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S C Suri
Chairman, Delhi Chapter

K L Mehrotra
Head, Technical & Publication Cell

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Jawahar Dhatu Bhawan, 39, Tughlakabad Institutional Area
M B Road, Near Batra Hospital, New Delhi-110 062
Tel: 011-29956738, Telefax: 011-29955084
E-mail: iim.delhi@gmail.com; Website: iim-delhi.com

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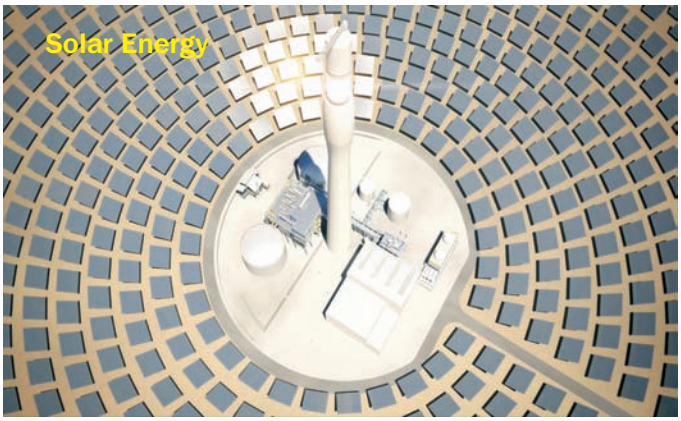

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INTRODUCTION

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India's Current Constraints for Higher Rate of Economic Growth in Manufacturing Sector and their probable Solutions

R N Parbat
Former President, The Indian Institute of Metals and
Former Director & COO, Indian Aluminium Co. Ltd.
rabi_044707@bsnl.in

In 2015, India is, once again, at the stage of an Economic take off. World Bodies recognize India as an awaken Elephant and the Prime Minister calls it a Running Tiger with MAKE IN INDIA MISSION.

What are then the Major Barriers in India for Fast Economic -Growth?

- Legislative Reforms
- Legal Reforms
- Institutional Reforms
- Colonial Mindset at Bureaucratic Levels
- Ministerial Interference
- Absence of Committed Politicians
- Environment & Forest Clearance
- Acquisition of Land for Industrial & Infrastructural projects
- Access to Mines (Metal & Coal) for Major Metal and Energy producing Organizations
- Access to portable water for industrial activities and strict implementation of Total Recycling of Water with Zero Discharge to the environment
- Non-availability of properly qualified professional Engineers and skilled Technicians
- Limited-availability of IT Engineers for development of New Systems while a large number of IT Engineers are available for Maintaining Imported Systems
- Indian Electronic & Instrument Industries are mainly assemblers of Imported Parts rather than Manufacturers of Parts, whereas China is strong in both Manufacture of Hardware and Software
- Indian Engineering Industry became dependent on Foreign Technology and Supply of Foreign Equipment

- Indian Research is aimed at production of Ph. ds with publication of technical papers rather than coming out with Break-through Technologies, relevant for Indian Economic Growth (Besides FIRST Green Revolution, Nuclear Power & Energy and Space Research, nothing worthwhile can be mentioned)
- Indian Industries become HIGH COST units very soon while Singapore, Taiwan and China took more than 30 years to become relatively higher Cost compared to South America, Africa and some of our South East Asian countries
- While Indian Entrepreneurs are showing less confidence in Indian Economy, how can we wish to woo Foreign Investors to invest in India

Let us now try to analyse each one of the above issues.

- **Legislative & Legal Reforms**
  Century old Legal System needs a complete overhaul. It has already been recognized by the Ruling Party and the Parliament. We now need to Bell the Cat soon. Supreme Court and High Courts are emerged under 30 year old Cases. When shall a new litigant expect to get a hearing to his or her Case?

- **Institutional Reforms**
  Banking System, Financial System and other Control Systems also deserve a New Look. Banks are burdened with high NPAs, at whose fault? Has anyone been punished for such poor performance? Financial Regulators have also failed to control Financial Scams and Private Investment cum illegal Banking.

- **Colonial Mind-set at the Bureaucratic Levels**
  The Current Central Government, for the First Time in Independent Indian, has started addressing the Bureaucratic mind-set, suggesting that the bureaucratic focus should be on Development work and not merely on Controls. At the same time, they have been assured of safely net in case of any genuine mistake. They have also been advised that maintenance of Administration is their responsibility while the Political Leaders will continue to focus on Social and Economic Issues of the population in the country.

- **Ministerial Interference**
  The Current Prime Minister has advised the Ministers and the Legislators not to interfere in the Bureaucratic Actions as long as they are Development oriented. They should try and help the Bureaucracy to combine Development with Social Issues in their Action Plan.

- **Committed Politicians**
  During the last 40 years or so, India did not see many Politicians, committed to Public causes. They have been by and large self-seekers. That had led to rampant corruption in public life.

  The Bureaucrats were also not spared. Honest bureaucrats lost out in bargain and the corrupt ones gained profusely. How otherwise, could a Bureaucrat amaze property worth more than Rs.10/20/100 Crores and Politicians made property worth more than 1000 Crores?

  Hopefully, the current Central Government' strict vigilance and reassurance to the Politicians and the Bureaucrats for clean performance will have a salutary effect.

- **Environment and Forest Clearance**
  The previous Government at the Centre, though liberalized many industrial, infrastructural, financial and service sector regulations, they kept a STRICT control on the Environment & Forest Clearance to favour the favourites. They even used motivated NGOs to support Govt. stand. That is how POSCO, MITTALS, VEDANTA and many others were deprived of Environment clearance or permission to acquire mines and land for their new Greenfield projects.

  The current Central Govt. seemed to have understood the game plan of the previous Govt. at the Centre and hence, made the clearance policy a more transparent practice. Hopefully,

2G Spectrum Scam, Coal Scam and Mines Scam, Money laundering, etc. are matters of the past.

Environment, Ecology and Forest are national concerns BUT that should not stand in the way of economic growth of the country, benefiting millions of our country men and women. Every country including China has tackled this issue fairly successfully, then why should it be so difficult for India? Our current Ruling Party at the Centre assured the World that India would like to decrease her dependence on Global Worming CO_2-generating Fossil Fuels and progressively increase the proportion of Clean and Renewable Energies like Solar, Wind, Bio-Gas and Nuclear Fission. At the second stage, India will go for the use of Hydrogen Fuel Cell, Geothermal Energy, Wave Energy, Nuclear Fusion Energy, etc. as the source of Energy. Our previous Prime Minister as well as the current Prime Minister has been very successful in receiving approval for importing Uranium from Russia, USA, Australia, France and Canada. A number of NGOs and some Political Parties, opposing installation of Environment friendly and technically safe Nuclear Power Plants in India, should be silenced by sound technical logic and the history of performance of our Nuclear Power Units. It must not be forgotten that India set up her FIRST Imported Heavy Water Cooled Nuclear Power plant more than 50 years back, thanks to the foresight of Dr. Homi Bhaba and Jawaharlal Nehru. Thereafter, Indian Nuclear Scientists at Trombay in Mumbai and Kalpakam in Tamil Nadu have developed FIRST BREEDER Nuclear Technology and over 1000 MWE capacity in First Breeder Plutonium Reactors are already in use and under construction. The final opportunity is, however, in Thorium Reactors. First Breeder Plutonium Reactors are used to convert naturally occurring Thorium, available in plenty in Indian Coastal sand from Orissa through Andhra, Tamil Nadu and Kerala (more than 50 % of World's Thorium reserve is in India), to Uranium 233 to embark on 3rd. Stage Nuclear Reactors. At that stage, India will not only be self-sufficient in Nuclear Fuel but will also be an Exporter of Thorium Fuel and Thorium Reactor Technology. Hence, there is an urgent need to educate the Indian Public and the Political Parties on the need and the importance of Nuclear Power in India.

- **Acquisition of Land for Industrial and Infrastructural Projects**

Land is an essential part of any industrial or infrastructural project. Again, there has been too much of politics with sanction of land for any development work. Previous Government at the Centre and the State Governments at State capitals were pursuing a so called "pro-farmer land policy" as a popular Vote Bank policy. This has failed to improve the economic lot of our rural population. Repeated crop failures force migration of agriculture labourers to urban sectors in search of jobs. Also the children of agricultural labours do not want to work in the field, instead they prefer Industrial jobs. As a result the population in villages are getting poorer and often resorting to suicide due to unmanageable financial burden resulting from crop failures. A permanent solution is, therefore, in bringing in a Second Stage Green Revolution by further introduction of latest technologies in the use of least quantities of fertilizers and water for at least 50 % higher yield of the produces. Current Prime Minister's slogan "LESS DROP BUT MORE CROP" is perhaps the RIGHT objective for the Agro-Scientists and the Modern Farmers.

The Politicians and the Social workers should in tandem work with the Farmers and convince them to part with necessary land at a substantial financial compensation for building Roads, Schools, Hospitals, Rural Housing and medium size industries in the rural areas to provide employment to rural people. Overall development along with substantial increase in agricultural production through Second Stage Green Revolution will ultimately improve the economic prospect of rural people and prevent large scale migration to urban areas creating new slums.

- **Access to Mines (Metal & Coal) for major Metal and Power producing Organizations**

There was a total Policy paralysis in this regard during the regime of the previous Govt. at the Centre. The Current Govt. at the Centre and the State Governments at the State Capitals

have arrived at a "win-win" situation for all the four partners, i.e. the Land owners, the Investors, the State Govt. and the Central Govt. The displaced habitation in the mining area will, although, receive a substantial financial compensation with a promise of employment for at least one able-bodied person from each family in the industry, I would have preferred the Land Losers to get an Equity share in the Industry for "life-long" earning for their families.

It is imperative that a Metal Producer should not only get access to a Metal Mine but also to a Coal Mine to meet their captive energy requirement. Similarly, a Thermal Energy producing Company should also get an access to a Coal Mine for their captive use.

- **Access to Portable Water for Industrial activities and strict implementation of Total Recycling of Waste Water with Zero discharge to the environment**

  Industries cannot operate without water. Mineral Dressing, Coal-Washing, Chemical-Processing, Water based lubrication and Cooling of machineries to maintain room temperature need large volume of water. Used water should, however, be reprocessed, cooled and recycled for the same industrial purpose ensuring Zero discharge to the environment. This would minimize the requirement of further fresh water to maintain the process and the health of the Equipment in the industry. Water is a scarce resource in the World. Conservation of portable water is an International concern. It is claimed that the 3rd. World War, if any, would be fought on Water Crisis and not on Oil Crisis.

- **Non availability of properly qualified Professional Engineers and Skilled Technicians**

  A Slow rate of Industrial growth in India over the last 60 years or so, created a sluggish demand for Engineers and Technicians in the country. After introduction of Liberal Economic Policy in 1991, a ray of hope was created in the country but subsequent economic slowdown in the World, ineffective corruption-prone coalition Government at the Centre and the emergence of Strong Regional Political Parties created a total imbalance in the political system of the Country. At the same time, on the basis of Technical Manpower Forecast for India, fresh Engineering Colleges, Polytechnics and Industrial Training Centers were set up. Number of fresh Engineers swelled from 6,00,000 in 2007 to 16,00,000 in 2015. Thanks, to the emergence of IT, ITS and Telecom industries. More than 80 % of all the qualified Engineers irrespective of their academic discipline are absorbed in those newly emerging Information-Technology Industries.

  As a result the quality of basic Engineering courses got a serious jolt. All courses were aligned to the needs of IT Industries.

  Today, when Metal Industries, Process Industries, Power Industries, Mining & Mineral Processing Industries, Refractory/Ceramic Industries, Auto & Casting Industries, Defense & Atomic Industries are looking for Engineers and Postgraduates Scientists, quality persons are not available in the market. Best quality Indian Engineers and Scientists are migrating to US, Europe and Japan for better career options in the state-of-the-art Research facilities and Front line Technology driven Industries. Some of them are also opting for Administrative and Financial jobs.

