

## NEWS LETTER

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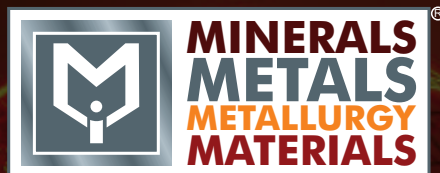
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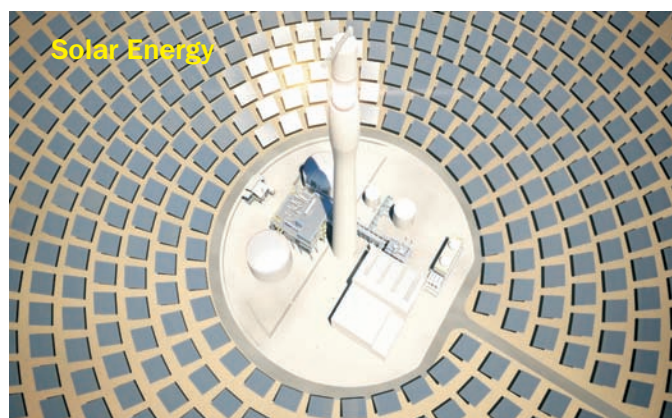
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# WHY INDIAN R & D HAS A POOR RECORD IN INNOVATIONS

Contributed by Prof. Hem Shanker Ray

Formerly Professor, IIT Kharagpur &  
Director RCL, Bhubaneswar, in the IIM Metal News

Though there are some outstanding achievements of India in some areas such as aerospace, nuclear energy, agriculture etc., the country ranks low in the International Innovation Index because of a poor innovative culture. This article discusses why, in general, our R & D centres have failed to evolve to compete with the best in the world. It also discusses some measures that may provide remedies.

## Introduction

During a recent lecture delivered in Bangalore N R Narayana Murthy created a flutter by saying that no big invention has come out of India since its Independence. This sweeping statement has shocked many and provoked fresh discussions on the subject. Many blamed the Information Technology (IT) sector, which includes INFOSYS of which Murthy himself is the founder, for luring away the brightest minds by offering huge salaries. Earlier our R & D problems were said to be because of the brain drain to the West. However, the main causes lies elsewhere. Our R & D centres, with some exceptions, are simply neither tuned for innovation nor capable to achieve them under the present conditions. In fact in many of these the words 'technology' and 'innovation' are used rather casually, specially in the Universities.

No doubt there have been outstanding achievements by ISRO, DAE, DRDO etc. One recent example is the Mangalyan, the space mission to Mars, that was accomplished by some 1000 scientists working for nearly three years on a mission mode with a meagre budget of some Rs. 300 crores. Earlier ISRO had put a satellite to orbit the moon and had launched the GSLV satellites too (twenty five in all). Those not only brought the country pride and prestige but also direct benefits to the society. There has been a great deal of participation of the private industry which produced high quality components with many spin offs. The GSLV satellites have revolutionized education and weather prediction. DAE has put the country amongst the front ranking countries in nuclear research and power generation. DRDO has produced the missiles the army needs. Earlier the country produced a super computer when it

was denied by the West. Our country also has an enviable record in achieving Green Revolution and then White Revolution.

Yet these achievements cannot guarantee the country an image of an innovating society. There is no widespread culture in our R & D. There is in general, no structured pressure on individual scientists or teams to deliver in that front and the fear of failure keeps people in the beaten tracks. Contrast this with the motto of the famous 3M company that says. 'If a scientist never fails then he deserves to be fired'. Again, mostly, a small number achieves far more than the remaining as per the Pareto Principle which says that eighty percent of everything is because of only twenty percent. In R & D Laboratories a good many do little R & D.

There is some truth in the fact that our budget for science education and R & D remains small compared to many other nations and in spite of promises it does not increase. In fact, in the recent budget hike is only about 3.4 percent in real terms for Science and Technology compared to the previous year. The continuing vacancies in the top positions in several IITs and Research establishments is an additional cause for concern. However, these are not the basic reasons for our poor record. The main road blocks are elsewhere and these are discussed in this article.

India's Rank in the International Innovation Index  
International Innovation Index is a global index measuring the level of innovation in a country. This is produced by the Boston Consultancy Group (BCG) in collaboration with the manufacturing industry. This index, which looks at both the business outcomes of innovation and Governments' policy to encourage and support innovation through public policy, is developed from a survey of a large number of senior executives in different countries and in-depth interviews of some select top level executives. The data for 110 countries are available in the Wikipedia. Table-1 shows indices for 22 countries chosen arbitrarily.

The reader needs to consult the Wikipedia to know how the numbers and the + or – sign are

derived. The point to be noted is that India is way down at 46 (Amongst the large countries it is at 16) though it is, surprisingly, rated as better than Russia, Egypt, Sri Lanka, Indonesia and Brazil. The data show something very remarkable. Some countries exploit their innovations efficiently for commercial profits but India is very poor in that front. We may have promising innovations but they are not exploited.

In an Innovative Society there is a favourable environment for technology transfer where an invention finds enterprise to become an innovation.

Values of Innovation Index are made available by some other organizations also and there may be minor differences. Values compiled by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO) give the following rankings of India in recent years. The numbers in the brackets indicate total number of countries taken into account.

2008-23 (107), 2009-41 (130), 2010-56 (132), 2011-62 (125), 2012-64 (141), 2013-66 (142), 2014-76 (143).

It appears that India is going down in the ranking.

Table 1: Ranking of countries according to Innovation Index (2000 figures)

Rank	Country	Overall	Innovation impact	Innovation performance
1	Singapore	2.45	2.74	1.92
2	South Korea	2.26	1.75	2.55
3	Switzerland	2.23	1.51	2.74
8	United States	1.80	1.28	2.16
9	Japan	1.79	1.16	2.25
10	Sweden	1.64	1.25	1.88
14	Canada	1.42	1.39	1.32
15	United Kingdom	1.42	1.39	1.37
16	Israel	1.36	1.26	1.35
17	Germany	1.12	1.05	1.09
21	Malaysia	1.12	1.01	1.12
27	China	0.73	0.07	1.32
44	Thailand	0.2	-0.12	0.35
46	India	0.06	0.14	-0.02
49	Russia	-0.09	-0.02	0.16
65	Egypt	-0.47	-0.46	-0.43
69	Sri Lanka	-0.56	-0.61	-0.46
71	Indonesia	-0.57	-0.63	-0.46
72	Brazil	-0.59	-0.62	0.51
92	Argentina	-0.97	-0.62	0.51

Rank	Country	Overall	Innovation impact	Innovation performance
98	Nepal	-1.05	-1.23	0.77
110	Zimbabwe	-1.63	-1.63	1.48

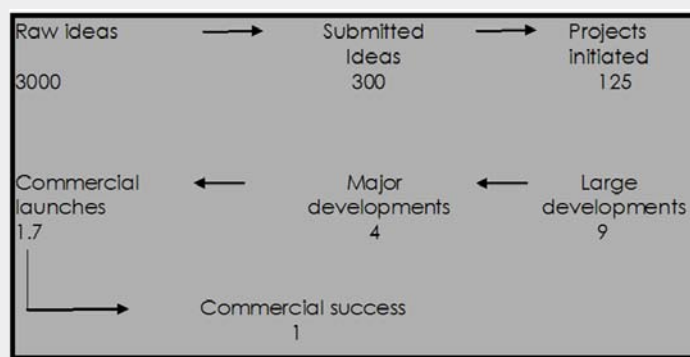
## Technology Transfer (T<sup>2</sup>)

This widely discussed subject is a process by which existing technology is transferred to fulfil the user's needs of useful processes, products and programmes. Common difficulties faced include the following:

- People and organizations are naturally resistant to change.
- Often the human element of personal contact amongst the right people stand in the way of innovation diffusion and adoption.
- Technology transfer needs some expensive steps as will be discussed later.
- A promising technology is often not commercialized because of inadequate publicity amongst professional networks.
- Acceptance of a new technology takes time, a lot of work etc.

Important technology transfer activities include cooperative research projects, contact research, patenting, copyright, licensing etc.

No wonder not many R & D results eventually find successful commercialization. One study Reports the following:



Before we discuss this subject in greater depth we need to first understand what is innovation.

## What is innovation?

Amit Chatterjee answered the question in the following words:

"The term innovation is derived from the Latin root 'nova' which means 'new'. It means, therefore, to bring something new to the world which

changes the way people live, work and interact with one another. An innovation must have a kind of newness which is beneficial in some way, such that it can be celebrated in the media, protected through patents and registration, distributed quickly and efficiently to the lowest number of people for this benefit and to bring about general welfare and the public good".

The Economist in October 13, 2007 Issue (p.4) said that innovation is fresh thinking that creates value, new products, business processes and organic changes that create wealth or social welfare. The Wikipedia views innovation as the application of better solutions that meet new requirements, in articulated needs or existing market needs. This is accomplished through more effective products, processes, services, technologies or ideas that are readily available to markets, governments and society.

Essentially the concept refers to putting into practice some invention. A narrow technological approach focuses specifically on product and innovation. This is usually knowledge intensive entrepreneurship. Obviously, there is a close link between entrepreneurship and innovation. It is well known that innovation brings change and vice versa. It brings a chain reaction like tossing a pebble in a pond when ripples spread disturbing the calm elsewhere. Every established institution is doomed to decline if it fails to innovate. In many of our R & D laboratories the results reported have seeds of innovation but they cannot be taken forward.

The Government of India had declared this decade as a decade for innovation and came up with a new Science, Technology and Innovation Policy, now known as STI-2013. The document says the following:

"Scientific research converts money into knowledge and innovation converts knowledge into wealth. Innovation is more than mere conversion of knowledge into a workable technology. It implies an S & T led solution that is successfully deployed in the economy or society".

Recently there has been the report of a solar powered aircraft which uses no fuel. The single seater, with average car size body but very large wings, runs with four 17.4 HP engines, the power supplied by 7248 solar cells on the wings and the body, is now flying around the world. (The Economic Issues 11.3.2015). This is a great

invention but as per the definition of STI-2013 it is still not an innovation.

