this grade for making bullet-proof submarines and ship

hulls. Some amount is available. But other, like DMR and NACE grades, get imported.

In fact, there is a huge gap in quality ship-building plates. Our producers don't make that grade of steel because it is just not viable. Special bar quality (SBQ) grade is required for ship-building. It is not difficult to manufacture this grade. SAIL plants are quite capable of producing it. A ship-builder requires 4,000-5,000 tons of steel for a ship of average capacity, mainly for the hull and platform. But the problem lies in the fact that 200-250 width and length combinations are involved. It is not viable for any steel manufacturer to produce at such niche levels and keep in stock. Around 50-100 tons of width, thickness and length are required, so it is better to import. But there is demand from ISRO and the nuclear power, wind turbines and solar power segments. Here, the typical size of plates is not produced in India. In 5-10 years, non-conventional energy can supercede demand for thermal power. Thus, there is a high demand projection for such special steels. But this technology is available. The plates sizing will have to be done and the grades will require some typical alloying elements with vanadium, niobium etc. But, since the order position is not high, there is no viability in producing these in India. If there is a regular order flow, then it becomes viable.

Source: Steel Insights

IISC: COPPER-COATED MEMBRANE MAKES DRINKING WATER SAFE

There is an age-old practice of storing drinking water in copper vessels to rid the water of bacteria. Scientific evidence of copper vessel's antibacterial property became available in March 2012 when a paper in the Journal of Health, Population and Nutrition found that water stored in copper vessels for 16 hours killed pathogenic bacteria such as E. coli and cholera causing Vibrio cholerae O1, and Salmonella

species. Now, researchers at the Indian Institute of Science (IISc) Bengaluru have developed a water-filter membrane with copper ions to make drinking water safe. The results were published in the journal *Nanoscale*. A team of researchers led by Prof. Suryasarathi Bose from the Department of Materials Engineering at IISc made the commonly used polyvinylidene fluoride (PVDF) water-filter membrane to prevent biofouling and kill bacteria. To do this they first made the inert PVDF membrane functional by blending it with a polymer (styrene maleic anhydride or SMA).

Though copper oxide is an excellent antibacterial agent, it can be toxic if the concentration of copper in the water exceeds 1.3 ppm (WHO standard). So the researchers coated copper oxide with a biocompatible polymer (polyphosphoester or PPE) for controlled release of copper ions. A porous gel-like structure of copper oxide coated with the polymer was used for coating the membrane. The polymer used for coating copper has anti-fouling property. The SMA polymer coated on the membrane, which gets partially hydrolysed when in contact with water, interacts with the outer membrane of the bacteria to produce disc shaped structures. "It solubilises the membrane protein but does not kill bacteria. But the interaction with the bacterial cell membrane leads to release of a particular enzyme (phosphatase and phospholipase)," says Prof. Bose.

Bacterial effect

This enzyme released from the bacteria cleaves the polymer coating found on copper oxide resulting in controlled release of copper ions from the membrane into water. "In the absence of bacteria, the amount of copper ions released is 0.035 ppm at the end of three

days and 0.13 ppm at the end of 30 days," says Nagarajan Padmavathy from the Department of Materials Engineering at IISc and the first author of the paper. But when water with very high concentration of bacteria (10,000 colony-forming units of bacteria per ml of water) was used, the amount of copper ions in water at the end of four hours was 1.6 ppm, which is more than the WHO limit. "At 1.6 ppm, the copper ions in water can be toxic," says Prof. Bose. But the ability of copper ions to kill bacteria found in high concentration was four orders of magnitude higher at the end of four hours. "The ability to kill bacteria is more than 98%," says Padmavathy. According to Prof. Bose, the cleaving of the polymer coating is slow and takes about a year for it to be completely degraded. So the amount of copper ions released might not be high. These membranes with controlled release of copper ion may turn out to be a potential candidate for water purification applications with enhanced antibacterial and antifouling performances.

In the pipeline

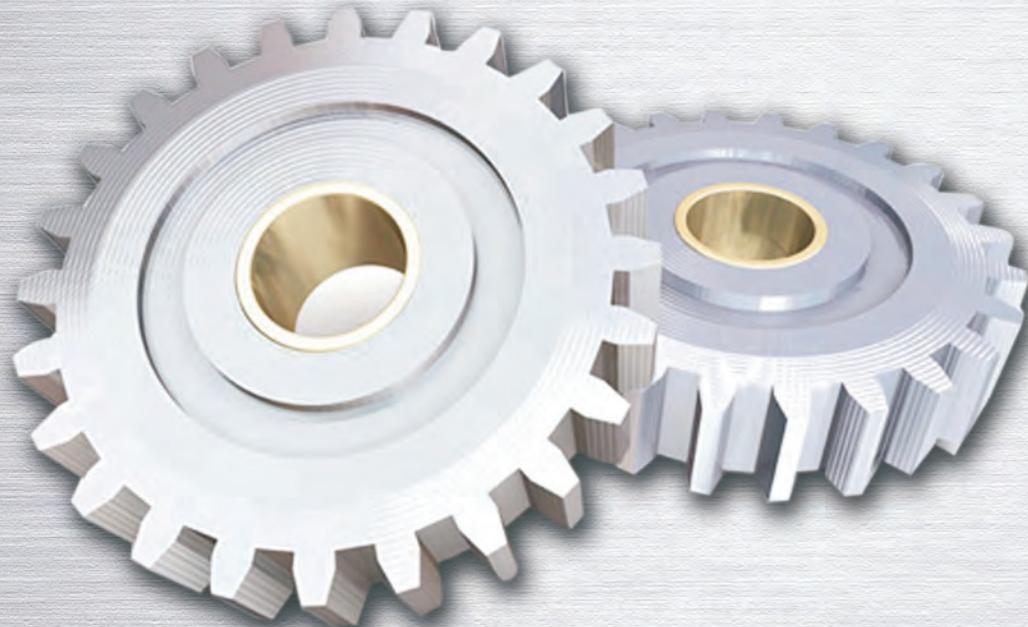
"We have to carry out more studies to understand the amount of copper a person would be exposed to over time by drinking the water filtered by copper-containing membrane. And also the amount of copper ions released into water from the membrane over a period of time when bacteria-containing water is continuously filtered," says Prof. Bose. Explaining why they chose to work with copper oxide than silver, Prof. Bose says: "Unlike silver, copper is inexpensive. But more importantly, copper oxide provides ample opportunities to harness different surface functional groups and polymers unlike silver."

Source: The Hindu



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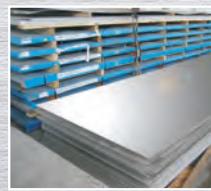
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