  What is the answer? The current Prime Minister has given a call for higher SKILL DEVELOPMENT at all levels in the relevant fields to ensure success of his policy "MAKE IN INDIA". The Ministries of Education & Human Resource Development and Science & Technology, in consultation with the Ministries of Industry, Metal & Mines, Coal & Power, Defense, Nuclear and Space Research should develop a Road Map for immediate Skill development to meet our Country's current and immediate future needs in Agriculture, Mining, Metallurgy, Manufacturing, Information Technology, High Technology Industries and Service Sectors Industries. There is also a big gap in the Demand-Supply scenario of Teaching Stall at Engineering and Higher Scientific education. Research and Teaching Profession should be made financially and career wise more attractive.

- **Limited availability of IT Engineers for developing New Systems while plenty of IT Engineers are available for Maintaining Imported Systems.**

  Micro Soft did set up a Research & Development Centre for New IT Systems at Hyderabad, around 20 years back with the objective of utilizing superior Indian brains for Low Cost development of New Systems in India rather than in US. But two years back, they have moved out their Research & Development Wing to their headquarters in USA as Indian IT Engineers were not found suitable for Research Work. Only those IT Engineers, mostly from IITs who undertake higher education in USA are found extremely suitable for research work.

  Mushrooming of a large number of IT Institutions without proper Teaching Staff, adequate Workshop and Laboratory facilities, have been responsible for creating "low quality" IT Engineers in India. Creation of a Research Environment at IT Institutions would, perhaps, help improving the quality of our IT Engineers.

- **Indian Electronic & Instrument Industries are mainly assemblers of Imported Parts, where as China is strong in Manufacture of both Hardware and Softer.**

  After independence of India, the Govt. of India through 5-Year-Plans, gave emphasis on Electronic, Telecommunication and Instrumentation Industries. Electronic Corporation of India was set up to promote manufacture of Electronic Goods. But, such industries continued to grow as Assembly Units of imported electronic components rather than manufacturer of such components indigenously. This was true for even Defense as well as development of Cryogenic Engines for Supersonic Aircraft. It was only after the Underground Testing of Nuclear Device, when the international community banned any supply of strategic equipment or technology to India, the Government and Civil Manufacturing Units started seriously looking for indigenous development of complex electronic devices for application in Civil, Defense, Nuclear, and Space applications. However, even now, we depend heavily on Japan, USA and Europe for import of many critical components and equipment. During the last 20 years or so, too much attention was given on Software industries ignoring attention on Hardware. An immediate correction is needed in this respect. Current Prime Minister's call to the International Manufacturing Community to Use India as a Manufacturing Hub, not only for Indian market but also for the World market is perhaps the right approach.

- **Indian Engineering Industry has also became dependent on Foreign Technology and Supply of Foreign Equipment**

  Indian Steel Industry is over 100 years old. Although, India claims to be the Third largest Steel Producer in the world, after China and Japan, we are yet to design and build a Single Blast Furnace or a Big Steel Rolling Mill. The preferred suppliers of both Technology and Equipment are Germans, Austrians, Americans, Japanese, Koreans and Chinese. It is worth mentioning that all those countries developed their knowledge base along the ascending curve of Steel production. India still prefers to be a Technology Shopping Country even at the current level of annual production of 100 Million Tons with a target to reach 300 Million tons by 2025/2030.

  The story is also similar in case of Aluminium. With nearly 6 Million Tons of indigenous Aluminium production per annum, India is still an importer of Technology and Equipment from France, Canada, Australia and China.

  Heavy Engineering Corporation of India was set up by the Govt. of India at Ranchi during 2nd 5 Year Plan period. It continues to be a Sick Unit due to lack of Focus. Whereas, Bharat Forge, a Private Sector Company, that came in existence in late 1960s has developed itself as a World leader in manufacture and international marketing of Forged Steel Components.

  Privatization of Public Sector Units is perhaps the Right decision to improve professionalism in the Business. Public Sector Units like Bharat Aluminium and Hindustan Zinc have grown more than 300% under the management of Private Sector Company, Vedanta Group within a short

span of 10 years. While Hindustan Copper, a Public Sector integrated Copper Company, has over a period reduced itself into a Mining-Company, the Private Sector Companies like Birla Copper and Vedanta Copper are thriving in Smelting and Downstream activities using imported Concentrate of Copper Ore.

It is, therefore, high time that the Public Sector Syndrome be slowly changed over to Private Sector for efficiency and speedy growth. Simultaneously, a National R & D Policy needs to be introduced promptly to encourage development of Indigenous Technology and Machines.

- **Indian Research is aimed at production of Ph.ds with publication of technical papers rather than coming out with "Break-through" Technologies, relevant for Indian Economic Growth (Besides FIRST Green Revolution, Nuclear Power & Energy and Space Research, nothing worthwhile can be mentioned)**

We have a large number of CSIR Laboratories, basically engaged in the field of Industrial Research. Besides, a large number of University & College Research Centers and Industrial Research Centers are also engaged in pursuing Research. In the last 60 years of Indian Research, how many Technological Breakthroughs, can we claim to our credit? A total relook is necessary in our National Research Programme to prioritize Areas of Research for National Causes. Fundamental Research must be pursued to push the Frontier of Knowledge but higher emphasis must also be given to Research work to improve the Economic Prospect of our large number of economically deprived population.

Industrial-funding is negligible in National Research Programme. This needs immediate correction. Engineers and Scientists are normally encouraged by their Professors to pursue Research in their chosen fields where international recognition is ensured. Indian issues are not, at all, important to them. Research funding is done mainly by the Department of Science and Technology, Govt. of India and the International Research Funds. Metallurgical and Manufacturing Industries hardly trust Indian Research System to resolve their outstanding industrial problems. Instead, they prefer to buy New Technologies from overseas market. We have a "trust-gap" between Users of Technologies and Researchers in the Country. There is, therefore, a need for serious dialogue between the Users of Technologies and the Researches under the umbrella of Govt. of India.

Setting up of New Research Laboratories in the Country may not be the right answer. National Metallurgical Laboratory at Jamshedpur, SAIL Research Centre at Ranchi and Jawharlal Nehru Aluminium Research Development & Design Centre at Nagpur did not, so far, help the Country in developing any significant "breakthrough" from their Research Centers. The Industrial Leaders, Technology Specialists and the Representatives of Govt. of India should sit together and find a tangible and lasting solution.

- **Indian Industries become High Cost Manufacturing Units very soon while Singapore, Taiwan and China took more than 30 years to become higher cost compared to South America, Africa and some of our South East Asian Countries**

Having spent my life time in Indian and Overseas Industries, I have learnt the technique of remaining a Low Cost Manufacturer. Continuous Modernization, Expansion of capacity, Infusion of Latest Modern Technologies and Continuous improvement in Labour Productivity through Labour rationalization and Labour training are keys to success. Innovation in New Technologies, Introduction of New Products, Expansion of Market share both Domestic and Overseas, Continuous reduction in Cost of Production along with Continuous improvement in Quality of the Products and the Yield of the Processes can only ensure Competitive Cost structure and Higher Profitability of a Manufacturing Unit. It is obvious that the Management Team should be Lean and Smart for Seamless implement of all the Management philosophies. I am a strong believer of the saying that "An Organization is an extended Shadow of it's Chief Executive".

In 1991, following the Economic liberation in India, the Members of the Industrial Club of Mumbai demanded Level Playing Ground for the Indian Industries. But within a short period of 10 years or so, Indian Industries modernized themselves and became competitive to the Overseas Industries. Ambanies, Bajaj Auto, Bharat Forge, Tata Steel, Hindalco Industries, TCS, Infosys, WIPRO are some of the examples.

- **While Indian Entrepreneurs are showing less confidence in India, how can we woo the Foreign Investors to invest in India**

  Representatives of the Govt. of India should meet the Industry Representatives in a Joint Session of CII, FICCI & ASHOCHEM and discuss the Major Concerns of the Indian Entrepreneurs, restraining them from investing in India despite the Liberal Economic Policy, being pursued by the Current Govt. of India. An Environment Friendly Government Policy is not only helpful to the Overseas Investors but also to the Indian Investors. The Economic, Social, Psychological and Environment issues must be resolved to the satisfaction of Indian Investors before we woo the Foreign Investors. Flow of Foreign Money into the Indian Share Market is a Market-Phenomena. This money can Enter and Exit on momentary decisions of the investors but Investment in Land and Manufacturing is of Permanent nature. The Current Central Govt. in India is saying and wishing to do many Good Things BUT the evidence of such WISHES are still not clearly found on the Ground.

  Land Acquisition Bill, Environment Clearance Practice, Simple Labour Laws for easy ENTRY & EXIT to and from the Industry along with relatively lower Interest rate are the demands of the Investors. They are unwilling to accept excuses, any more.

  National calamities like Flood, Draught, Natural Disasters and Parliamentary obstructions by the Opposition Parties are normal in any Developed or Developing Economy. Govt. has the only option to find an amicable and acceptable solution to all those issues.

In Conclusion, India is now ready for a BIG take-off and we cannot afford to MISS IT. The whole World is looking towards India for a Democratic Solution to the World Economic Crisis. The newly emerging Economies in Asia, Africa, South America and Eastern Europe are eagerly waiting to see the SUCCESS of Indian-experiment.

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Iron Ore Reserves and Resources – Some Key Issues for Indian Steel Industry

Shri S C Suri
Chairman, IIM-Delhi Chapter &
Hony. Member, The Indian Institute of Metals

Introduction

The paper reviews the reserves and resource position for Indian Iron Ores.

It also gives the production and demand trends for the Iron ores. The paper also reviews some key issues/concerns for Indian Iron Ore scenario for Indian Iron and Steel Sector.

1. *Reserves and resources position*

Hematite and magnetite are the two most important iron ores found in India. As of April 1, 2010, hematite resources amounted to 17,882 million tons. Of this, 8,093 million tons (45 percent) were under the reserves category and the balance 9,299 million tons (55 percent) under the resource category. The magnetite reserves amounted to 10,644 million tons.

State-wise reserves/resources of iron ore – April 2010 ('000 tonnes)

State	Reserves		Resources		Total	
	Hematite	Magnetite	Hematite	Magnetite	Hematite	Magnetite
Andhra Pradesh	152,217	–	229,261	1,463,541	381,478	1,463,561
Assam	–	–	12,600	15,380	12,600	15,380
Bihar	–	–	55	2,659	55	2,659
Chhattisgarh	900,110	–	2,391,714	–	3,291,824	–
Goa	469,844	50,112	457,328	164,057	927,172	214,169
Jharkhand	2,304,142	3,391	2,292,478	6,879	4,596,620	10,269
Karnataka	876,866	148,437	1,281,811	7,663,347	2,158,678	7,811,784
Madhya Pradesh	56,814	–	174,632	83,435	234,446	83,435
Maharashtra	13,414	621	269,795	–	283,209	621
Meghalaya	–	–	225	3,380	225	3,380
Nagaland	–	–	–	5,280	–	5,280
Odisha	3,313,000	156	2,617,232	54	5,930,232	210
Rajasthan	7,139	4,225	23,420	522,652	30,560	526,877
Uttar Pradesh	–	–	38,000	–	38,000	–
Tamil Nadu	–	–	–	481,876	–	481,876
Total	8,093,546	206,941	9,788,551	10,412,540	17,882,098	10,644,481

Source: Indian Bureau of Mines

2. *Production Pattern*

Domestic production of iron ore has seen a major dip since 2009-10. From 219 million tons, in 2009-10, it fell to 152 million tons in 2013-14, and is expected to remain stagnant in 2014-15.

The massive fall in production from 2010-11 to 2013-14 can easily be traced to the temporary discontinuance of mining operations in Karnataka, Goa and Odisha.