## Research Activities in the Universities

Most Government funded institutions of higher learning do some research against project sponsored by Government Departments like – DST, DRDO, CSIR etc., and in some cases by the industry. Most of this research of academic value, is not application oriented. In fact there is not much awareness about innovation and value of patenting. Many researchers continue to do what they have always done and often they relate to their Ph.D. problem.

There is a story about a man who was obsessed with his routine of mornings walk. He would never miss that. When asked why he was so particular about it he said that it kept him fit. 'Fit for what?' he was asked. After pondering for a while he replied, 'I guess it keeps me fit for the morning walk'. Many researchers do what they do to remain fit to do what they do. Of course, there are exceptions. There are some who are engaged in research of great academic value and some are in frontier areas too. Yet the fact remains at least there should be a serious attempt in doing things that will interest the society and the industry.

The terms 'technology' and 'innovation' are used very casually in the Universities and common claims of a new technology or a new innovation have no basis really. When we study the variation of current flowing through a resistor because of a voltage applied we do the experiment of Ohm's law that says that the ratio of voltage and current remains constant and the ratio is the resistance. If we were to study how the resistance changes with temperature or the composition of the resistor material and, even beyond that, to find out why then that is research. To find some application of this we may like to identify a material which will have a suitable resistance to generate heating for a furnace or to find one which will have a low resistance in an electrical circuit so as not to lose voltage because of heating etc. We do R & D. Here one is looking for potential application of the research work. If one finds a suitable material for a particular application then for large production of the material in an industry one has to find suitable engineering. R & D results combined with engineering produces a Technology. To establish a process one has to examine the financial aspects. This Techno-Economic Feasibility Report (TEFR) is the first step in establishing a commercial process.



Then there are many more things that need to be assured for the process, even if it is commercially viable, to be a successful process. The factors include availability of raw material, compliance with government regulations and environmental guidelines, availability of land, capital, water, energy, work force etc., ethics, marketing and so on which depend on agreement of all stake holders. Rarely can University research produce a successful commercial process, not even any process. There may many special requirements. For example, if there is a promising biomaterial to come the market it will need many years of study on bio-compatibility and clinical trials.

Because of all the discouraging factors many sincere researchers interested in applied research eventually give up and settle into academic research that can result in publication in journals and fetch recognition in many ways. There is no emphasis given on innovative work in the Universities where career growth depend mainly on research publications and length of service. Many teachers do little research and still advance in their career only by teaching. As regards R & D sponsored by the Private Sector, much of it relates to technical services only. Few Universities provide encouragement and facility for patenting.

## **National R & D Institutions**

This article started with examples of some outstanding achievements of some of the institutions. However, the general picture is not so very encouraging.

The priorities in organizations like ISRO, DRDO, DMRL, DAE etc., are well defined. This however, is not so in some others like CSIR where R & D projects cover a very wide range of subjects from basic raw materials like minerals and coal to cutting edge technologies in aerospace, genomics, computer modelling etc. Initially it did pioneering work for the mining and mineral industry, glass and ceramics, general engineering, environmental assessment etc. Then there was a phase where emphasis was given on quality of publications in high Impact Factor journals. The emphasis on earnings from the non-government sector was initiated in 1991 after the Abid Hussain Committee recommended that every laboratory must earn at least one third of its budget this way. The emphasis on patents came in the late 90s and early in this century as a result of which, for a while, the number of patent applications and patents sealed began to increase. In recent times,

however, while number of publications continues to rise, the number of patents has declined in many laboratories.

Patenting is an important step in innovations and CSIR rightly, is credited for increasing patent awareness in the country. Many others such as even DRDO, started filling for patents only when CSIR showed the way. However, in India most laboratories face serious problems, both financial and legal, in getting and maintaining a patent in the international market. Many years ago an organization called National Research and Development Council (NRDC) was created to provide help in this matter but it has not functioned well. Today many laboratories, if they have a promising technology, prefer to give it away to some entrepreneur for a lump sum fee with a caveat that would be valid for a period of three years or so after which the laboratory can hand over the technology to another party. Most often the technology/process is guaranteed for the laboratory scale only and scale up risk is left to the entrepreneur.

## **The New Resolution of Team CSIR**

After a recent meeting of the Directors of CSIR Directors a new set of 'Resolutions' were formulated which appear to be more like Directives from the Government. Some important 'goals' have been defined but not the steps for achieving the same. The government wants that CSIR laboratories must now develop technologies for national missions such as Swachcha Bharat, Swasthya Bharat, Digital India, Skill India, Smart Cities and Ganga Mission and there should be at least 12 game changing technologies every year. They must catch to the common man and the poor as well as the strategic sector and bring confidence of the society about the relevance of each laboratory catering to small, medium and large industry. Above all each laboratory should become self financing in 2-3 years. Each of these resolutions is definitely laudable and many laboratories are doing something or other in each area. There will now be a tendency to 'fit' their existing activities into these resolutions.

The Government is right in insisting on self reliance because 60-70 percent of the laboratories comes from the Government only. In a typical laboratory there may be for 100 scientists some 250 supporting staff and then again many Research Scholars and Associates. In CSIR Headquarters in Delhi there are hundreds of whom a good

many, though designated as scientists, do little R & D. Essentially they are policy planners and administrators who comprises the bureaucracy. There is, therefore, a very large number who do not add value and yet cannot be dispensed with at present. A small number of scientists can never achieve self sufficiency of the laboratories if they have to carry the baggage.

Some twenty five years ago Canada and Australia had R & D organizations similar to CSIR named, respectively, National Research Council (NRC) and Central Science and Industrial Research Organisation (CSIRO) and these faced a similar problem of relevance on Government support. Either of them were disbanded and individual laboratories were turned into 'Profit Centres' with well defined goals for some. Each unit was allowed autonomy, the support staff was cut drastically and measures were put in place for private partnership programmes for technology development catering to specific areas. All the individual laboratories turned around.

While setting goals are important, the more important is to study the road blocks that stands in the way, specific places for execution of milestones and desirable measures that need to be adopted strictly. Accountability must come with authority and freedom from bureaucracy.

## Problems in Developing Commercial Processes

There are, of course many problems. A few important ones are listed here. (Private communication, Dr. S. Srikanth, CSIR-NML, Jamshedpur).

- a. Foreign institutions generally introduce new technologies faster because of large R & D teams focused on specific areas with better facilities and financial support.

In India it is common for every scientist to be involved in projects in different areas simultaneously resulting in sub-critical time allocation.

- b. According to prevailing guidelines of allowed leave a scientist can give as low as 140 days for men and around 110 days for women per year. Then again far too much time is lost in non-value adding engagements.
- c. Relevance of projects undertaken is often based on perceptions and not calibrated with actual requirement of the industry or society. The users may not have any involvement or

stake either in the formation of the projects, funding or the review.

- d. There is often a lack of shared vision and mutual trust amongst team members and the teams and the policy planners.
- e. Generally there is absence of some necessary ingredients such as scale up and basic engineering package, thrust towards product or process development and commercialization, good record keeping, marketing efforts, strong decision making authority and a carrier chain to take an invention forward. There may be lack of 'subjective horizon' i.e. ability to project things into the future.
- f. Researchers often face opposition from many quarters and there are inadequate returns for their efforts. Accordingly, they often prefer to turn towards academic research that brings them ready recognition. If efforts fail then the leaders may abandon the scientist instead of standing by him.
- g. The bureaucracy rarely, if ever, shares the vision of a research team and remain unconcerned. If there is a genuine R & D accomplishment it is rarely because of its support and is generally in spite of its existence.

## Measures for Improving Effectiveness of Our R & D

These, automatically, follow from the preceding paragraphs - some measures would be as follows:

- a. Define focus, from high quality S & T teams and put it on mission mode with all necessary support. Objectives and deliverables should be clearly defined.
- b. The members of the Advisory Committees must be chosen with utmost care.
- c. Put in place proper evaluation methods to measure not only success but also genuine efforts which may not have resulted in success create schemes for recognition.
- d. As far as possible initiate projects in partnership with the industry who must have a financial stake in the project.
- e. Create a rapport with the media.
- f. Promote the IPR culture.
- g. Encourage researchers to take risks. Remember what has been said about the 3M Company earlier.



- h. Give full authority to the persons at the helm to take punitive actions or create disincentives for the non-performers and the indisciplined.
- i. Create a 'carrier chain' that will help take an invention forward. In countries like Israel the job of an R & D team ends when there is an invention or a promising process. Then other teams take the development forward whereas the R & D team is assigned a new project.

How an invention is taken forward will now be discussed.

## Technology Readiness Level (TRL) and Manufacturing Readiness Level (MRL)

When there is engineering involved in development of a material or a process then the journey from invention to innovation is a long one even when the conditions are favourable. One has to, necessarily, go through many levels in making the technology ready (TRL) and then, after the basic principles have been established, one can think of manufacturing opportunities which again has several levels (MRL). The needs for personnel and capital increase from one level to another. The basic ideas in the TRLs and MRLs are briefly summarized in Table-2. TRLs show stages of maturity for a product to diviner its function whereas MRLs show stages of maturity for a product to be produced. These levels on identified by NASA based on some selected technologies.

Generally 2-3 years are required at each level and 15-20 years to fully establish a commercial process even in advanced countries. There are or were, many promising technologies in our laboratories which unfortunately remained at level 4-7 because there were no carrier chain. Examples include technology for producing nickel from chromite overburden at IMMT, Bhubaneswar, technologies for production of magnesium at CSIR-CECRI, Karaikundi (electrochemical process), and again magnesium by pyrometallurgical process at CSIR-NML, also electrochemical process for sodium and magnesium at CSIR-NML. It took DMRL nearly 30 years to transfer to an industry the Kroll's process for titanium production. The necessity of going through every step meticulously may be illustrated by the following example.

The Rare Earths Ltd. (REL), Chatrapur, Odisha is well known for its production of a variety of products from beach sands of our east coast. For

many years it also tried to produce TiO<sub>2</sub>.

From ilmemeite using a process for which the process equipment were designed and supplied by a reputed engineering consultant. Unfortunately this plant never functioned satisfactorily and often the personnel or the equipment were blamed. Finally a manager demonstrated how well everything worked when he procured some 11000 tons of ilmenite from kerela with a composition that suited the plant. Apparently the plant was not designed for the locally available raw material.

**Table: - Achievements at different levels of TRLs and MRLs**

Level	TRL	Level	MRL
1.	Basic research on scientific and engineering principles	-	-
2.	Feasibility research on technology concept, application and benefits	0.	Assessment of manufacturing opportunities
3.	Feasibility research on proofs of concepts in separate components	1.	Identification of basic manufacturing implications, materials requirements
4.	Technology development to test the integrated system concept	2.	Basic concepts and feasibility of manufacturing, process steps, manufacturing design etc.
5.	System development in prototype and demonstration in relevant environment	3.	Manufacturing proof-of-concept developed. Laboratory studies validation theory. Hardware and materials necessary characterized. Supply chain requirement determined.
6.	Prototype (Pilot Plant) demonstrated in relevant environment. Performance results demonstrate validity of technology	4.	Establish capability to produce in a prototype. Establish production requirements and manufacturing risks
7.	Establish performing of technology and performance criteria	5.	Identify production capability of prototype components, materials, tooling, test equipment, personnel skills etc.
8.	Tests and demonstration phases completed to satisfy customer. Performance validated and confirmed	6.	Production capability, established, manufacturing processes defined and characterized. Detailed cost analysis done
9.	The actual technology is applied under real-world conditions. Scaled up/down technology is in development in a Demonstration Plant (DP)	7.	Pilot plant capability established. Cost calculation supply chain, suppliers and quality assurances, done, procurement details etc., established

Level	TRL	Level	MRL
10.	The technology is successfully in service in multiple application forms. Vehicle plant forms and geographical regions	8.	Initial production is underway
		9.	Full volume rate production demonstrated in manufacturing processes and procedures are established
		10.	All materials, manufacturing processes and procedures, inspection and test equipment are in production and controlled to six-sigma or some other appropriate quality level

## Assessment of R & D Outputs

Innovations from R & D centres must be assessed in terms of the impact they make on the society or the industry. Some great innovations are paper clips, stapler, 3M pabs, cello tape, Xerox machine and, of course many electronic gadgets. Not all great innovation involve big science but some definitely do. Women's sanitary towels as also babies nappies make use of super absorbing material, where 1 cc of them may absorb 600-700 cc of liquid. Rubber and polymer chapels that made foot ware common needed development of new material for use in place of the traditional leather which was expensive. Innovations tend to make things smaller or bigger, slower or faster and often versatile. Thus a hammer which is also a nail puller, a toothbrush with a tongue cleaner, a pencil fitted with an eraser, a cell phone fitted with a camera etc. The hovercraft, though a great invention, is not that great an innovation because it has not served that many.

Banerjee has done some pioneering work towards quantitative assessment of the benefits of R & D inputs. He says the following.

"Development and transfer of a radically new technology is rather infrequent since they requires large resources, inputs from multidisciplinary expertise, long gestation period, high risk of failure and large finances. They have to be pursued in mission mode.

He developed a method of evaluating SAIL's R & D at RDCIS rather successfully. Outcomes of some 1500 incremental improvements in technology have been evaluated over 20 years as per the record of benefits accrued through their application in various steel plants. Generally there are 60-100 innovations each year.

The two parameters evaluated are the following:

1. Customer satisfaction as determined by an Index (CSI), and
2. Economic benefit as determined by a Certified Annual Benefit (CAB) and Benefit to Cost Ratio (BCP).

However, attempts to adopt this or a similar procedure for the impact of CSIR technologies transferred to the industry have not been successful because it is difficult to get feedbacks from user industries.

## Make in India

A great deal is being discussed with reference to the Prime Minister's recent slogan 'Make in India'. The Boston Consultancy Group and CII have produced a valuable document during CII 13th Manufacturing Summit 2014 (This is available in the Internet).

The report says that to 'Make in India' a reality there are many necessary requirements such as the following (Relative priority as shown):

- State-of-are infrastructure to support manufacturing (18%)
- Driving Labour reforms (15%)
- Changing manufacturing policies around incentives and support to industry (12%)
- Political stability (9%)
- Aggressive marketing/re-branding Indian manufacturing image (9%)
- Deeper linkage between the Centre and State Departments (9%)
- Incentivized high-tech imports and R & D investment (8%)
- Reducing burden of compliance (8%)
- Concentrated help to SME sector to drive innovation (6%)
- Incentives (5%)
- Others (2%)

The two items highlighted is directly connected to R & D and innovation that are necessary for development. Unfortunately Indian Research infrastructure is inferior to many other countries and the country is losing in high technology exports.

R & D professional (i.e. full time researchers in industries, academia and Labs) per million people of some countries are as follow:

India - 160, Brazil - 710, China - 890, the US -

3,838, Germany - 3,950, Japan - 5,151. We have 1/30th of the number in Japan. India's share of high technology exports in total manufacturing exports (%) is on decline - 2009-9.1, 2010 - 7.2, 2011 - 6.9 and 2012 - 6.6. India's share of GDP spent on R & D is lower than peers and the Private Sector's contribution remains a matter of concern.

Overall R & D spending of some countries is as follows (in percent of GDP).

Japan - 3.4, Germany - 2.19, the U.S. - 2.8, China - 1.8, the U.K. - 1.8, Brazil - 1.2, Russia - 1.1, Malaysia - 1.1, Turkey - 0.9, India - 0.8, Mexico - 0.4.

The private sector contributes in India which stands poorly in comparison with the data of some other countries. The data are shown in Table.

Table: - Share in R & D expenditure

Country	Academics	Industry	Government
India	4	36	60
U.S.	3	64	33
Japan	20	70	10
Germany	18	67	15
U.K.	28	62	10
China	8	70	16

For many years now the Government of India has tried to rectify the situation but the strict policies and measures that need to be enforced to remedy the situation have not been adopted so far.

## Conclusions

Though there are some outstanding exceptions, our R & D centre are generally poor in record as regards innovation and the country is not an innovating society, ranking a poor 46 in the International Innovation Index for 110 centres as given by a reliable organization. In the Universities, specially, there is little concern for innovations and the teachers at best carry out academic research that bring them some recognition through publications. Our R & D centres do carry out some R & D that has seeds of innovation but measures to take them forward through a carrier chain is absent. The bottlenecks are well known and there are well defined remedial measures but the country has not been able to implement them.

*Extracted from IIM Metal News  
of February 2016 Issue*

## INDIA TO GROW AT 7-7.75% IN 2016-17: ECONOMIC SURVEY

The Economic Survey termed the external environment as challenging but projected a 7-7.75 percent GDP growth rate in the next fiscal which could accelerate to 8 percent in a couple of years. After a 7.2 percent economic growth in 2014-15, it said the expansion in the economy will be 7.6 percent in the current fiscal, the fastest in the world.

In spite of the challenges and lower-than-projected GDP growth rate during 2015-16, "the fiscal deficit target of 3.9 percent of GDP seems achievable".

Presenting an optimistic picture of the Indian economy, Chief Economic Adviser Arvind Subramanian's Economic Survey 2015-16 said that amidst the gloomy landscape of unusual volatility in the international economic environment, India stands as a haven of stability and an outpost of opportunity.

The Survey said the country's macro-economic is stable, founded on the government's commitment to fiscal consolidation and low inflation. The Survey underlines that India's economic growth is amongst the highest in the world, helped by a re-orientation of government spending toward needed public infrastructure. Describing these achievements as remarkable, the Survey emphasised that the task is now to sustain them in an even more difficult global environment.

However, it cautioned that if the world economy remained weak, India's growth will face considerable headwinds.

On the domestic side, two factors can boost consumption: Increased spending form higher wages and allowances of government workers if the 7th Pay Commission is implemented, and return of a normal monsoon.

At the same time, the Survey enumerated three downside risks: Turmoil in the global economy could worsen the outlook of exports; contrary to expectations, an oil price rise would increase the drag on consumption; and the most serious risk is the combination of these two factors.

"One of the most critical short-term challenges



confronting the Indian economy is the twin balance sheet problem – the impaired financial positions of the public sector banks and some corporate houses. The twin balance sheet challenge is the major impediment to private investment and a full-fledged economic recovery," the Survey said.

The Survey further stated that the country's performance reflected the implementation of a number of meaningful reforms. There is a palpable and pervasive sense that corruption at the Centre has been meaningfully addressed which has been reflected in transparent auctions of public assets. Foreign direct investment (FDI) has been liberalised across the board and vigorous efforts have been undertaken to ease the cost of doing business. Stability and predictability have been restored in tax decisions which have been reflected in the settlement of the Minimum Alternate Tax (MAT) imposed on foreign companies. Major public investment has been undertaken to strengthen the country's infrastructure.

However, the Survey has expressed concern over approval of the GST Bill being elusive so far, the disinvestment programme falling short of targets and the next stage of subsidy rationalisation being work-in-progress. It added that corporate and bank balance sheets remain stressed, affecting prospects of a revival in private investments.

It further said that perhaps the underlying anxiety is that the Indian economy is not realising its full potential.

The Survey stated that the country's long-run potential growth rate is still around 8-10 percent and realising this potential requires a push on at least three fronts. First, India has moved away from being anti-markets and uncritically pro-state to being pro-entrepreneurship and sceptical about the state. But being pro-industry must evolve into being genuinely pro-competition.

Similarly, scepticism about the state must translate into making it leaner. It emphasised that the key to creating a more captive environment lies in addressing the exit problem which affects the Indian economy. Second, the Survey called for major investments in health and education of people to exploit India's demographic dividend to optimal extent. Third, it said that India cannot afford to neglect its agriculture.

The Survey pointed out that the upcoming Budget and Economic Policy will have to

contend with an unusually challenging and weak external environment. It suggested that one tail risk scenario that India must plan for is a major currency re-adjustment in Asia in the wake of a similar adjustment in China.