Though domestic iron ore production exceeded domestic demand till 2011-12, a very small quantity of iron ore would be imported based on specific commercial consideration of individual companies. However, the subsequent fall in production resulted in India importing about 3 million tons in 2012-13, with imports rising to 15 million tons in 2014-15.

When iron ore is mined, it is extracted in the form of "fines", "lumps" and "concentrates".

Approximately, "fines" constitute 58 percent of the total produce, the rest primarily being "lumps" with "concentrates" being a miniscule portion of the total produce. The share of iron ore "lumps" in total production increased from 38 percent in 2005-06 to over 42 percent in 2009-10, while that of iron ore "fines" increased from 53 percent to nearly 58 percent in the same period.

India's Iron Ore Production by Grade (million tonnes)

Products	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Lumps	62.64	88.31	97.85	95.57	91.72	82.06	62.70
Fines	87.90	98.24	114.88	119.22	126.16	125.34	104.18
Concentrates	0.60	1.15	0.52	0.64	0.75	0.71	0.41
Total	165.23	187.70	213.24	215.43	218.63	208.11	167.29

Source: Indian Bureau of Mines

The iron ore mining industry in India has been severely hit following the ban on iron ore mining by the Karnataka government in July 2010 as well as closure of all mines in Goa in 2012.

Though the ban led to the shortage of iron ore, global prices didn't rise, largely on account of increased supplies from Australia and Brazil as well as global meltdown and resulting lower demand of iron ore from steel plants in China.

3. *Demand Pattern*

The demand for iron ore is expected to be from the domestic steel industry, domestic sponge iron industry, and from China, especially for ores with lower Fe content. On the domestic front, the iron and steel industry accounts for over 58 percent of the total iron ore consumption whereas sponge iron accounts for about 40 percent.

The Planning Commission estimates the crude steel capacity and production in the country will increase to 146.6 million tons per annum and 131.9 million tons per annum respectively, by 2016-17.

According to the projection by the Ministry of Steel, domestic steel production is slated to reach 200 million tons by 2020. However, the current global economic scenario may have a moderating effect on domestic steel demand. Two of the major steel producers (Tata Steel and SAIL) have captive raw iron ore mines but other Indian steel producers have varying degrees of self-sufficiency and primarily depend upon domestic iron ore supply to meet their requirement.

With about 1.6 million tons of iron being required for producing 1 million ton of steel, this translates into a demand of about 200 million tons of iron ore by 2016-17 and about 250-280 million tons by 2020, from the domestic steel industry alone (the rest being met from scrap).

The iron ore lumps accounted for about 54 percent of the total despatches followed by fines at about 46 percent during 2010-11. Captive sources account for over 25 percent of the total iron ore consumption while non-captive sources account for over 74 percent. The iron ore consumption in India will continue to increase largely on account of planned expansion in steel production capacity by both public and private sector companies.

4. *Iron Ore Exports*

As for exports, the significant fall in production in the last few years resulted in exports of iron ore falling dramatically. Following a global meltdown in demand and export ban in Karnataka and Goa, exports of iron ore from India declined significantly from a peak of about 117.36 million tons in 2009-10 to about 16 million tons in 2013-14. It is forecasted to further decrease to about 10-11 million tons in the current fiscal. Higher railway freight for iron ore exports compared to domestic freight charges and a 30 percent export duty on iron ore has meant that exports today are unviable at an export price of $50 per ton.

5. *Likely scenario*

If one were to make a projection of iron ore availability based on the demand, supply and resource position as it stands, then the current status of Iron ore reserves indicate adequate availability for 30-33 years assuming that 250-280 million tons of iron ore will be required per annum beyond the year 2020 by the domestic steel industry.

However, the picture is more complicated. Around 55 percent of the hematite resources remain yet to be converted into proven reserves in freehold and leasehold area. As per the "Iron and Steel Vision 2020" published by IBM (August 2011) the resources are estimated at 60 percent Fe cut-off grade (as against the present threshold of 45 percent Fe grade) which is not realistic.

Presently, low grade ores are not suitable for direct use in Steel-making mainly because of high alumina and silica ratio that limits blast furnace productivity. The Indian iron ore therefore has to be utilised as a blend of various grades of ores for the blast furnace to maintain the quality requirement (+62% Fe and Al_2O_3 + SiO_2 = 5%). Taking into account the alumina/silica ratio to be not more than 5 percent, if adequate focus is given on technological up-gradation for utilizing low grade ores, in

order to ensure that the quality of ore amenable for steel making is available, then the projection can get drastically altered as both reserves and resources position will further stand considerably enhanced while taking into account the estimates at a lower cut-off grade at 45 percent Fe.

Also, detailed exploration in all potential areas would be necessary for identifying new iron ore deposits.

6. *Issues / concerns*

- Since generation of fines is an integral part of the process of iron ore mining, it is imperative that the fines are either consumed by the domestic steel industry (after beneficiation and agglomeration) or sold in the export market. Otherwise, huge stockpiles of fines can be an environmental hazard, besides being a loss in monetary terms. Exports of very low grade of iron ore, if not beneficiated at present, should be examined.
- Beneficiation and pelletisation technologies need to be incentivised and capacity augmentation of pelletisation and sintering facilities to utilise low grade fines should become a priority area. Fines are mostly used in sintering or pelletisation and this step will enable use of the low grade ores. During last few decades of selective mining (lumps and concentrates) a substantial chunk of subgrade or marginal grade ores (-60 + 45% Fe) is lying unused in situ or staked in dumps. Together with the staked fines (-10 mm) and slimes (in tailing ponds) where significant tonnages of valuable hematite are presently locked up, value-addition for its utilisation is the need of the hour.
- There are constraints in rail, road, port infrastructure such as lack of power, rail connectivity to ports, inadequate rail capacity for domestic and export of iron ores, lower haulage capacity of rail wagons etc. besides poor condition of roads and low capacity of handling of iron ore at ports. The augmentation of rail infrastructure is therefore vital, particularly in the eastern sector. Also, the railway freight class for the both domestic steel industry and exports of iron-ore, should be reduced to 120.
- The present estimate of the reserves position does not give a complete picture, as 55 percent of the hematite resources remain yet to be converted into reserves. Further, as per the "Iron and Steel Vision 2020" published by IBM (August 2011) the resources are estimated at 60 percent Fe + cut-off grade which in is not realistic. The re-assessment of iron ore reserves/resources at lower cut grades (45 percent Fe) is called for taking into consideration ore characterisation (Al_2O_3 + SiO_2 <=5%) so that the steel industry can use the ores. Such a re-assessment will substantially increase the iron ore resources in the country.
- The demand of iron ore at present has kept aside the reserves of Banded Iron Formation (BIF) in the inferior category, resulting in huge piles of BIF as rejects. Utilisation of these inferior grade materials by adopting suitable beneficiation techniques may reduce the burden on land and environment.

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Assocham seeks 25% cut in iron ore prices from NMDC

Believe in yourself! Have faith in your abilities! Without a humble but reasonable confidence in your own powers you cannot be successful or happy.

Apex industry body Associated Chambers of Commerce and Industry of India (Assocham) has urged the government to reduce iron ore prices by about 25 per cent to help domestic steel industry become competitive. "Asian economies like China, Japan and Korea have become more competitive and are exporting steel to India at throwaway prices due to drop in Platts iron ore index, thereby creating huge problem in the country and posing threat to the survival and sustainability of domestic steel industry," noted Assocham in a communication addressed to Steel

and Mines Minister Narendra Singh Tomar. "India's leading iron ore producer, National Mineral Development Corporation (NMDC) is charging 25 per cent higher charges as compared to other iron ore miners based in Odisha that is adversely impacting domestic steel industry," said D S Rawat, national secretary general of Assocham. Though NMDC has reduced prices of iron ore lump and fines (from January) that are in line with those prevailing both in Odisha and international market, the state-run miner is still charging much higher prices for iron ore fines. "Suppliers from Odisha are offering 63 per cent iron ore fines at the rate of Rs 2,150 a tonne in comparison to Rs 2,340 (together with Rs 351 for royalty) charged by NMDC that is higher by about Rs 500-600 a tonne," Assocham said. Moreover, iron ore prices in international market have been dropping continuously and it had also dropped substantially in March this year. The Assocham letter further highlighted: "The Platts index in global market has fallen from $63 a tonne to $54 a tonne, i.e., by Rs 550 a tonne approximately, from March 1 to March 26." India's steel industry is reeling under severe pressure, on account of sluggish economic recovery and various factors impacting external and internal environment such as higher prices of iron ore due to shortage in the country owing to Supreme Court's intervention.

Source: Business Standard

SAIL's Vision 2025 – Ramping up Steel Capacity

SAIL, one of the largest steel producers in India, has a Vision 2025 for modernization & expansion plans from the present steel capacity of 23 MnT to 50 MnT. Of the INR 15 trillion estimated capital expenditure, INR 400 billion will be invested in West Bengal (WB) in building new capacities and allied activities, including mining. Steel capacity for WB would be about 10 MnT as compared to 5 MnT now, as mentioned by C S Verma, Chairman, SAIL.

According, to an information with SteelMint, Secondary steel producers have about 2.0 MnT pa rebar production capacity in WB and according to our survey, it is operating at 60-70% capacity owing to adverse market conditions.

SAIL Started Bar Mill at ISP Burnpur

SAIL-ISP (Burnpur) commenced bar mill operations last month (March 2015). It has installed 0.7 MnT pa capacity high quality bars, such as seismic grade rebars of diameter 8 to 40 mn in straight length. As of now, it is running at less than 50% of its capacity but the production will ramp up over the coming months, according to officials of SAIL (IISCO-Burnpur).

According to SAIL's website, Chairman C S Verma has reviewed performance of ISP, Burnpur and visited the Bar Mill, Continuous Casting Shop, Universal Section Mill and the Blast Furnace 'Kalyani' (the largest operating blast furnace in the country). He motivated and persuaded the senior officials to work on a war footing for ramping up production to derive maximum benefits of the new facilities.

Congratulating the ISP collective, Mr. Verma said that since the products from this mill would meet the demand of high quality TMT bars for infrastructure and construction sector, early stabilization of the mill will facilitate IISCO Steel Plant to augment its market share for these products.

SAIL's New TMT Rolling Mill in Kerala

SAIL-SCL Kerala Limited is 50:50 JV owned by SAIL & Government of Kerala. The JV will be soon setting up its new TMT rolling mill in Kozhikode, Kerala. The INR 650 million set up will be commissioned with 70% bank loans and 30% investment by the JV & State government. It will have a capacity to roll about 65,000 MT of TMT bars a year.

A senior officer at SAIL-SCL Kerala explained, "This rolling mill is in trial phase and will commence operations towards the mid of April'15. Initially, we plan to produce around 50% of the total capacity and will increase the production gradually, depending on the market conditions and order size. We'll manufacture TMT in the sizes between 8 mm to 25 mm, Fe500 grade. We also have a plan to set up a Billet production unit, but we will also purchase Billet from SAIL, roll them into TMT and sell them back to SAIL."

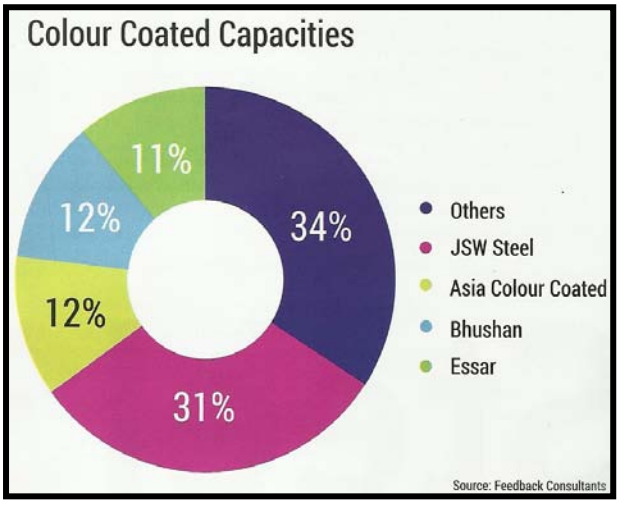
Investment in Infrastructure may boost Demand of Steel

In the Union Budget 2015-16, Finance Minister has allocated around INR 700 billion to various infrastructure sector, which is likely to boost demand of construction material like steel & cement. Upcoming capacities by the various primary & secondary steel producers in this year will probably be engaged to cater the demand of infrastructure projects.