Source: Steel Insights

## GOVT'S EFFORTS TO ENHANCE INFRA SPENDS TO IMPROVE DOMESTIC STEEL DEMAND: PRAKASH KUMAR SINGH

As the steel industry is passing through one of the most challenging times, the newly-appointed SAIL chairman Prakash Kumar Singh has his task cut out. In an interview with Surya Sarathi Ray of FE, he speaks of the company's strategies to counter competition and future plans. Excerpts:

**The steel industry is passing through a difficult phase. How long do you think this cycle will continue? Which are the factors that have the potential to lift the sector from the current downturn?**

The global steel industry is facing challenging times mainly due to the overcapacity created by world's largest steel producer, China and its consumption slowdown due to economic restructuring. China, despite contracting its output by 2.3%, remained an aggressive exporter with exports of more than 112 MT in 2015 (more than the total production of India), registering 20% growth over 2014. India has been one of the major destinations for dumping of surplus steel by China. Although domestic consumption in India has registered annual increase of 4.2% in 2015, the expansion in demand was largely met by imports which jumped to 9.3 MT registering a growth of 24.1%. Under such circumstances, recent favourable policies announced by the government and its concerted efforts to enhance infrastructure spends in viable sectors is expected to improve domestic demand and provide some impetus to the Indian steel industry in the coming financial year.

**SAIL has been doing badly over the last few quarters. Are better days near?**

The effects of demand-supply imbalance in global steel industry primarily driven by the slowdown in steel consumption in China after three decades of growth has had an adverse impact on the performance of steel producers across the world. Top and bottom line of the Indian steel producers have also been hit by global factors. SAIL also had to suffer a net loss for the third quarter of FY16, primarily due to a 24% decline in net sales realisations over the corresponding period last year. In case of some of the products, the domestic steel companies are even unable to recover their cost of production. However with recent government support, prices have started to recover gradually.

SAIL is trying to reverse the trend by ensuring cost reduction and ramping up of production, which remains the prime focus of our activities.

India is emerging as a large economy and remains a bright spot for the world. Our country shows solid signs of handsome growth potential in coming years providing a base for comfortable consumption forecast. India's per capita consumption at 59 kg is much below the global average of more than 216 kg and China's more than 500 kg, which presents the domestic steel sector with enough room for growth. This, coupled with government's thrust on infrastructure as well as on manufacturing will help in improving demand of steel intensive sectors and provide the much needed support for the domestic steel industry's growth.

### **How to tackle cheaper imports from China, Japan and Korea?**

Cheap imports from China and countries exporting steel to India under various trade agreements have affected the domestic steel market, which has recorded steep decline in prices since August 2014. Chinese export prices fell by almost 50% during July, 2014 to December 2015 impacting steel prices globally.

Under such a scenario, Indian steel producers sought intervention of government to provide relief measures to domestic industry. Measures in the form of safeguard duty on HR Coils in last September and recently in the form of Minimum Import Price (MIP) imposed on February 5, 2016 on certain tariff lines are expected to provide temporary relief. Long term trade remedial measures in the form of anti-dumping and countervailing duty are required for preventing dumping of unfairly priced imports.

### **Can you give us a tentative time-frame for the completion of your company's ongoing capacity expansion programme? Will SAIL postpone its "Vision Document" programme aimed at reaching 50 MTPA hot metal capacity?**

SAIL has invested more than Rs 70,000 crore in its modernization and expansion programme including modernization of the mines. Our modernization and expansion programme is cost and energy-efficient and will usher in the state-of-the-art technologies for producing world class products with best in class quality of value added products. Most of our new facilities and mills have been operationalised and we are currently focusing on completing our balance modernization projects and ramping up our production from 13 MT to 20 MT saleable steel gradually.

### **Is SAIL-ArcelorMittal JV on track?**

SAIL recently signed a MoU with ArcelorMittal, world's leading steel supplier to the global automotive sector, which has approximately 17% market share and the MoU is moving forward in the right direction.

Source: The Financial Express

## **STEEL INDUSTRY TO SEE BETTER DAYS, WORST BEHIND US: TATA STEEL**

The steel industry is likely to see good days ahead as the "worst is behind us", Tata Steel India Managing Director T V Narendran said recently. "The worst is behind us," Narendran said on the sidelines of CII's annual regional conference here. Referring to steel prices, Narendran said he did not wish to predict their range for the next few months, but said domestic steel price was still lower than minimum import price (MIP) imposed by the government in February. In the recent past, domestic price was up by Rs 3,000 and international steel prices had also moved up by 15 per cent, he said. Rural focus in Budget and the Seventh Pay Commission recommendations will fuel domestic demand, he said. Narendran said domestic steel makers were following the developments in China. Speaking about Tata Steel Kalinganagar, he said the company was currently focussing on stabilising the first phase of three million tonnes capacity. Depending

## TOTAL COMMISSIONED CAPACITY IN INDIA



## STATE-WISE TOTAL SOLAR COMMISSIONED CAPACITY IN THE COUNTRY (MW)

Andhra Pradesh	475.74
Arunachal Pradesh	0.265
Bihar	5
Chhattisgarh	73.18
Gujarat	1,024.15
Haryana	12.8
Jharkhand	16
Karnataka	104.22
Kerala	12.025
Madhya Pradesh	678.58
Maharashtra	378.7
Odisha	66.92
Punjab	342.32
Rajasthan	1264.35
Tamil Nadu	635.87
Telangana	392.39
Tripura	5
Uttar Pradesh	140
Uttarakhand	. 5
West Bengal	7.21
Andaman & Nicobar Islands	5.1
Delhi	6.712
Lakshadweep	0.75
Puducherry	0.025
Chandigarh	5.041
Daman & Diu	4
Others/Rooftop	114.223

All figures as on March 7, 2016

on cash flows and current demand, plan for additional three million tonnes second phase would be carried out. Taking into account the first phase of Kalinganagar project, the total flat capacity would get ramped up to 10 million tonnes. But the long capacity would remain at three million tonnes and the company could import from its three million tonnes South East Asia unit. Narendran said Gopalpur ferro alloy plant would commence operations in the next quarter.

Source: The Economic Times

## TATA STEEL'S KALINGANAGAR BLAST FURNACE TO BE LARGEST IN INDIA

The blast furnace at Tata Steel's new greenfield plant at Kalinganagar in Odisha is tipped to be the country's largest. The furnace with a production capacity of 4330 cubic metres will produce 3.2 million tonne per annum (mtpa) of hot metal per annum. Prior to Kalinganagar, the blast furnace at the Steel Authority of India's new and expanded IISCO Steel Plant at Burnpur, Kalyani', commissioned on December 1, 2014 was the country's largest with a capacity of at 4160 cubic metres. It was followed by Durga, the new blast furnace at SAIL's Rourkela Steel Plant, with a capacity of 4060 cubic metres which was commissioned in August 2013. The company is aiming at an integrated commissioning of all units by September this year, Rajiv Kumar, vice president (Operations-KPO) Kalinganagar Operations said during a meeting with media persons. The total investment would be around Rs.25,000 crore in the first phase of the project. With the first phase in Kalinganagar plant being commissioned, Tata SteelBSE 0.66 % 's total domestic production is poised to go up to 13 million tonnes per annum (mtpa). The new plant would produce three mtpa of steel in the first phase and later the capacity would be ramped up to six mtpa. However, he did not wish to speculate on the time frame for scaling up the capacity. Apart from the large blast furnace, Kalinganagar also has the first twin wagon tippler allowing unloading at the rate of 3,500 tonnes per hour. It will be the first such installation for bulk material handling in the country. At the



Steel Melting Shop with a 4.1mtpa capacity, the country's largest LD converter of 310 tonne will be in operation. The plant's Hot Strip Mill presently having a 3.5 mtpa capacity can go up to 4 million tonne.

Source: The Economic Times

## FINANCE MINISTRY BODY RECOMMENDS STEEL IMPORT DUTIES

An arm of the Indian finance ministry has recommended maintaining import duties on some steel products until March 2018, a government document showed recently, in a move to support the local steel industry and protect mills from cheaper imports. The government imposed a provisional safeguard import duty for 200 days on some steel products in September 2015 and last month set a floor price on imports to deter countries such as China from undercutting local mills, the first such move in more than 15 years.

Steel imports into India, the only major market where steel demand is growing, dropped for a fourth straight month in February. However, companies such as JSW Steel, Tata Steel and Kalyani Steels continued to lobby for more protectionist measures as imports weighed on their margins. The chief of the Directorate General of Safeguards, a division of the finance ministry, said an investigation found that cheap overseas purchases of steel were causing serious injury to India, the world's third-largest steel producer, and the imposition of safeguard duty would be in the public interest. The Director of Safeguards recommended a 20 percent import tax for hot-rolled flat products of non-alloy and other alloy steel in coils of 600 mm width or more for the first year, minus anti-dumping duty, the document showed. The duty could be lowered every six months after the first year and by March 2018 could be levied at 10 percent depending on the value of the goods, the director recommended. Such recommendations from the safeguards department are generally accepted by the finance ministry because they come after detailed investigations.

Source: [www.in.reuters.com](http://www.in.reuters.com)

## STEEL MIP IMPACTS COMPETITIVENESS OF ENGINEERING SECTOR: FIEO

Imposition of minimum import price (MIP) on steel has impacted the competitiveness of Indian engineering exporters, Federation of Indian Export Organisations (FIEO) said a few days back. "Exporters are already working on low margins and facing cut-throat competition besides huge volatility in currency. The imposition of MIP resulting in increase in steel prices by 15 per cent has further blunted the competitive edge of Indian engineering sector," exporters body FIEO said in a statement. While engineering exports have declined by about 16 per cent in first 11-months of the current fiscal, it said adding "auto and auto components, cycle and cycle parts, hand tools, industrial and electrical machineries are the worst sufferer". The MIP imposed on 173 steel products covers roughly 80 per cent of steel imports and thus impact engineering sector hugely, it said. Government needs to strike a balance between the interest of few large steel companies at the cost of thousands of micro, small and medium units which together provides more than 100 times of the jobs provided by large steel companies, it added. It said that government should provide steel to all export companies particularly in MSME sector at international prices without compelling them to go through advance authorisation route which requires a minimum quantity of imports for economic viability and thus not suitable to their requirement. Meanwhile, engineering exporters body EEPC said the sector will showcase its products in prestigious four-day Russian industrial trade show at Yekaterinburga, starting from July 11. The sector will project how the country is seeking global technology and investment with a view to becoming the manufacturing hub for the global supply chain, EEPC said in a statement. "Facing global headwinds, India is looking to diversify its trade and industry collaborations and Russia fits in very well in our game plan. Some of the blue-chip public sector companies, including the NTP, BHEL and NHPC have responded well to be part of the show," it said. India is the partner country in the global show.