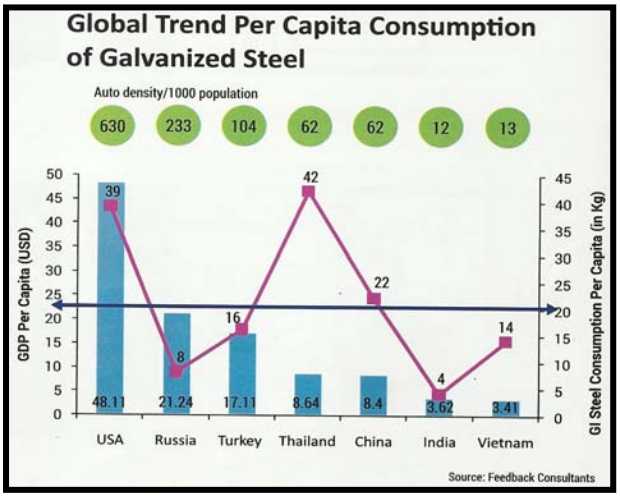
Source: Steel 360

Color Coated Steel Market – A Global & Indian Perspective

A lot is being talked about galvanized & colour coated steel popularly known as PPGI; certainly, it has a great potential in a developing country like India. PPGI is pre-painted galvanised iron (GI) steel usually with a hot dip zinc coated steel substrate. It is also known as pre-coated steel, coil coated steel, colour coated steel and there are many other names to it. Today, GI refers to essentially pure zinc (>99%) continuously hot dip coated steel, as opposed to batch dip processes. PPGI refers to factory pre-painted Zinc coated steel, where steel is painted before forming, as opposed to post painting which occurs after forming.

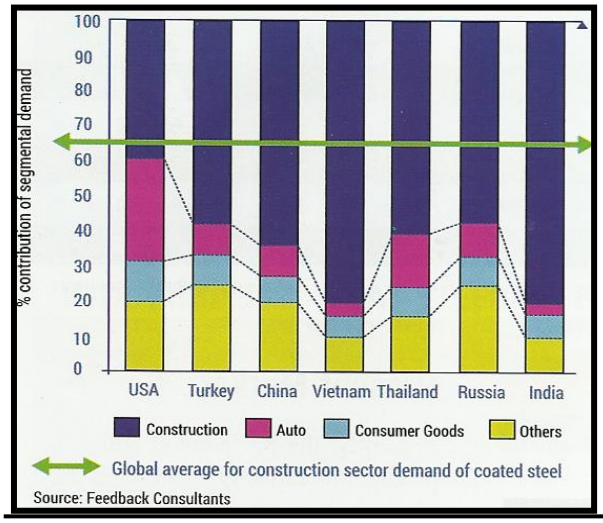


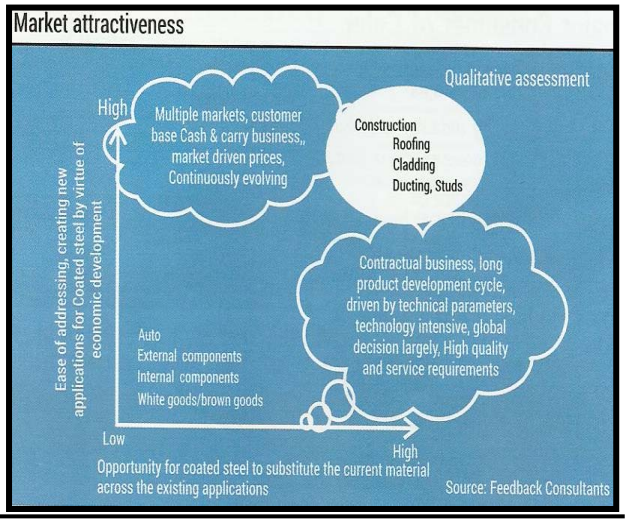
The colour coated steel finds high application in automotive & the construction sector. We know that the coated steel consumption is higher in the countries with high auto density like USA, Russia and Turkey; but this is just one of the two drivers.



Per capita consumption in China & Thailand is higher, even when compared to USA. Studies show variation in consumption pattern of colour coated steel that varies between nations. On one hand, USA utilizes a higher proportion of the steel in Automotive, Consumer goods and other sectors. On the other hand, Vietnam, India, China and some other nations largely utilize this product for construction.

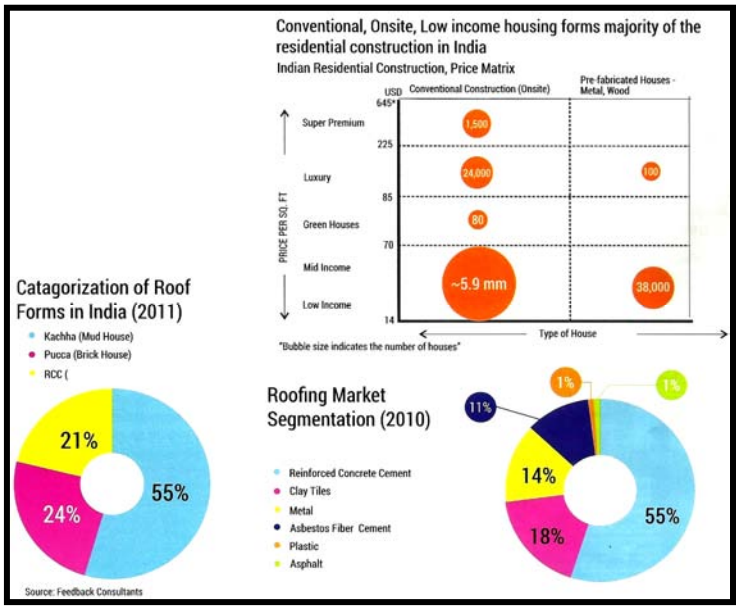
India is the third largest steelmaker in the world, and the country is construction based economy as of now. There's a hope among market participants for the steel demand to rise in the country, which will largely come from infrastructure development projects proposed by the government.





Consumption of Colour Coated Products in India

Indian construction largely follows the conventional onsite construction and only a few prefer a pre-fabricated house. The Indian demography has a large population of low & middle income groups and they invest about USD 14-70 per sq. ft. per house. Here's an info graph depicting Indian housing forms and material they consume for manufacturing.



Bus Manufacturing – a major Consumer of Color Coated Sheets

Bus manufacturing industry is India is one of the major consumers of coated steel. Indian bus industry manufactures over 50,000 buses & coaches every year, making it the world's second largest market. Foreign companies have started investing in India.

Present Market

Presently, the pre painted coil production capacity in India is 2.2 MnT. JSW Steel is largest producer of colour coated steel with an installed capacity of 0.65 MnT pa, followed by Bhushan Steel and Asian Colour Coated Ispat.

From the beginning of the year 2015, demand for coated steel from domestic suppliers is either dropping or stagnant, but market is predicted to revive by Sep'15. There's an over capacity in steel production in China, as a result it is exporting the excess steel. Around 30% of the coated steel used in India is imported. This is a big threat and challenge for Indian Steel Producers as some of the imports are inevitable as domestic steel plants cannot produce. Chinese & Korean companies are very efficient in manufacturing very low Zinc coating up to 30-40 GSM, which is a requirement of white goods industry. In many cases, Indian companies do not have capacity to provide such a thin zinc coating. Customer awareness in India about Coated Steel is very low, which further encourages import of inferior quality.

On a global perspective, around 30% of Flat steel demand is accounted for by Coated steel. Japan, Europe & USA are coated steel intensive markets.

Source: Steel 360

Raw Material	Consumption FY12	Consumption FY16 (Estimated)
GP Tubes	27,500	68,750
GI Tubes	3,500	8,750
GPSP Sheets	12,500	31,250
GPSP Sheets	27,500	68,750
PVC Laminated Sheets	5,000	12,500
CR Tubes	12,500	31,250
Total	88,500	221,250

Figures in MT — Source: Feedback Consultants

Galvanised Steel

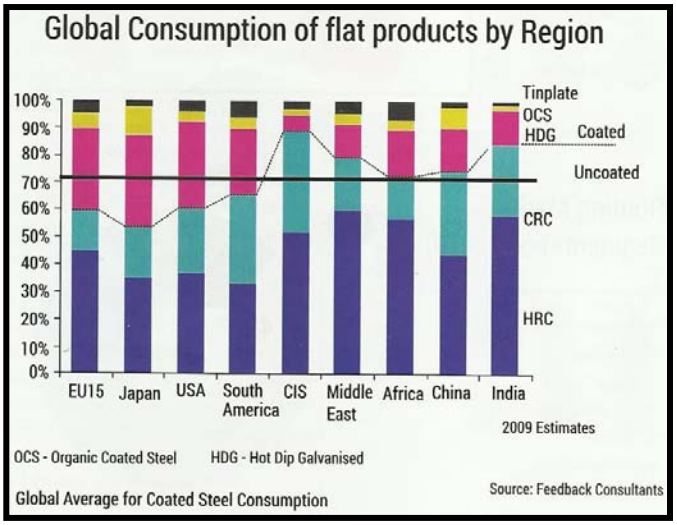
Category	Raw Material	Sheet Thickness	Quantity per Bus (in kg)
Bus Structure	Rectangular GP Tubes	Up to 2.7mm	550
	Rectangular GI Tubes	Above 2.7 mm	70
External Panels	GPSP Sheets	0.65 mm to 1.5 mm	250
Sheet Metal Parts	GPSP Sheets	1.25 mm to 2.7 mm	550
Internal Panels	PVC Laminated Sheets	0.5 mm	100

Source: Feedback Consultants

CR Tubes

Category	Diameter	Thickness	Quantity per Bus
WGR & Hat Racks	19.05 mm	1.25 mm	70
Seat Frames	22 mm, 25.5 mm	1.60 mm	180

Source: Feedback Consultants



SAIL chairman suggests Salem Steel Plant to have own captive power unit

Steel Authority of India Limited (SAIL) chairman CS Verma during his visit to the Salem Steel Plant (SSP) had sought early commissioning of the third sendsimir (machine for rolling steel) mill. According to a SAIL statement, Verma had asked the senior management of SSP to benchmark its productivity and efficiency with the best in the industry, for the survival and growth of the steel plant. The measure would help the Salem Steel Plant to improve the market share in cold rolled stainless steel products and for improvement of the plant's bottomline, he desired that the early commissioning of the third Sendsimir mill has to be taken up expeditiously, according to SAIL's statement. Verma asked the senior management of SSP to benchmark with the best in the industry in every aspect of productivity and efficiency for the survival and growth of the steel plant. He wanted SSP to set up a captive power plant to address the long term energy needs, and suggested them to also explore ways for tapping environment-friendly solar energy. Against the backdrop of stiff competition from domestic and international stainless steel producers, he emphasised the need for immediate measures aimed at substantial reduction in cost, and for augmentation of production while maintaining quality standards.

Source: Business Standard

AIM to start a Steel Management Company

AIM Steel International appeared on Steel 360's April'14 issue with plans to enter the Indian market. It is April'15 and the group has clear plan to set up a steel management company providing aid and solutions for the domestic fabricators in India. Here's Omar Ali, VP-International & Domestic Affairs, AIM Steel USA once again, further elaborating the bullish plans for India.