Source: The Economic Times



# Why the world is v about China

**THE DRAGON IN THE ROOM** China has come to a stage where anything that happens to its economy has global reactions. HT gives you some key indicators that explain why the country has such an influence on the world



## GDP



### \$10.3 trillion

The size of the China's GDP in 2015. **India: \$2 trillion**

- China is the world's third largest economy behind the US and the 28-member European Union. The country's GDP has grown at an average rate of around 10% since 1991
- The problem, however, is that China is slowing down. In 2015, the country's GDP grew at 6.9%, faster than every major economy except India, but slowest in 25 years
- China is one of the biggest importers of raw materials such as minerals, and also the biggest market for companies, including Apple
- A slowdown reduces consumption, hurting those dependent on China to sell their products

## Industry



### 45%

Share of industry in China's GDP. **India: 30%**

- Manufacturing PMI – an indicator of growth in manufacturing activity – rose for the first time in March this year after falling for seven months. Despite the monthly increase, the index did not grow year-on-year
- The manufacturing powerhouse is currently reeling under excess capacity, primarily in the steel, coal and real estate sectors. The stagnation has meant China is importing less raw materials
- For example, China's coal imports dipped 30% in 2015, according to Bloomberg. This would have hurt Australia, which accounts for 40% of China's coal imports

## Imports



### \$1.6 trillion

China's imports in 2015. **India: \$450 billion**

- China, which is the world's second-largest importer after the US, saw a 7% drop in import volumes in 2015
- The top three products that China imports are crude oil, integrated circuits and iron ore – accounting for 30% of the total imports. China processes these goods into products such as petrol, electronic goods and steel
- Interestingly, unlike coal, imports of crude oil, integrated circuits and iron ore increased in 2015. This would generally counter the argument that the economy's slowing down, but problem is that much of the goods are produced using these imports end up being exported



## worried



ILLUSTRATION  
ABHIMANYU SINHA

### Exports



**\$2.2 trillion**

China's exports in 2015.  
**India: \$310 billion**

- China is the world's biggest exporter of electronic devices (\$215 billion) and steel (\$30 billion)
- Big companies, including Apple and Microsoft, prefer to manufacture in China due to low costs
- The problem is not much with exports as with underpriced exports, which are termed dumped by importing countries. Dumping is claimed to damage domestic industries
- China exports its excess capacity because domestic consumption has been hit. The problem is exacerbated when China devalues its currency to make its low-priced exports even more attractive

### Renminbi



**RMB 6.47**

Exchange rate of yuan against \$. **India: ₹66.65**

- Over the past year, the RMB — or yuan — has depreciated by over 6% against the US dollar
- Devaluation of the yuan makes China's exports more attractive. These exports crowd out those from other countries, which can prompt them to devalue their currency, triggering "currency wars". This is why a yuan devaluation causes global markets to tank
- Most countries do not devalue their currencies because it makes imports costlier. These countries, such as India, generally run a trade deficit. But with forex reserves of \$3.2 trillion, China does not have to worry much about this

### Forex reserves



**\$3.2 trillion**

China's foreign exchange reserves. **India: \$366 billion**

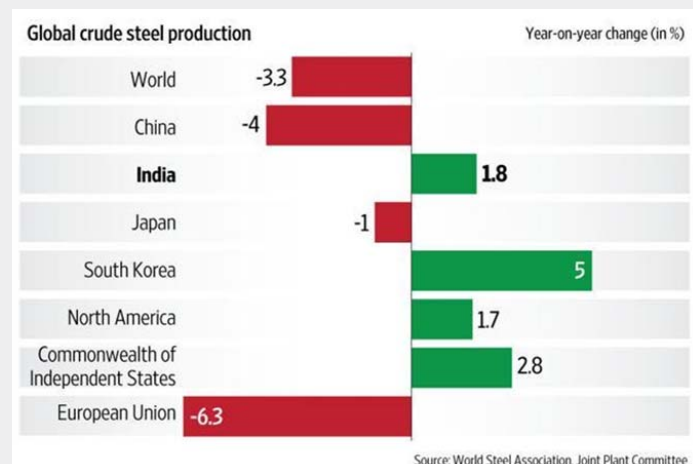
- China has built this war chest by being a net exporter for the past two decades. Forex reserves help a country control its currency. China's huge pile means that capital outflow — people taking their money out of the country — do not affect China much
- Forex reserves also come in handy to pay off debt. At present, China is sitting on a total debt of \$28 trillion, which is half of the world total. Out of this close to a \$1 trillion is off-shore debt — loans taken from overseas sources
- A slowdown in China puts this debt at risk. In case it defaults on even part of this debt, it will have a drastic impact globally

FIGURES IN RED ARE COMPARATIVE NUMBERS FOR INDIA; TEXT: B SUNDARESA



## WILL STEEL OUTPUT INCREASE, PROVIDING SUPPORT TO SURGING IRON ORE PRICES?

India's steel makers must be happy that the government is planning a revival package for the sector. This is on top of measures to protect them from rising imports. Times are tough for the sector globally as weak demand and excess capacity have affected prices.



The World Steel Association said global crude steel production in February declined by 3.3% from a year ago. Largest producer China's output was down by 4%. The European Union too saw a sharp decline but some countries' output increased too. Data for the next few months will be watched closely. If steel output revives, it may explain the surge in iron ore prices. More importantly, it puts a floor under steel prices. That may be some good news after a very long winter for steel companies.

Source: www.livemint.com

## LACK OF STEEL DEMAND CAN NEGATE MIP IMPACT

The long-pending demand of domestic steel-makers for imposition of the minimum import price (MIP), to prevent low-priced imports, was accepted by the government on February 5. However, that has led to a moderate increase in the prices of majority of the products in the domestic markets.

But many in the industry feel that the impact

of the MIP might be negated if there is no real increase in demand for steel in the country in the coming days and which will not come through either unless there is a positive change in the market sentiment.

### Fact File

- Amount needed to provide basic education for all those who don't have it now in India, annually: US\$ 6 billion (Rs. 402 Billion).
- Amount needed to provide basic water and sanitation for all those who don't have them now in India, annually: US\$ 9 billion (Rs. 603 Billion).
- Amount needed to provide basic health and nutrition for all those who don't have them now in India, annually: US\$ 11 billion (Rs. 736 Billion).
- The Capital Building in Washington, D. C. has 365 steps, representing every day of the year.
- The name Jeep came from the abbreviation used in the army for the "General Purpose" vehicle, G.P.
- Only one person in two billion will live to be 116 or older.
- Months that begin on a Sunday will always have a "Friday the 13<sup>th</sup>".
- The Eisenhower interstate system required that one mile in every five must be straight. These straight sections are usable as airstrips in times of war or other emergencies.

Compiled by Shri K L Mehrotra  
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"Till now, there has been no indication that actual steel demand will increase at a much higher pace of say 10 percent compared to the current growth of around 4 percent till January 2016. Any higher growth in demand is unlikely until and unless the government announces major infrastructure projects to boost sentiment and encourage private sector investment," said an official from a steel company.

"Our demand from the government was to ensure increase in steel demand by announcing or speeding up infra projects but, since it was difficult to spell this out directly, it was felt that the industry should push for MIP, which the

government has accepted," the official from a Kolkata-based steel company said. "Imposition of the MIP may effectively reduce imports by 50-60 percent. These are currently averaging around 1 million tons (mt) per month or 12 mt per annum but may decline to 5-7 mt provided the MIP is extended for a year from the current tenure of 6 months and to that extent domestic steel sales may rise," he said.

"If there is growth in steel demand then, probably, it can be said that there has been an impact of the MIP," he said.

The official expected Budget proposals for 2016-17 to have some confidence-building announcements that would lead to a spurt in steel demand and also an improvement in market sentiment, which subsequently did happen with the government announcing total targeted infrastructure spend in FY17 which was higher by 28 percent over FY16. However, only government spending will not lead to growth in steel demand as actual demand growth will come through private investment, which is not likely to happen unless there is improvement in sentiment," said an official from another steel company.

"Today, the situation is such that nobody is willing to invest in view of the uncertain environment. The confidence of investors was severely impacted after what happened in the case of coal blocks. At present, there is lack of confidence in the environment, because investors are not sure whether any decision taken by the government will not be changed by the judiciary in the future or not," the official said.

Elaborating, the official said, "Investors feel that it is the government which should take a call on policy decisions. If the Supreme Court intervenes on policy matters such as coal blocks then, naturally investor confidence will not be boosted." "See what happened with the coal blocks. The previous allottees, who had spent huge amounts of money on developing the blocks, found the same subsequently de-allocated, and are not even getting the returns on their investment and matters have moved to court," said an official.

## High inventories

A spurt in steel prices, triggered by the recent announcement of the MIP for a host of steel products, except on API grade conforming to X-52 and higher grades, may not sustain in the coming days unless there is genuine demand for

products from the market, industry sources feel.

"Steel prices may have firmed up, which is good for the industry which was bleeding due to low-cost imports. But until and unless there is genuine increase in demand, the upward trend may not sustain and prices may soften a bit as there is huge inventory lying with various manufactures," they said.

An indication of the downward correction was witnessed in prices towards the beginning of the week starting February 16, but firmness returned to some extent on February 20, according to a compilation of prices of various steel products by Steel Insights' sister publication ISMW.

There was practically no increase in demand, but manufacturers and traders have managed to push up prices in anticipation that negative sentiment that was created in view of rampant imports at much lower prices will now turn positive, they said.

Market report suggests the companies like Tata Steel, SAIL, JSW, JSPL and others are running huge inventories and thus a brief downward correction came in during the middle of the previous week ending February 20.