Q: **Can you tell us about projects executed by AIM Steel over the last one year?**

A: We have completed many major projects around the world, including the American Embassy of London.

Q: **Are there new locations, where the company has entered or planning to enter in 2015-16 or after?**

A: Currently, we will have our office open in Hyderabad (India) in about 2 months and Doha (Qatar) in about 4 months. We will meet with the supreme committee in Doha in hopes of obtaining work at 2022 FIFA world cup stadiums.

Q: **What's your experience with the Indian market? How good or bad is the demand for fabrication in India?**

A: During our first 2 years of market entry in the Indian market, we had to face many challenges. But we now have much hope owing to Prime Minister Modi's efforts and collaborations with American companies doing business in India.

The demand for Steel fabrication in India is very high. Our major effort will be to develop a Steel management company that will manage engineering quality control, quality assurance and scheduling i.e. we will tackle the entire steel related solutions of our clients. We've plans to get an extensive subcontractor base here in India to cover the customer management. Ascribable to our size, financial capacity, knowledge and experience, our customers feel comfortable with us to manage their steel related solutions. Within a couple years, we plan to start fabricating within India, with our own facilities in conjunction with local fabricators. Currently, we have decided to open an office in Hyderabad and we have located our office space and have had our name approved to enter the market.

Q: **AIM Steel International has a plan to start a Steel management company in South India. Please throw some light on how this need was realized?**

A: India has great fabricators, but with tremendously growing economies, it is hard for local

resources to keep up with a fast pace growth. We have seen that in many countries including America, there is a high demand to assure quality, scheduling, financial support and technology advantage. Many buildings in India are concrete based but according to our market research, India is planning to develop infrastructure, power & retail sectors, which all require a heavy structural steel design.

Q: **What are the USPs of this start up? Are there similar players in the market already?**

A: There are a few major players in the Indian market doing great work and are of very large size. Although our company is large, we plan to focus on medium to large projects up to USD 500 million and managing medium to small fabricators those have revenues of USD 10 million to USD 60 million. (Dollar or INR?)

Q: **Please let us know about Vimana Design LLC and how it'll add to the vision of AIM Steel?**

A: Vimana Design is an engineering company started and majority owned by AIM Steel International. Vimana is a structural engineering company that when attached to a structural steel fabricator such as the AIM Steel International, presents us a big advantage. Many engineers understand how to plan and engineer buildings, bridges, power plants; simply don't see the issues in the field or issues with fabricating. We don't have this issue, since on one hand you have the design company and on the other hand a fabricator, who understands and knows how to fabricator, so together they are a great team. Besides, I am proud to state that I, Omar Ali came up with the name Vimana.

Q: **Tell us about the next 5 years plan of AIM Steel for the Indian market?**

A: Within 5 years, we plan to have a staff of at least 200 for AIM Steel International and 100 for engineering. Most importantly, hopefully the fabricators those we utilize and help to manage, our revenues would have increased at least by 50%. This is really significant to me and our nominated executive Director of our India office Mohan Devu, to help develop and sustain local resources. As for AIM Steel International, we plan to generate at least USD 100 million in revenues within 5 years.

Source: Steel 360

Initiatives towards Upliftment of Indian Steel Industry

Since many years, Indian Steel Industry has been tussling with situations to sustain itself in the domestic as well as international market. Mining ban on 26 Iron ore & Manganese mines in Odisha, de-allocation of 204 Coal blocks in Sep'14 and an upsurge in Steel import, especially from China & Russia, have collectively injured the domestic market sentiments. In order to give some relief to the steelmakers, Indian government has taken some initiatives and issued vital legal orders for revival of the industry. Steel 360 highlights some essential initiatives by the government to rescue the Indian steel industry.

Peak Rate Duty hiked to 15% on Steel Products

Indian government has made a sincere attempt against increasing import of cheap rebar. It proposed to surge the peak import duty rate from 10% to 15%. This step will stem the tide of cheap steel import from nations like China & Russia. During Sep'13 to Mar'14, India imported about 220,600 MT bar & rod (alloy & non-alloy). Later, such import touched the highest level i.e. about 1,224,400 MT during Sep'14 to Feb'15. Imports have increased by more than double, which has wiped out business for domestic steelmakers. This peak rate duty may calm down the turbulances rising from Chinese cheap imports.

MMDR Amendment Bill, 2015

After lot of controversies and prolong wait, Rajya Sabha passed the Mines & Minerals Development and Regulation (MMDR) Amendment Bill, 2015 on 20th of Mar'15. The bill introduces a system of mines' auction to enhance transparency in mineral allocation process. The bill was passed with 117 members in favour of the decision and 69 against it.

In a cabinet meeting held on 5th of Jan' 15, chaired by Odisha Chief Minister, Naveen Patnaik, it was decided that all the non-coal (both captive and non-captive) mines, which are waiting for second and subsequent renewal, will be allocated only through competitive bidding. While, mines those are waiting for first renewal will not be auctioned. However, this rule was not applicable for the mines held by OMC and other PSUs. Further on 12 Jan'15, President Pranab Mukherjee had signed an ordinance to amend the MMDR Act, 1957.

Not convinced with the union government's decision, Odisha Steel & Mines Minister, Prafulla Mallick remarked that the ordinance will only serve the interests of few high net worth people, who have exploited mineral resources of the country for the last 50 years. Odisha government was concerned because the state was planning to auction 18 mines those were pending for second and subsequent renewal. It cannot do so, as the ordinance extended their transition period for 5 years in merchant mining and 15 years for captive mines. Besides, Odisha demanded for more powers to allot mining leases to state owned PSUs and to levy a cess on major & minor minerals.

Month	Alloy Steel	M-o-M	Non-Alloy steel	M-o-M	Total	M-o-M
Apr'14	21,560	0	25,210	0	46,770	0
May'14	32,070	49%	34,580	37%	66,650	43%
Jun'14	8,230	-74%	45,970	33%	54,200	-19%
Jul'14	14,380	75%	73,090	59%	87,470	61%
Aug'14	44,040	206%	64,450	-12%	108,490	24%
Sep'14	23,490	-47%	131,500	104%	154,990	43%
Oct'14	61,600	162%	142,300	8%	203,900	32%
Nov'14	140,440	128%	99,200	-30%	239,640	18%
Dec'14	163,000	16%	85,600	-14%	248,600	4%
Jan'15	111,580	-32%	62,300	-27%	173,880	-30%
Feb'15	155,590	39%	47,800	-23%	203,390	17%
Total	754,420		786,790		1,541,210	

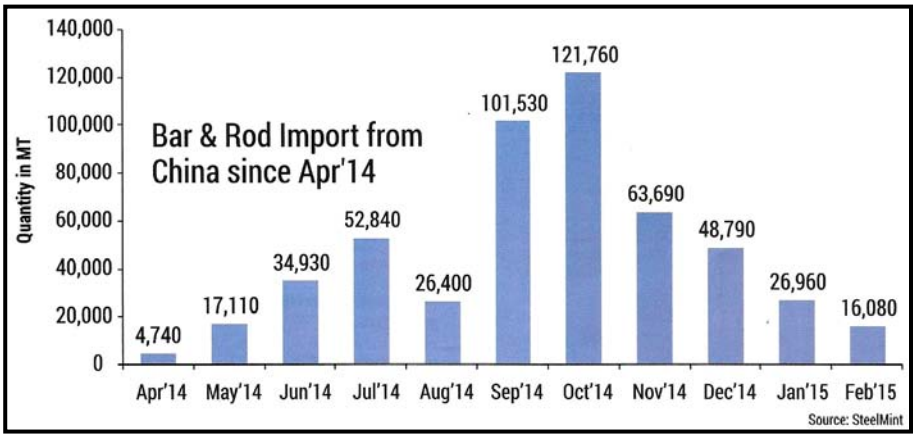
Quantity in MT

Source: JPC-Ministry of Steel

Despite obstructions, the union government passed the MMDR Amendment Bill, 2015 and ensured the Indian steelmakers that all mineral concessions will be granted only through auction (Section 10 B & 11). In addition, the mining license will be for 50 years after which, there will be no renewal but compulsory auction [Section 8 (1), (2), (3) & (4)). This will not repeat the issue of SC's verdict on second & subsequent renewals. Section 12 (A) of the ordinance has provided easy transferability of concessions obtained through auctions so as to attract private investment & FDI. Moreover, MMDR Bill, 2015 has also given an open opportunity to new miners to be a part in the competitive market.

Steel & Steel Products (Quality Control) (Amendment) Order, 2014

Indian steel producers have been battling with rising bar & rod import from China for a year now. Few Indian steel associations like India Steel Rerolling Association (ISRA), All India Induction Furnace Association (AIIFA) and rolling mill owners from Maharashtra & Tamil Nadu had raised their voice against increasing import of rebar under alloy grade category. Indian Ministry of Steel, after receiving various complaints had issued an order on 4th of Dec'14 and made BIS norms mandatory for the Chinese Steel products.



Against the notification issued by IMF on 7 Nov'14 that made BIS norms mandatory for the clearance of imported material from China, Indian importers filed a stay petition in Bombay High Court and Madhya Pradesh High Court, as their cargoes imported from China were not cleared by the customs.

According to JPC's monthly data, Bar & Rod import increased during Apr'14 to Dec'14, but after implementation of BIS norms, such imports have declined from China.

Source: Steel 360

Tata Steel's margins will remain squeezed as product prices fall

Despite a significant fall in Indian operations' Ebitda (earnings before interest taxes, depreciation, and amortisation), T V Narendran, managing director, India and South East Asia, Tata Steel, remains hopeful. He tells Aditi Divekar about gaining comfort from not having to buy iron ore. He also speaks of his wait for the Kalinganagar unit (Odisha) to get operational. Excerpts:

Q: **Tata Steel India has witnessed a significant fall in its Ebitda (operating earnings) due to weak steel prices and demand. Now with an additional cost head of the district mineral fund (DMF), where do you see the Ebitda?**

A: The margins will remain squeezed as steel prices fall and also because of the DMF contribution, but at least there is comfort that we won't have to buy iron ore. We bought almost five million tonnes last year and some of the overhang is still going on. So, hopefully Tata Steel will have their mines operational, where we will save on raw material costs. About domestic steel demand, it is OK. Tata Steel always sells whatever it produces, so I am not concerned about the volumes.

Q: **May be Tata Steel is not affected in terms of its volumes, but steel prices have declined, so realisations will take a hit. How do you plan to tackle that?**

A: In the steel sector, one needs to look at a long-term perspective and not just on a quarter-on-quarter basis. We believe in the government's Make-in-India theme and are hopeful that steel prices will move up once demand goes up, as more investment comes into the infrastructure segment. We are bullish on the demand front.

Q: **Can you give us an update on your Kalinganagar plant in Odisha? Will the FY16 production figures include the entire three million tonnes from this plant? Does the mid-2015 deadline for this project stands pushed back.**

A: The plant is almost ready, but is waiting for some environment clearances. We have sought the consent to operate (CTO), but the government has asked for some clarifications and we have replied. As soon as we get the CTO, about 150 days from then, the plant will start to run. As far as production contribution from Kalinganagar goes, I will not comment till I get the CTO. For Kalinganagar, we are waiting by the day and whether this project stands pushed back only depends on when we get the CTO.

Q: **Tata Steel's Thai deliveries have been under pressure. How do you see the deliveries, given even the Thai steel sector is hurt due to increased imports?**

A: Last month, after a long time, we crossed 100,000-tonne sales in Thailand, and so it's good. If you see the Thai economy, it's the slowest-growing one in South East Asia, as there was a lot of political instability. But the martial law has been giving some economic stability, so we hope things will look up.

Source: Business Standard

Steel scrap import stops on new and stringent check

Steel crap import has stopped with the revised guidelines in the latest Foreign Trade Policy, which mandate photography of every step of scrap uploading in containers at the origin.

This is likely to hit about 10 billion tonnes of India's steel production of 88 mt in 2014-15. "Secondary steel producers like us are facing huge problems. It is a futile exercise by the government. What's the point in reopening the container after filming? No one intends to import garbage instead of metal. There can be better ways to govern like third-party inspection, agencies' certification, etc," said Ankit Miglani, deputy managing director, Uttam Galva Steel, India's largest producer of the galvanised product.

Until March 31, third-party inspection and certification were accepted, though at the sole responsibility of importers. The government now wishes to prevent import of radioactive material with the metal scrap.

"Shipments have stopped due to the lack of clarity on the implementation of videography. Pre-shipment inspection agencies have stopped inspection of cargo, as the new guidelines require a trained expert in radioactivity to inspect goods," said Sanjay Mehta, managing director of MTC Business Pvt LTD, the country's largest processor of metallic scrap, with a monthly volume of around 1.5 mt. After 8.16 mt in 2012-13, steel scrap import was only 4.78 mt in 2013-14, due to lower demand from consumer industries. In 2014-15, it is estimated at 9.6 mt.

Implementation of the proposed change in guidelines is a challenge due to lack of trained radioactivity inspectors and machines. According to Rohit Shah, managing director of Perfect Valves, "Around 1,500 inspectors are required to be stationed. Facilitating of visas and their remuneration would add to the cost for the government, to gain nothing. Without setting up adequate infrastructure, implementation of videography of scrap containers would be a big blow to secondary metal producers."

Integrated steel producers use scrap as coolant for manufacturing steel. For large primary and secondary steel producers, sponge iron replaces scrap. Hence, suspension of scrap import would not impact them in a real sense. But mills that use only scrap as raw material for value-added products and articles for direct use in consumer industries will be hit severely, say sources.

Source: Business Standard

Indian Steel Plants Spread Wings

Tata Steel Scunthorpe Bags Contract for New London Underground Railway

Tata Steel has landed a major contract for new London underground services with the steel set to be manufactured in Scunthorpe.

The contract is to supply highly wear resistant rail for the Crossrail project beneath the heart of London. In total, 7,000 tonnes of Tata Steel rail will be used on the Crossrail route which will serve 40 stations below the capital.

It will travel more than 100 kilometer from Reading and Heathrow in the west, through new twin bore 21 kilometer tunnels below central London to Shenfield and Abbey Wood in the east.

Steel will be manufactured at Tata Steel's Scunthorpe site before being rolled at the Company's Hayange mill in northern France.

Mr. Gerard Glas, Tata Steel's rail sector head said that "The Crossrail project will have a huge impact on improving the commuting experience in London and we are delighted to be a part of that. Our premium heat-treated rail is produced using a unique patented process which ensures it has exceptional wear resistance."

He said that "Rather than using traditional methods of heating and cooling, Tata Steel has developed a system where the rail moves through an induction furnace which uses an electromagnetic field to heat the steel to 950^0 C.

The rail is then rapidly cooled using compressed air. The resulting uniquely low residual stresses provide further protection against risk of rail failure compared to other in-line heat treatment processes."

He added that "This combination of innovation and a close working relationship with the customer means Tata Steel is able to provide the best possible solution for this historic new line."

Source: Steel tech

Tata Steel to set up 2nd Ferrochrome Plant in Gopalpur

Tata Steel has applied for environmental clearance for setting up a second up a second ferrochrome plant in Gopalpur, Odisha. Mr. Arun Mishra VP Gopalpur project of Tata Steel said that "The Company is now setting up 55,000 tonnes per annum capacity ferrochrome plant, as an anchor project in the proposed industrial park with an investment of around INR 400 crores. The plant will start

operation by July 2015." He further added that the Company also plans to set up a second ferro-chrome plant with capacity of 240,000 tonnes per annum in the same place. The Company has sought environment clearance for the second plant.

Source: Steel Tech

Iron ore miners told Chinese steel growth forecasts too bullish

Australian iron ore miners need to accept their long-held forecasts for Chinese steel growth are likely to be too optimistic, according to the former iron ore president of BHP Billiton. Speaking after the price of iron ore slumped again to just $US47.08 per tonne, Ian Ashby said he had not expected to see iron ore prices plumb these depths until after 2020. "With the price in the $US40s I'm shocked, but I'm not shocked by the volatility because the market is trying to find itself," he said. "If you go back and look at the cycles, whichever commodity they are in, generally the price will overshoot big time on the high side, and then it will fall off a cliff." Mr Ashby headed up BHP's iron ore division during the absolute peak of iron ore prices between 2006 and 2012, and he said the slowdown in China had not been fully appreciated. "The wall of supply has hit. My concern would be that I don't think the slowdown in China has been fully analysed with respect to what it means for steel demand and I also think that there is going to have to be some 'fessing up soon by certain companies that the demand they've projected into the future is not going to materialise," he said. Rio Tinto and BHP have long predicted that China's steel industry would peak at 1 billion tonnes sometime between 2020 and 2030, and both companies have reaffirmed that view in recent months.

You look at the top four companies and you will probably still see them all still saying it is going to be 1 billion tonnes somewhere around that time period, the evidence at the moment is that it's flat or going backwards at about 900 million if not less, with an economy that has shifted and just pure demand falling away," said Mr Ashby. The comments echo the thoughts of China Iron and Steel Association deputy secretary Li Xinchuang, who in September warned that steel production in China would not reach 1 billion tonnes. "Over the next 10 years, according to our studies, China's steel production can be over 800 million tonnes for a long time, but it cannot go over 900 million tonnes," he said in September during a visit to Melbourne. He expanded on the comments last month, saying that Chinese steel production had officially peaked at 823 million tonnes in 2014, and would slip to 814 million tonnes in 2015. Iron ore industry veteran Russell Tipper, the former chief executive of Brockman Mining, said Chinese steel would continue to grow, but at a more gradual pace. Mr Tipper, who has worked for Aquila Resources, Rio Tinto and BHP in his career, said he was surprised that the price slide had not claimed more scalps in the Chinese mining industry. "The only thing I can't reconcile is the lack of a supply response in the Chinese iron ore industry," he said.

Satisfaction is in the effort, not in the attainment. Full effort is full victory.

..Mahatma Gandhi

Earlier this decade, conventional wisdom in the Australian iron ore sector suggested that Chinese iron ore mines were losing money with iron ore at about $US110 per tonne, with the price expected to remain above that level in the longer term. The price slide over the past year appears to have disproved that theory. "There can't be many iron ore mines in China profitable at this price," said Mr Tipper. Most pundits believe that Rio Tinto and BHP are the only profitable iron ore miners in Australia at current prices, with the 14 per cent fall in the iron ore price over the past week likely to have pushed Fortescue into the red, where Atlas Iron and Mount Gibson have likely been for several months now. Mr Ashby said Fortescue did a great job building its export business in such a short time, but it may have pushed its debt-funded growth strategy "one step too far". Fortescue had net debt of $US7.47 billion at December 31, with the bulk due to be repaid in 2019. Mr Ashby said if current market conditions were to persist, Fortescue would have no choice but to start selling assets. "I think the capital markets are closed for them," he said. "They are not going to survive without doing something and I don't think they are going to get any debt relief, so I think they are going to have to sell some of their assets down."

Mr Ashby said he expected Fortescue to sell down stakes in mines rather than its port and rail infrastructure. "This is an infrastructure game, so the infrastructure has the value at the end because the predators will be out there, the BHP Billitons will be out there in ten years time," he said. "So I don't think they are going to sell down the infrastructure, if it were me I would be selling down the mineral resources." Iron ore prices have now fallen 34 per cent since January 1, and 60 per cent since they were $US119.82 per tonne in April 2014. Both Mr Tipper and Mr Ashby dismissed suggestions there was an organised push within China to drive the price down, saying that the various steel mills and provincial governments had never been able to organise themselves into a united push. Analysts at Commerzbank said the current momentum pointed to even lower iron ore prices in the near future.

Source: www.brisbanetimes.com.au

India likely to remain net importer of iron ore in FY 16

India is likely to remain a net importer of iron ore in 2015-16 as the falling international prices might encourage steel majors to continue import of key steel-making raw material through the current year. However, the quantity of imports may not be as high as last fiscal owing to an expected increase in the domestic production of iron ore. In 2014-15, India imported 15 million tonnes of iron ore, an all-time high and for the second consecutive year the country's imports will far exceed exports. Exports out of the country is pegged at a meagre 4.5 million tonnes. During this year, imports are likely to be around 10 million tonnes. This is despite reopening of mines in Odisha and the huge pile ups in several mines. But, the fact that international prices are continuing their downward journey and are ruling at below $50 per tonne CFR China would keep the interest of importers in the global seaborne trade. Also, inconsistency in supply of iron ore and availability of high grade ore at cheap prices will be encouraging for the steel mills to keep their import intact. Indian steel mills, which do not have captive mines, require around 95 million tonnes of iron ore per annum. JSW Steel, which was the largest importer last year at 10 million tonnes, will continue to be the major importer in FY16. Other importers include Tata Steel and Welspun among others.

"This year, we are going to increase our capacity utilization above 90%. Though the availability of domestic iron ore will improve during the year, we will continue to import to meet the requirement at our plants. However, we may not import as much as last year and might end up at around 6 million tonnes from places like South Africa," Vinod Nowal, deputy managing director, JSW Steel said. Tata Steel, which imported around 2 million tonnes last year, is expected to import this year too to feed its Kalinganagar steel plant, which will be operational, analysts tracking the sector said. Last year, imports took place at $70-90 per tonne and this year, prices are hovering around $50 per tonne, which is a good enough reason for the mills to import iron ore containing very high grades, Nowal added. He, however, said price correction carried out by NMDC last week was not enough. Instead of Rs 500 per tonne reduction in prices of fines, they should have reduced by at least Rs 1,000 per tonne, he said.

"The recent correction of Rs 500 per tonne in domestic prices of iron ore fines by NMDC is welcome. However, more downward correction in ore prices are required to ensure imports are totally avoided. We need to continuously evaluate this domestic pricing aspect of iron ore fines vis a vis import offers in view of continued pressure on global steel pricing as well," H Shivramkrishnan, Chief Commercial Officer, Essar Steel said. The production of domestic iron ore is pegged at 137-140 million tonnes for 2014-15 and for the current financial year, a growth of 15% is expected. The growth will come from NMDC, mines in Karnataka and Odisha. Recently, Rungta has received EC nod for 16.5 million tonnes in Odisha. NMDC has announced that it would increase production by 20% to 35 million tonnes as against 31 million tonnes in FY15. In Karnataka, production is set to increase by over 20% to 22 million tonnes in 2015-16. Goa is also likely to commence production towards the second half of this year. "With the current prices in international market, there will be no scope for Goan miners to export. Moreover, the prevailing 30% export duty on iron ore and differential freight tariff charged by the Railways will not encourage exports to happen," an analyst said.

Source: Metaljunction

NMDC eyes 20% rise in production in FY16

State-run miner National Mineral Development Corporation (NMDC) is aiming to raise its output by 20 per cent to 35 million tonnes by the end of this financial year, a top company official said recently. "Our production will increase by 20 per cent by this fiscal-end to 35 MT from 30.7 MT now," NMDC Chairman and Managing Director Narendra Kothari said. Trial production started at a mine in Bailadilla in Chhattisgarh last month with a capacity of 7 MT, he said, adding the mine will begin operations in the next few months. "Another mechanised mine will be commissioned in Karnataka by August with an additional 7 MT capacity which will help increase the overall production," he said. Last December, Union Steel and Mines Minister Narendra Singh Tomar had directed NMDC to aim for an annual production of 100 MT by FY21. On the issue of volatile iron ore prices, Kothari said, "We have revised prices downward in February and March. We have not announced any price revision in April even though we review and revise prices every month, and the global prices are also very volatile." The state-run mining company has come under pressure lately as it has not revised down prices in April as of yet, despite fall in global prices. It is charging up to 25 per cent higher than other private miners. The domestic iron ore imports hit a record high of 15 MT last fiscal owing to ban on mining activities and declining global prices.