"It is not only lack of fresh demand that forced prices to slip off highs, but another factor was a higher level of inventories lying with most of the integrated steel producers," officials said.

"There is huge inventory lying with various companies and till these get depleted, the probability of which is very low at least in the next 3-4 months, the prices may continue to move around current levels," they said.

Till the demand increases and inventories go down, I do not think, the firmness witnessed in prices post-MIP announcement will continue. Already, prices of most of the products are lower than that prevailing on February 4, i.e., a day before the MIP was announced, said another source.

Asked if the MIP will lead to any major increase in India's domestic steel production in the balance period of the current financial year, the officials said: "We do not think there will be any major increase in domestic steel production as already there is huge inventory to the extent of nearly six months," they said.

However, if demand picks up, then there will be an impact of the MIP on not only domestic prices,

but domestic steel production as well.

Only a few measures are required to be taken by the government to boost steel demand like announcing a few confidence-boosting measures so that investors are encouraged to put in fresh investment, said one source.

### **Will bankruptcy law bail out steel?**

The possibility of any great success of strategic debt restructuring (SDR) looks bleak as far as the Indian steel industry is concerned but a section feels the proposed new bankruptcy law could help revive the sector.

"There had been some instances wherein lenders have converted debt to equity, but such conversion has been of practically no impact as the steel industry as a whole, not only in India, but globally, is reeling under depressed demand and excess supply," an official from a Kolkata-based steel company said.

Incidentally, almost all Kolkata headquartered steel-makers had initially gone for corporate debt restructuring (CDR) under which they had got some concessions on repayment of the principal and interest component of their debts.

But, after the negligible impact of CDR over the past few years, the banks had resorted to SDRs, wherein loans taken by the companies were being converted to equities.

According to some estimate, at present, the steel industry as a whole accounts for as much as Rs 4 lakh crore of loans from the banks in the country.

"I do not think there will be many SDRs going forward because so far it has not addressed the basic problem being faced by the industry. The problems were not addressed because the steel market itself is in a difficult stage," the official said.

Moreover, there had been practically no instance of banks actually taking over management control of defaulter companies despite converting debt to equity.

Incidentally, the Reserve Bank of India has issued a circular on the SDR scheme on June 8, 2015 that re-iterated to all the commercial banks and term-lending and refinancing institutions like EXIM Bank, National Bank for Agriculture & Rural Demand (NABARD), National Housing Bank (NHB) and Small Industries Development Bank of India (SIDBI) should consider change of management to recover stressed assets.

The circular said that the general principle of restructuring should be that the shareholders bear the first loss rather than the debt holders.

In the circular, the apex bank had come out with three suggestions for the banks to consider when a loan is restructured.

The first suggestion was possibility of transferring equity of the company by promoters to the lenders to compensate for their sacrifices, while the second suggestion was promoters infusing more equity into their companies.

The third was transfer of the promoters' holdings to a security trustee or an escrow arrangement till turnaround of the company to enable a change in management control, should lenders favour it.

Commenting on the situation, an industry source said, "It has been found that existing management of companies who are unable to repay the debt or whose accounts have become kind of NPA have practically no grudge in giving up management control in the current market situation, especially at a time when prices are low and demand for end-products is not that high."

Steel prices had fallen nearly 35 percent during the past one-and-half-years and, as a result, most of the steel companies had failed to service their debt.

"Now a new bankruptcy law may come in and only that will solve the problems. But even the new bankruptcy law will take its own time," the official said.

Incidentally, in February 2015, The Bankruptcy Law Reform Committee had submitted its interim report, but there has been no major progress after that.

"Till a tribunal is set up, implementation of the committee's suggestion and framing of the law would be difficult and it will take at least one year from here to come out with a bankruptcy law," the official said.

Another source said half of the cycle has already moved as far as SDR is concerned and now what will happen is instead of companies bearing losses, these would now be borne by banks.

"The situation will be such wherein all losses would be borne by the government and profit would be shared by all as the banks will be required to be funded by the government,' another source said.

Source: Steel Insights



## Given import buffers, steel firms clamour for more

Although there is now a safeguard duty and minimum import prices on various steel products, five companies have asked the government to impose anti-dumping duty (ADDs) and countervailing duty on select products.

The five firms are JSW Steel, Steel Authority of India, Tata Steel, Jindal Steel & Power, and Essar Steel. They have asked the Directorate General of Anti-Dumping & Allied Duties for these two duties on particular steel products of one category – hot rolled flat products of non-alloy and other alloy steel, in coils of a width of 600 mm (millimetre) or more, said a government official.

In September, the government had imposed a 20 percent safeguard duty on various products of this category only. Few days back, the directorate-general said the duty should be extended for two and a half years, as increased imports threatened serious injury to domestic producers. The government is yet to take a decision on this.

In February, the government had imposed a minimum import price (MIP) for six months on as many as 173 steel products to protect domestic companies from cheaper imports. And, the steel ministry is working with the finance ministry on a financial package within two months for the sector.

"The companies are looking for a long-term solution. Unlike safeguard duty or MIP, the anti-dumping duty or countervailing duty is country-specific. The companies' focus is on China, which is the top steel exporter to India," said the official.

The steel ministry said imports were down 25 percent over a year ago in the first 11 months of 2015-16. In 2014-15, imports were 9.3 million tonnes (mt); in 2015-16, these would be seven mt.

Safeguard duty is allowed under World Trade Organisation rules as a temporary measure.

Source: Business Standard

## SAFEGUARD DUTY ON STEEL IMPORT EXTENDED

The central government has extended the safeguard duty on some steel imports till March

2018, to protect domestic industry from cheaper supplies from China, amid a global glut. However, the duty would be reduced to 10 per cent in stages over the next two years. In September last year, India had imposed a 20 per cent safeguard duty on 'hot-rolled flat products of non-alloy and other alloy steel coils of a width of 600 mm or more'. Major steel companies have also asked for an anti-dumping duty, as well as countervailing duty on various products in this category. On March 15, the Directorate General of Safeguards said the duty should be extended for two and a half years as increased imports were threatening the domestic producers. In a notification issued recently, the Central Board of Excise and Customs (CBEC) said the 20 per cent safeguard duty would be extended till September 13.



The duty would be reduced gradually — it would be 18 per cent for the period between September 14, 2016 to March 13, 2017; 15 per cent between March 14, 2017 and September 13, 2017; and 10 per cent between September 14, 2017 and March 13, 2018. "The extension vindicates what the domestic industry has been talking about. Considering the extent of injury because of dumping, whatever margins have been imposed based on the prices prevailing during the investigation period might not be adequate. So, it is a welcome step by the government," said Seshagiri Rao, joint managing director and group chief financial officer, JSW Steel.

## A HISTORY OF PROTECTION

- **June 2015:** India imposed anti-dumping duty of up to \$316 a tonne on some steel products from three countries, including China
- **September 2015:** The government imposed 20 per cent safeguard duty on steel products of this category, which has been extended till March 2018 in a notification passed on March 29, 2016
- **February 2016:** Minimum import price imposed for six months on 173 steel products
- **March 2016:** 5 major steel companies ask that anti-dumping and countervailing duty be imposed on some products
- In another major step, the steel ministry is working with the finance ministry to issue a financial package within two months to revive the sector

In January, the government had imposed a minimum import price (MIP) for six months on as many as 173 products to protect domestic players from cheap imports. If required, the government may extend it beyond six months. Moreover, the steel ministry is working with the finance ministry to issue a financial package within two months for revival of the sector. "The steel industry has been seeking long-term measures to contain a huge influx of imported steel. The final findings and extension of safeguard duty till March 2018 is a right step and we welcome this move," said H Shivaramkrishnan, chief commercial officer, Essar Steel India. According to the steel ministry, imports came down by 25 per cent in the first 11 months of the current financial year. In 2014-15, steel imports were of 9.32 million tonnes (mt). This year, the imports would be around seven mt. Safeguard duty is allowed under World Trade Organization rules as a temporary measure, for a specified period, to protect a country's domestic industry from cheaper import.

Source: Business Standard

## GOVT EXAMINING STEEL BAILOUT DEMAND

India's steel ministry is working with the banks and top policy advisors to consider the feasibility of a bailout package for indebted local metal producers, industry sources said.

Losses at Indian steelmakers have widened as cheap imports from Asian countries, including China, have forced them to cut prices. The flood of imports prompted the government to impose

safeguard taxes in September and set a minimum import price.

Since December the government was studying restructuring of loans.

The Indian steel industry has sought a moratorium on loan repayments, segregation of loans to allow converting a part of borrowings to redeemable preference shares or bonds, and a special financial instrument to help lower capital costs.

India is saddled with Rs 8 trillion (\$118 billion) of stressed assets in its financial system with borrowing costs that are among the highest in the world. Steelmakers owed banks Rs 3 trillion, according to latest data from the Indian central bank.

The government will also decide on extending safeguard duties on imports over the next couple of weeks. The feedback after putting in safeguards has been good. The surge in imports seems to have been stemmed," a government official said. "And companies are getting a better price for their products."

Imports fell for a third month to 916,000 tons in January, according to provisional data from the steel ministry. Shipments jumped 24 percent to 9.31 million tons in the 10 months through January, it said.

## ISA seeks special financial package for steel sector

Earlier, the Indian Steel Association (ISA) had written to the government and Indian Banks Association (IBA) for a financial package for the steel industry in line with a similar support extended to the textile and sugar sectors.

India has emerged as the third largest producer of steel in FY16 with a production capacity of 110 million tons (mt).

Considerable investments have been made towards expansion, modernisation and new product and technology lines, leading to huge borrowings.

However, capacity utilisation has fallen 10 percent on huge imports in recent times, leading to financial stress.

EBIDTA margins of steel companies have dropped



by 40 percent and this has impaired debt servicing.

While the government has taken positive steps like a safeguard duty and MIP, there is requirement of a support system from all stakeholders for survival of the industry, the ISA said.

The ISA called for a short-term moratorium on payments of interest and principal amount and segregation of sustainable and balance debt.

"The sustainable debt will consist of long-term debt as well as working capital required to run business at optimum capacity level and to generate pre-determined debt service coverage ratio," the association said.