Source: Business Standard

Mineral auction rules: States asked to decide on exploration permits within a month

The Centre has proposed major changes for the grant of different mineral concession licences in order to bring flexibility to the mining sector. In recently introduced mineral auction rules, the government has initiated a two-stage auction and a different method of auction for licences where state governments can grant composite prospecting and mining licences. The government has proposed issuing non-exclusive reconnaissance permits within 30 days to any mining company after it submits an online application along with necessary documents. According to the rules proposed by the Mines and Minerals (Development and Regulation) Act, if a state government has inadequate evidence of mineral content after the first stage of reconnaissance, it can directly initiate the auction for a composite licence. A reconnaissance permit is granted for preliminary prospecting through regional, aerial, geophysical or geochemical surveys and geological mapping. A prospecting licence is granted for exploring, locating and proving mineral deposits. A mining licence is required finally to extract minerals. The state government will have to first issue a notice for a composite licence after which it will expect companies to apply for non-exclusive reconnaissance permits. The rules propose state governments allow at least one year for reconnaissance before the final tender document for auction is issued.

The highest moral law is that we should work unremittingly for the good of mankind.

.....Mahatma Gandhi

"All such non-exclusive reconnaissance permits would automatically stand terminated upon the issuance of the tender document," the rules state. If a state government has adequate evidence of mineral content, it can initiate the process for auctioning mining licences. However, companies that were granted reconnaissance permits or prospecting licences before the implementation of the new mining law will have the first right on prospecting and mining licences, respectively. The two-stage auction, to be conducted on an electronic platform chosen by the state government, will be similar for composite and mining licences. According to the proposed rules, the holder of a non-exclusive reconnaissance permit will not be able to stake any claim on a mining lease if it is successful in discovery of minerals. The permit holder, on discovery, may have to ask the state government for an auction of the mining licence. It will also have to pay fees of Rs 1,000 per Sq. Km for the area required for exploration. The state government will have the power to auction of any area being explored, and any non-exclusive reconnaissance permit over the notified area will stand terminated. The Centre has also proposed the company that is granted the mining licence will complete the area's detailed and complete exploration and prepare a feasibility study within five years.

Source: Business Standard

Mines ministry to frame mineral concession rules by end of April

The Ministry of Mines will complete the process of drafting the Mineral Concession Rules (MCR) under the new Mines and Minerals (Development and Regulation) Act, 2015, by the end of April 2015 and circulate it to all the states. "The MMDR Act, 2015 was gazette on March 27, 2015, and we have begun the process to draft rules and regulations under which the mining sector will be governed. Once the rules are sent to states, they can go ahead with the auction of mineral assets in their respective states, probably by end of May or early June," Minister of Steel and Mines Narendra Singh Tomar told reporters recently. Tomar, who visited steel ministry undertaking KIOCL Limited and reviewed the performance of the company for 2014-15, said the ministry will define the procedure for conducting auction of mineral assets and state governments will have to abide by those procedures. The new MMDR Act, 2015 also provided by reserving mineral assets to public sector companies under Section 17a2(A) and under this section companies like KIOCL will stand to benefit, he said. "I have urged the chief minister of Karnataka Siddaramaiah to allocate mining lease to KIOCL in the state. The company has been present in the state of Karnataka for many years and the state government should make use of the company's presence by helping it to secure mines," Tomar said. He said the ministry has notified public sector companies like NMDC, KIOCL, RINL, SAIL and MOIL to conduct mineral exploration, which was till now restricted to MECL alone. The government intends to see that at least Rs 250 crore is spent for exploration of new mineral areas in the country. "Till now, in the last 66 years of independence, we have seen exploration of mineral reserves in only one per cent of the mineral bearing areas in the country. We want to change that now and invest huge amount of money to explore more areas," Tomar added. KIOCL Chairman and Managing Director Malay Chatterjee said at least Rs 1,000 crore from all the companies put together could be invested in mineral exploration in the coming year. The KIOCL has also set up a separate division—Mining engineering exploration department — with qualified and experienced engineers to carry out exploration, he said and added that the company was free to carry out exploration in any state in the country.

Source: Business Standard

Modi vows to 'clean up mess' in India

In a Madison Square-like event, Prime Minister Narendra Modi took jibes at the United Progressive Alliance government when he pledged to clean up the "mess left behind" and change the country's image from one of "scams" to a "skilled" nation. "Kem cho" (how are you), he started in Gujarati as he addressed a huge gathering of Indians, flanked by Canadian Prime Minister Stephen Harper and his wife, clad in a dark blue sari. "The country (India) is facing many challenges. And there is only one medicine," he said as the crowds shouted "Modi, Modi". He said "vikas (development) is the solution to all the problems of the country....only development can take the country forward." Taking a veiled dig at the previous government, the PM, said, "Jinko gandagi karni thi, woh kar ke chaley gaye. Lekin hum safai karenge (Those who had to create the mess, they had done and left. There is a lot of mess. We will clear it up and go," Modi said, without taking any name. "The nation is huge. There is a lot of mess. It has been there for long. It will take time but it (cleaning) will be done as the attitude of people has changed," said, Modi.

"Earlier, the country was known as 'scam-India'. We want it to be known as 'skilled-India'," he said in yet another attack on the previous regime during which scams tumbled out as the gathering lapped up what he said with cheers. The reception hosted by Harper at the Ricoh Coliseum was attended by a huge number of Indians, who have settled in Canada for decades, and the event was a replica of an address Modi made at the Madison Square in New York during his visit there last year. Modi said the "jan mann" (people's attitude) has changed over the last 10 months since he took over. There is now an "atmosphere of trust" which was making things happen like the voluntary participation in Clean India campaign, rich people giving up LPG subsidy and bank accounts being opened for the poor, he said. Urging the diaspora to contribute to India's development by sharing their expertise and experience, Modi said the people of India have enough potential but they only needed an opportunity. He said it was with the aim of strengthening the hands of the people of India that he was asking various countries to share their expertise and technology.

Modi underlined that India had the youth power as 65 per cent of its population is below 35 years of age and if they decide to work for the progress of the country, nothing can stop the nation. He said the march of development has already started over the last 10 months in a "transparent and corruption-free" environment. In this context, the Prime Minister said while earlier two km length of road was being built per day, now 11 km is constructed in a day. The Prime Minister cited a Bollywood song 'kitna badal gaya insaan...(how much the human has changed)' to make his point that the attitude of people has changed in India and they needed to be trusted to make things happen. In this context, he said after he gave a call for "swachh bharat" (clean India), common people have come forward to clean up places. He said his government is focusing on skill development as he was of the view that by 2030, the developed world would require skilled people in a large number and India will be the only place to source them.

Source: Business Standard

Instead of aluminium, we should make alumina and get it smelted abroad

A few years earlier, central government-owned National Aluminium Company (Nalco) saw profits and market capitalisation falling and two chairmen succession coming under the lens of investigation agencies. In that backdrop, ANSUMAN DAS was made chairman and managing director of the Odisha-based company in August 2012. During his last day in office, he recounts to Dillip Satapathy & Kunal Bose the steps taken to steady the company and change its image. Edited excerpts:

Q. **You faced a tricky situation with the Nalco bauxite mine lease nearing its end on your assuming the chairman's office. How did you save the situation?**

A. Our strength is in ownership of high-quality bauxite deposits. I ensured that ahead of the lease expiry, the mines operated at optimum capacity. We quickly built two months of stocks. The refinery operation remained normal. Our intense interaction with government agencies resulted in getting a temporary permit to operate the mine and then the lease was renewed.

Q. **Your decision to keep idle almost a third of smelting capacity was path-breaking. It must have required a lot of convincing the government and workers.**

A. It was a kind of double whammy. Aluminium prices on the London Metal Exchange (LME) were staying stubbornly low, while the cost of energy rose because of our using expensive imported coal to supplement the coal linkage. So, I thought the sensible thing would be to keep that much capacity idle. I asked my directors to hold open house meetings with smelter employees, to convince them that the production discipline would be in the long-term interest of Nalco. They graciously accepted the loss of incentive money, and the mines ministry saw the logic. Our profits improved as a result of our decommissioning a large number of smelting pots.

Q. **LME prices remain around $1,820 a tonne. The premium paid on ready delivery has also slipped considerably. What is your take on the market?**

A. I think in the near term, aluminium will move between $1,800 and $1,850 a tonne. Worryingly, as global supply of the metal has risen, thanks to China stepping up export, the premium is down to nearly $100 a tonne for immediate delivery. I hope these rates will improve. The problem is, with China growing at the slowest pace since 1990, it has the compulsion to export large quantities of aluminium and steel.

Q. **The Utkal E-coal block was allotted to Nalco for captive use but cancelled with other allotments by a Supreme Court order. A big disappointment for you.**

A. This 67.49 million tonne (mt) block was given to feed our two new power plants of 120 Mw each. Our claim to this and an adjacent block rests on the provision in the Mines & Minerals (Development & Regulation) Act for reservation of resources for the public sector. More, we have done a lot of development work there to make it ready for mining. My point is, either you

give me coal deposits of 200 mt or give me coal linkages for 6.6 mt against our present one for 4.8 mt. Power and fuel are 32 percent of our production cost. We need cheap coal for viable operation.

Q. **Any progress in the intermittently discussed second smelter?**

A. We use as much as 15,000 kwh to make a tonne of aluminium. The challenge is to do the smelting at a place where cheap energy – coal or gas – is available. We are told by consultants that two preferred destinations for building a 500,000 tonne smelter will be Indonesia, where you have coal in plenty, and Oman, where gas comes as cheap energy feedstock. Because of our large and high-quality bauxite deposits, India's strength is in making alumina, the intermediate material for aluminium. We should make alumina here and get it smelted abroad. Instead of our staying a net exporter of aluminium, where a lot of energy is packed, let that electricity be used here in more purposeful ways.

Q. **India's per capita aluminium use 1.4 kg, against the world average of about seven kg. What are areas here where more aluminium will be used?**

A. Prime Minister Modi's Make in India programme succeeding will give a boost to demand. While electricity will continue to have nearly 50 percent of total Indian aluminium use, I believe construction, transportation and packaging hold much promise for the white metal. As India is rapidly building capacity in aviation, the aluminium industry should get ready to supply alloys with lithium.

Q. **Have you left any job unfinished?**

A. I wish I could start implementing the 1-mt expansion of the alumina refinery at Damanjodi. Also, the 270,000-tonne caustic soda project at Dahej in Gujarat. I hoped I could secure the Odisha government recommendation for a mining lease of the Pottangi bauxite deposit (in koraput district). What gives me much happiness is that I could put Nalco on the road to becoming a producer of 500 Mw of renewable energy in the next few years. It already has 100 Mw of wind power capacity and another 100 Mw is to be added this year. We will also be harnessing solar energy, starting with 20 Mw shortly.

Source: Business Standard

Technology, Product Development and Application

Steel is an Integral Part of the Global Circular Economy-Worldsteel

The World Steel Association (Worldsteel) has announced the launch of a new publication 'Steel in the circular economy – A life cycle perspective'. It examines the critical role of steel in delivering true sustainability to our society and calls for a global rethink of regulations in all market sectors across every region.

This publication demonstrates how steel enables a sustainable society, through a circular economy, when the full life cycle of steel products is taken into account. It highlights the need for legislators and industry decision makers to take a full life cycle approach before making legislative or manufacturing material decisions. It contains case studies from around the world that show how this is being carried out on a practical basis.

Reduce:
Over euro 12 billion spent annually on R&D means high-strength steel can now weigh less without losing strength – 25% weight reduction in new steels used for car parts.

Reuse:
Steel's durability fully extends the life cycle of the product. Reusing structural steel will increase with sustainable designs.

Remanufacture:
Steel's ability to restore used products to like-new condition – A wide range of steel products are already remanufactured worldwide.

Recycle:

Thanks to its magnetic quality steel is the most recycled material in the world. 650 Million tonnes recycled annually.

Edwin Basson, Director General at Worldsteel commented on the launch: "In a world of finite resources we must leave the outdated 'take, make, consume and dispose' mentality behind and move toward a circular economy model for optimal resource efficiency. To achieve this we need a life cycle approach that measures the social, economic and environmental impact of a product at each stage in its life cycle. We believe that life cycle thinking must become a key requirement for all manufacturing decisions going forward."

"The steel industry is an integral part of the circular economy model. A circular economy promotes zero waste, a reduction in the amount of materials used, and encourages the reuse and recycling of materials. These are all fundamental advantages of using steel. Therefore, in a well-structured circular economy, steel has competitive advantages over other materials."

New Steel Alloy Stronger than Titanium Developed in South Korea

According to a report published in the prestigious journal Nature, researches in South Korea have developed a new recipe for making a high strength, low density steel alloy that can outperform titanium in terms of strength and ductility. Because of its lightness, this may find many applications kin automotive and aircraft manufacturing.

This new type of steel can be made using standard steelmaking equipment and for one tenth the cost of the strongest titanium alloys.

The new steel alloy proposed by the South Korean team actually strengthens the steel in the same fabrication process that makes it lighter and more flexible. The specifics get pretty complicated, but the recipe essentially improves on existing steel-aluminium alloying processes.

As such, deployment of the new technique could be rapid and the breakthrough could have wide-reaching implications in manufacturing, construction and engineering.

Research team wrote "The balance of lightness, strength and ductility in metallic alloys has been explored since the Bronze Age. There is increasing demand for a broad range of structural materials for environmentally benign, energy efficient, lightweight engineering systems."

In materials science, ductility is a measure of a substance's ability to be stretched or bent without breaking. It's a big deal in manufacturing, particularly auto manufacturing, because steel alloys designed to make the metal lighter usually result in a more brittle metal. As a result, manufacturers looking to make lighter cars have turned to alternative materials.

The road to the new alloy started in the Soviet Union during the 1970s. Soviet engineers discovered that adding in aluminium during the steelmaking process resulted in a very strong and lightweight metal. However, this alloy had one major flaw: It was incredibly brittle. While the force needed to break it was considerably high, when the metal did reach its breaking point, it would shatter instead of bend like conventional steel. The reason for this brittleness was that the metal contained veins and nuggets of crystals called B2. The crystals were form via the fusing of iron and aluminium atoms.

The South Korean scientists determined that if the B2 crystals were properly dispersed throughout the metal, it would resist splintering. Researcher said "My original idea was that if I could somehow induce the formation of these B2 crystals, I might be able to disperse them in the steel. The team spent years refining their process and eventually settled on heat-treating and then thinly rolling out the steel to get the B2 crystals to form as desired. The researchers also found that adding a bit of nickel offered more control over B2 formation by causing the crystals to form at a higher temperature. The final result is 13 percent less dense compared to normal steel, and has almost the same strength-to-weight ratio compared to titanium alloys.

The Korean team noted that before their new steel can be mass produced, they need to determine

how to protect it from oxidation. Conventional steel is protected by a thin silicate layer that is applied to it, but silicate reacts with this new material, so it isn't an option.

Cheap Wonder Metals will make a Faster, Cleaner World

If only aluminium, titanium and magnesium were cheaper, they would replace steel and help us cut fuel bills and emissions. That day may not be far off.

TESLA'S electric sports car; the Audi A8; Lockheed's SR-71 spyplane: only the fastest, sleekest vehicles and aircraft have been made from high-grade aluminium, magnesium and titanium. These wonder metals are light and strong, but have a downside, namely their high cost and the large amounts of energy needed to produce them.

The US Government is funding a group of projects that aim to unleash light metals for the masses. Run by the Department of Energy's research arm ARPA-E, the METALS programme aims to make aluminium and magnesium cost the same as steel, while titanium could become as cheap as the slightly pricier stainless steel.

ARPA-E's primary goal is to reduce the energy that goes into transport – by making cars and planes lighter. The immediate benefit would be to make them a whole lot zippier and more energy-efficient, and there are many other exciting possibilities further down the road.

Steel is much used in motor vehicles and load-bearing structures, like bridges. Aluminium, magnesium and titanium would be better in most cases, but are prohibitively expensive.

"Titanium is the best structural metal there is," says James Klausner, who leads METALS. "It's lightweight, it's strong and it lasts forever because it does not corrode." He sees titanium potentially displacing steel - if the price would only fall from US$35 to US$4 per kilogram.

ARPA-E's stance is that reducing the energy cost of light metal production would benefit the US in the same way as its recent glut of cheap gas, by bringing it closer to energy independence.

Massachusetts-based Infinium is one firm aiming to revolutionise aluminium production. It is exploiting a new kind of electrochemical cell that separates the metal from its ore without generating carbon dioxide, a by-product of traditional methods. Chief technology officer Adam Powell says their process is 30 percent more energy-efficient, and the company is already producing rare earth metals like neodymium and dysprosium in this way.

Magnesium is present in huge quantities in the ocean, but at such low concentrations that extracting it is very energy-intensive. At the Pacific Northwest National Laboratory in Richland, Washington, researchers have partly solved that problem, using a catalyst that reduces the working temperature of the process from 900 to 300 ^{0}C.

By bringing the energy cost down and making lightweight metals the stuff of everyday manufacturing, ARPA-E hopes there will be other major benefits too. According to Klausner, "light weighting" all cars and planes in the US would save 121 billion litres of fuel a year and cut carbon emissions by about 5 percent.

But if such projects succeed, there is a need to tackle another challenge – recycling these light metals. Iron and steel can easily be pulled out of a waste stream using magnets, but that doesn't work with aluminium and magnesium. The latest model of Ford's famous F-150 truck, which sells in the hundreds of thousands each year, contains far more aluminium than any previous model. Getting all that metal back out is uneconomic in the US at present.

So ERCo, a company based in Plainfield, New Jersey, is working to adapt a steel recycling technique for use with aluminium. The firm uses lasers to determine the composition of a vat of molten metals derived mainly from aluminium scrap. An automated system then adds more scrap – chosen to turn the mix into a desired alloy.

Scrap which contains aluminium is currently crushed and shipped to China, India or Bangladesh,

where it is painstakingly sorted by hand. Known as zorba, this gravelly mixture of shredded car seat fabric, aluminium chunks and copper wiring is a human-made gold mine in countries with low labour costs, but shipping it there in the first place wastes energy.

A University of Utah spin-out uses a finely tuned varying magnetic field to do the same sorting without human intervention. Different metals feel the field to different degrees, depending on how it interacts with their atoms. The demo unit running on the ARPA-E conference floor perfectly sorted a conveyor belt feed of copper and brass from aluminium, spitting each metal into its designated container. The firm will trail the technology this year at a plant in Plymouth, Utah, owned by Nucore – the largest steel producer in the US – which generates much of its own raw materials via recycling.

Together, these technologies will make for a world that is much lighter on its feet.

Sleek cars and fuel efficiency are nice, but what else might ubiquitous light metals unlock? Cheap titanium is particularly promising. With it, we could build structures impervious to creeping salt corrosion, not just on land, but in the ocean too. Replacing steel with non-corroding titanium could skirt one of the main obstacles to wave power's adoption.

Titanium could also be used to make wind turbine blades that are easier to spin up. Air travel would become cheaper as planes like the Airbus A380 or the Boeing Dreamliner become standard, not the luxurious long-haul exception. Robots will even get safer as a titanium skeleton carries less momentum, so a moving robot arm is less able to hurt humans.

Amazon: They know where it is

As the world's largest online retailer, Amazon needs somewhere to put all of those products.

The solution? Giant warehouses, Eighty to be exact. Strategically located near key shipping hubs around the world.

The warehouses themselves are massive, with some over 1.2 million square feet in size (111,484 sq. m). And at the heart of this global operation are people (over 65,000 of them), and a logistics system known as chaotic storage.

Chaotic storage is like organised confusion. It is an organic shelving system without permanent areas of sections. That means there is no area just for books, or a place just of televisions (like one might expect in a retail store layout). The product's characteristics and attributes are irrelevant. What's important is the unique barcode associated with every product that enters the warehouse.

Every single shelf space inside an Amazon warehouse has a barcode. And every incoming product that requires storage is assigned a specific barcode that matches the shelf space in which it will be stored. This allows free space to be filled quickly and efficiently.

At the heart of the operation is a sophisticated database that tracks and monitors every single product that enters/leaves the warehouse and keeps a tally on every single shelf space and whether it's empty or contains a product.

There are several key advantages to the chaotic storage system. First is flexibility. With chaotic storage, freed-up space can be refilled immediately. Second is simplicity. New employees don't need to learn where types of products are located. They simply need to find the storage shelf within the warehouse. One does not need to know what the product is, just where it is. Lastly is optimisation.

Amazon must handle millions and millions of orders. That means that at any given moment there is a long list of products that need to be 'picked' from the shelves and prepared for shipment.

Since there is a database that knows every product required for shipment and the location of each product inside the warehouse, an optimised route can be provided to employees responsible for fulfilment.

Since Amazon deals with such a wide variety of products there are a few exceptions to the rule.

Really fast-moving articles do not adhere to the same storage system since they enter and leave the warehouse so quickly. Really bulky and heavy products still require separate storage areas and perishable goods are not ideal for obvious reasons.

In this storage system a wide variety of products can be found located next each other.

A necklace could be located a DVD and underneath a set of power tools. This arbitrary placement can even help with accuracy as it makes mix-ups less likely when picking orders for shipment.

Source: Steel Tech

If You Don't Decide What's Important In Your Life,

Someone Else Will Decide For You

Your destiny is not a matter of chance; it is a matter of choice. Many people have the right aims in life-they just never get around to pulling the trigger. You have to know what you want in order to attain it.

"Not to decide is to decide." Weeds grow easily in the soil of indecision. Get out of the middle of the road. Standing in the middle of the road is very dangerous; you can get knocked down by traffic going both directions. The train of failure runs on the track of indecision.

Because of indecision, you can die before you're actually dead. "Indecision is debilitating; it feeds upon itself; it is, one might say, habit forming. Not only that, but it is contagious; it transmits itself to others"

A man with one watch knows what time it is; a man with two is never quite sure. Until you are decisively committed, there is hesitancy and the chance to draw back, followed by ineffectiveness. Listen to what you say. If you hear yourself saying, "I've decided," you're on the path towards an exciting and productive life.

Leaders have wills, not just wishes. The greater degree of wishful thinking, the greater degree of mediocrity. The weak are always forced to decide between alternatives that others have set before them, not the ones they've chosen for themselves. This lifestyle will leave you unhappy. However, consider what Mike Murdock says, "you have no right to complain about what you permit.

A wise person makes his own decisions; an ignorant one follows public opinion. Don't worry about not making a decision; someone else will make it for you. You are where you are today because of the choices you've made and haven't made. "The average man does not know what to do with this life, yet wants another one which will last forever," said Anatole France.

Results and success follow commitment and decisions. The result is that one decisive person always accomplishes more than a hundred people with just an interest. Decisions are what transforms an idea into a reality.

Be decisive even if it means you'll sometimes be wrong. A key to your future is that you can still choose, you can still decide. What you commit yourself to be will change you from what you are into what you can be. Decision determines destiny.

This is the eleventh of series of "Nuggets of truth" which are our sound food for soul. Get ready to blow the lid off our limited Thinking & create your recipe for happiness & success.

Compiled by Shri K L Mehrotra

Vice Chairman – IIM-DC & Former, CMD – MOIL