The remaining part of the debt, that is the balance debt, is proposed to be repaid over an extended period of time by converting it into redeemable preference shares or redeemable bonds, the association added.

The Indian Steel Association is the premier body of Indian steelmakers which represent 60 percent of steel capacities in India. ISA is a common platform formed to further interests of the steel industry in India and be a part of its growth and serve the interest of the public at large, looking forward to higher levels of prosperity.

The major challenges that the industry is facing include low per capita steel consumption, rising imports at unfair predatory prices and shortage of raw materials. ISA seeks to promote consumption, which is low in India, and campaign for "infrastructure" status for the industry.

The vision of ISA is that it shall work towards transforming the Indian steel industry as a global leader acclaimed for its quality, productivity and competitiveness with focus on health, safety and environment along with a growing thrust on innovation through R & D, adopting an inclusive and collective approach.

Source: Steel Insights

## BRIEF REPORT ON TECHNICAL PRESENTATION ON ULTRA LIGHT ENERGY ABSORBING SELF HEALING AND SELF LUBRICATING MATERIALS FOR TRANSPORT SYSTEMS

Indian Institute of Metals - Delhi Chapter organised a technical presentation on 'Ultra Light, Energy Absorbing, Self-healing and Self-lubricating Materials for Transport Sector' at our premises on 12 March 2016:



At the outset, Shri K L Mehrotra Chairman Delhi Chapter, welcomed the participants in the programme. He introduced the speaker – **Prof. Pradeep Rohatgi**, Distinguished Professor at State University of UWM (University of Wisconsin at Milwaukee, Milwaukee, USA) and Director UWM Centre for Composite Materials.

Thereafter Shri S C Suri, immediate past Chairman, Delhi Chapter, gave an overview about the activities of Indian Institute of Metals, in general, and for Delhi Chapter, in particular. Thereafter, the dais was handed over to the Prof. Rohatgi for his Presentation

Prof. Rohatgi, in his presentation on **Ultra Light, Energy Absorbing, Self Healing and Self Lubricating Materials for Transport Sector**, touched upon development of Metal Matrix Composites



(MMCs) and their applications in industry. He highlighted the following:

- Forming and Microstructure of MMCs, which have wide applications in Aerospace, Automotive and Electronic sectors
- Up-coming Mg based Composites for Automotive Sector, which are lighter by 80% than Fe and 33% than Aluminium



- Application of Self-lubricating Composites in Engine Piston, Turbines, Cylinder lining, Bearings, Bushings, Compressor vanes, wear plates etc.
- Usage of Syntactic foams and Sandwich Composites
- Lead Fly ash composites
- Self-healing Composites, inspired by self-healing of bones in humans, for industrial applications. Sn-Cu, Al, Ni-Ti and Sn-Bi Composites are prominent in this category
- Nanocomposites (specifically Al-Matrix Nanocomposites) is the newest direction being pursued for MMC development.
- Metal matrix nanocomposites (MMNCs) - materials into which insoluble nano-sized particles have been added in order to increase strength or other properties
- Activities of UWM Centre for Composite Materials with possible areas of collaboration with Industry





Concluding remarks of Prof. Rohatgi focused on

- MMCs help reduce the weight while increasing the energy absorbing capability of Army Transportation systems. While Polymer nanoclay nanocomposites have received considerable attention, the work on MMNCs is in its infancy



- Powder metallurgy, cryomilling and solidification processing are being successfully used to incorporate nanosize particles including carbon nanotubes in metal matrices
- Exceptionally large increases in strength, hardness & wear resistance and reduction in friction coefficient can be obtained as a result of incorporation of very small volume percentages of nanoparticles in matrices of metals
- Self-healing, Self-lubrication and Self-cleaning MMCs can decrease energy consumption and increase the reliability & survivability of Military Transportation Systems



After conclusion of the presentation, there was lively question and answer session.



About 40 persons participated in the programme, including 2 participants from Student Chapter at Dehradun.

Shri G I S Chauhan, Hony Jt. Secretary, proposed vote of thanks.

At the end, Prof. & Mrs Rohatgi were honoured with mementoes by Chairman on behalf of the Chapter.

The programme concluded with lunch.

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## BRIEF REPORT ON SEMINAR ON ALUMINIUM DIE CASTINGS

Indian Institute of Metals - Delhi Chapter organised a one day Seminar on 'Aluminium Die Casting' at our premises on 19 March 2016. Shri M P Sharma, Hon. Treasurer, Delhi Chapter, was the Coordinator of the Seminar.



At the outset, Shri B D Jethra Past-Chairman Delhi Chapter, welcomed the participants in the programme. He gave an overview about the activities of Indian Institute of Metals, in general, and for Delhi Chapter, in particular.



Thereafter, Mr. Rahul Khanna, member IIM-DC Executive Committee introduced the Chief Guest – **Dr.A.K.Gupta**, Chief Executive Officer, Rockman Industries Ltd. He also introduced the Guest of Honour – Sh. D.C.Sharma, Plant Head Super Alloy Castings. Five eminent Speakers from Aluminium Die Casting Industry made their Presentations on the Subject

**Mr. Sam** from Guangdong Yizumi Precision Machinery Co. Ltd., China, in his presentation highlighted various activities & capabilities of YIZUMI and focussed on **Yizumi New Series Machine Improvements**. He touched upon their unique development of H Series machines, Close Loop designs, Servo motor technology and Automation Cells. He emphasised on machine safety, reliability and efficiency aspects of Die Casting Machines.



**Mr. Manish Garg** from Digital Design Solutions Gurgaon, in his presentation highlighted various activities & capabilities of DIGITAL DESIGN SOLUTIONS and focussed on **Process Solutions for Tooling Industry**. He emphasised on greater



innovation pressure on suppliers owing to global fuel economy and emission regulations drive. He focussed on their capability for providing complete solutions for their clients in areas of



Production design, styling, tool design, forging, PLM, CAM, Simulation, mold tooling, sheet metal and technical documentation.

**Mr. Sendil Kumar K** from *Kaushiks International Bangalore*, in his presentation focussed on **Productivity Improvement in High Pressure Die Casting Industry**. He emphasised that productivity



improvement can be achieved by implementing latest technologies and smaller supporting equipment. He highlighted the salient features of U20 & CX25F2 (from Hishinuma Machinery), Gravity Casting tilt pour Machines (from CMH Manufacturing USA) and Water-free Electrostatic Spray Technology for high pressure die-casting (from Aoki Science Institute Japan).

**Mr. Devendra** from *Future Design Engineers, New Delhi*, made a presentation on **Robotics** on behalf of his colleague **Mr. Laxman Ram Sharma**. Mr. Devendra highlighted the requirements of robotics in Industry, recent trends & types, automation principles and strategies. He also focussed on Robotics and Automation in Foundry Industry.



**Dr. Shamik Baranwal** from *AdviZ Consulting & Solutions Pvt. Ltd. Gurgaon* made a presentation on **Utilisation of Solar Energy in Industries**. He highlighted the usage of Solar Energy in drying Agricultural products, Water & Space heating and Generation of electrical energy. He emphasised the importance of Site Selection, Soil testing, Civil works & Infrastructure preparation, Load Survey & Shade analysis, Structures, Installations, Battery and Weather Monitoring System in the entire Project work. **Mr. Ankit Agrawal** from *Boond*



*Engineering and Development Ltd. New Delhi*, presented some interesting details of various installed projects, viz. Milk collection and testing chain at Unnao UP, Lights for Education in schools, 150 kW Solar system at Delhi Metro station at Badkal Morh Faridabad, 40 kW Solar system at Jesus & Mary College Chanakyapuri Delhi, 55 kW Solar system at Palwal Haryana, etc.

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



Mr. D.C.Sharma, Guest of Honour spoke about his experiences in Die-casting Industry over a long period of time.

Dr.A.K.Gupta, Chief Guest focussed on Innovative practices in his address.



About 80 persons participated in the programme, including students from Academic Institutes.







At the end, Dr. A. K. Gupta, Dr. D.C Sharma and all Presenters were honoured with mementoes by Sh. B.D.Jethra on behalf of the Chapter.  
The programme concluded with lunch.

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## BLEAK PROGNOSIS FOR MINERALS AND METALS

A message that has come loud and clear to producers of minerals and metals from Finance Minister Arun Jaitley is that global challenges could become stronger in the coming days. After the world economic growth slid to 3.1 percent in 2015 from 3.4 percent in the previous year, economists have started fearing the onset of a global recession. This happens when global growth sinks below two percent. What is particularly unnerving is that quite a few developed economies, including the US, European Union (EU) and Japan, are prone to be stuck in deflation.

Jaitley has given hints in the Budget of the "risks of further global slowdown and turbulences." The point not to be missed is that last year, world trade volumes grew by only two percent, lower by more than a percentage point of GDP growth. The Economist writes: "Before the financial crisis, global trade used to grow faster than GDP; now it is lagging behind." This does not bode well for our engineering exports, which constitute 23 percent of the country's total exports. An important consumption point for steel and non-ferrous metals, engineering products originating in India will have trying times in their two principal markets of the US and EU.

While manufacturing activity in EU expanded at its weakest pace for a year in February, manufacturing purchasing manager's index (PMI) for the US has remained below 50 that separates growth from contraction since October. In better times, China invested heavily in rapid build-up of capacity of the whole range of metals from steel to aluminium to copper. Now that the country is managing to grow at below seven percent in the wake of migration from investment-led to consumption-led growth, it has the burden of surplus of metals, particularly steel and aluminium. The country's official PMI stood at 49 in February. Caixin/Markit China PMI, where the focus is on small and mid-sized companies, is not faring any better either. In the circumstances, China remains under compulsion to sell metals of which it has surplus in the world market at subsidised rates. This is however, much to the annoyance of countries, including India, which

host major steel and aluminium capacities. Precisely because of hidden and not-so-hidden subsidies, steel exporters in China are subject to growing trade action in the US, the EU and India.

In the first 10 months of 2015-16, India's steel imports were up a disturbingly high 24.1 percent to 9.306 million tonnes (mt) when exports took a hit of 32.5 percent to 3.156 mt. No wonder that during this period, the country's steel production for sale was down 1.8 percent to 75.66 mt. The saving grace is steel consumption here grew by 4.2 percent to 65.919 mt. The Joint Plant Committee of steel ministry points out "such growth (consumption) was mostly led by imports" as decline in saleable steel production here would bear out. No doubt, global environment for steel and other metals will continue to remain 'unsupportive' requiring of the government to build 'firewalls'. Ahead of the Budget, the steel industry got relief by way of minimum import prices ranging from \$341 to \$752 a tonne on 173 of 343 principal steel products. The Budget has raised the import duty on primary aluminium to 7.5 percent from five percent and on aluminium products to 10 percent from 7.5 percent. The hike became unavoidable since imports now have a share of 56 percent in India's use of aluminium. Though government dispensation falls short of what the industry wanted, Aluminium Association of India chairman T K Chand says revised duties will help in "checking influx of cheap imports."

Referring to the Budget focus on infrastructure development embracing highways and road building, construction of new ports and revival of 'under-served' airports, a spokesperson for Steel Authority of India says this will be a booster for steel demand. Incidentally, infrastructure alone accounts for half the country's steel consumption. Chand is particularly welcoming of the move to provide liquefied petroleum gas (LPG) connections to 15 million below poverty line (BPL) households in 2016-17. In the next two years, 50 million BPL households are to get this benefit. As this will spare the poor women from the curse of chullah smoke, the demand for LPG grade steel will get a major uplift. Per-capita rural demand for steel is stuck at a low 12.11 kg. But, rural India will demand so much more steel if farmer income is doubled by 2022.

Source: Financial Express



## CORPORATE INDIA LOOSENS PURSE STRINGS FOR IITs

Titan wants IIT Kanpur to help develop a system for non-destructive measuring of gold purity and is ready to pitch in with 25% project cost. SYNOPSIS India has committed about Rs 2 crore to IIT Kharagpur for developing next generation cyber physical systems and industrial internet of things while ESDCON is ready to part with Rs 11 crore upwards to an IIT that can develop more efficient vehicular and storage batteries.

US-based V J Technologies, on the other hand, is interested in developing a state-of-the art tsunami generator for studying coastal planning of built environment for key civil engineering and infrastructure projects with IIT Bhubaneswar while Ecosense Sustainable Solutions is pitching for an e-PV diesel generator to counter grid failure with a diesel and photovoltaic combination. More than Rs 156 crore and 160 project proposals have been committed so far by the industry across IITs for India-specific research solutions under the Uchchatar Avishkar Yojana (UAY), a mission that works also to meet 'Make in India' goals.

Queuing up behind various IITs are the various arms of Tata Group from Tata Motors and Tata Steel to TCS, besides Unilever, Cummins, GE, Perkin Elmers, Edgewood, V J Technologies and Aditya Birla group, among others.

In all, 25 ministries and departments have come together to co-fund the range of innovative research projects.

The Idea behind the UAY, being piloted by the human resources development ministry, is to promote innovation of a higher order that directly serves the needs of the industry and improves the competitive edge of Indian manufacturing while promoting a vibrant research ecosystem across IITs.

Thirteen of the 16 IITs are going to be part of this industry-academic collaboration, with IIT Madras taking the lead with 39 project proposals, followed by IIT Kharagpur at 21 and IIT Delhi with 19. IITs apart, the Indian Institute of Science (IISc) Bangalore is also participating in the mission with 23 proposals submitted. About 100 of the total 160 proposals involve industry

funding of Rs 1 crore upwards. The new and renewable energy sector has maximum industry backed proposals so far, followed by heavy industries, communication and ICT, and health applications.

As agreed in the IIT Council meeting held in October 2015, the programme will bring in government funding for industry-sponsored, outcome-oriented research projects. The funding formula involves the industry contributing at least 25% of the project cost.

Source: The Economic Times

## 17TH CENTURY CANNON UNEARTHED IN HYDERABAD

The unearthing of a 17th century cannon recently in the Hussaini Alam area of the city created a buzz about the treasure that might be lying buried.

"The cannon was unearthed when we were digging in the area at a house. At 2 a.m. I got a call. I immediately rushed and asked them to remove it carefully and keep it aside and I alerted the police about it," said Mohammed Hanif.

But unlike the cannon that was discovered last year only a few yards away in Naya Pul which was cast in bronze, this one is cast iron. The seven-foot iron cannon with encrustations caused by time has not yet been inspected by the State Department of Archaeology and Museum. "As the police have taken custody of the cannon, we are not worried about its safety and we will inspect and take its custody," said an ASI official.

Through the day, visitors thronged the area as the news spread about the cannon being unearthed in the open area behind the AD 1762 era Masjid e Buland Haji Moulana.

Probably mounted on the old wall that girdled Hyderabad, the spot of the cannon is also closer to Petla Burj, one of the bastions of the old city. What lends credence to this is the cannon's small pivot, unlike what would be needed to mount it on a carriage. Unlike the Qutb Shahi and Mughal cannons with their tapering form, the cannon unearthed is a straight piece with serrations all around it, and an elemental design in the front.

Source: The Hindu

## ODISHA MINERS INCREASE IRON ORE FINES PRICE BY 6-8%

Merchant miners in Odisha have tinkered with iron ore fines prices, raising it by six to eight percent. The increase in prices has stemmed from the state government's move to collect contribution from the lessees for District Mineral Foundation (DMF) with retrospective effect from January 12, 2015.

According to the guidelines listed in the amended Mines and Minerals Development & Regulation Act, miners who have bagged leases before January 12, 2015 would have to fork out 30 percent of the royalty as DMF contribution. An industry estimate put the figure for such miners at Rs 1,500 crore in case of Odisha.

New miners will need to contribute 10 percent of the royalty. The Federation of Indian Mineral Industries had moved the Delhi High Court against the Odisha government's decision to collect DMF dues retrospectively.

"Despite the direction of the Delhi High Court, the state government has taken coercive action to raise demand of arrears on DMF retrospectively, resulting in hike in prices of iron ore," said an official with a steel firm.

The ex-mines price of iron ore fines (with 62.5 percent Fe grade) for March has gone up to Rs 1,275 a tonne, inclusive of royalty from Rs 1,200 in February. In Odisha, iron ore prices are steep because the state government charges a uniform, high royalty rate even for the lowest grade of ore, violating statutory provisions. For iron ore fines, royalty was higher than the statutes by Rs 300-400 a tonne.

The price raise has come amid a huge stockpile of iron ore fines at mines pit heads. By the end of 2014-15, the inventory reached 60.93 million tonnes (mt). Around 70 percent of Odisha's iron ore output consist of fines. Pellet makers, key users of iron ore fines, are struggling to keep operations afloat due to escalating prices. Although the state has a pellet manufacturing capacity of 28 mt a year, most pellet plants have shut down while the remaining were operating at a bare minimum level. Pellet, an intermediate product in steel making, competed with calibrated lump ore. But, since lumpy ore is comparatively cheaper, most steel makers have shunned buying of pellets.

Source: Business Standard

## IIT - M: TURNING METAL WASTE INTO RESOURCE

Researchers at IIT Madras have successfully turned Ti6Al4V alloy waste - shavings that are produced when a metal is machined - into resource using low-cost means. Shavings produced in aerospace machining operations are usually disposed as low-volume scrap. But researchers at IIT Madras have tuned the shaving into foils (3 mm width and 1 mm thickness) that are 1.5 times harder than the parent material.

Researchers in the past have produced shavings with hardness up to three times that of the bulk material using the machining approach. Shavings produced when a bulk material is machined under controlled laboratory are extensively strain deformed. As a result, the coarse grain structure of the bulk material becomes ultrafine grained in the shavings. It is already known that nanostructured materials composed of sub-micrometer scale grains have properties that are much different from conventional materials.

In this case, the fine grain structure of the shavings endows them with increased hardness and greater strength; malleability and ductility get reduced but not significantly, said H.S.N. Murthy, professor at the Aerospace Engineering Department.

"To take advantage of the enhanced physical properties of the shavings, we attached a die extrusion to the cutting tool so that the shaving gets extruded in the form of foils," said Prof. Balkrishna C. Rao from the Department of Engineering Design.

"We have produced and characterised the material. We are looking at 2-3 applications. One would be to use smaller particles as reinforcement in composite," said Prof. Murthy. Using the foils as wear padding is another possible application.

Source: Hindu Business Line

Production of major minerals (mt)			
Mineral	2013-14	2014-15	% Change
Coal	565.77	612.43	8.25
Lignite	44.27	48.26	9.01
Bauxite	22.90	22.08	(3.58)
Iron ore	152.18	128.91	(15.29)

Source: India Infrastructure Research

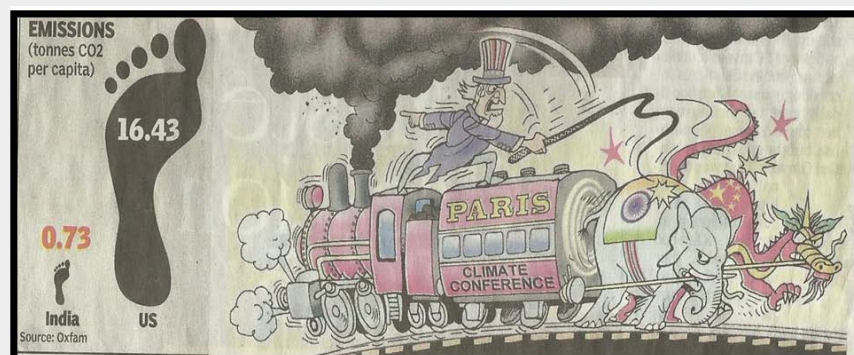


Export and Import of key minerals and ores (mt)		
Exports	2013-14	2014-15
Coal	2.19	1.22
Iron ore	16.29	7.30
Bauxite	3.49	6.75
Zinc ore and concentrate	0.05	-
limestone	2.75	3.76
Imports		
Coal	168.50	212.10
Iron ore	0.36	12.09
Bauxite	0.40	1.73
Limestone	12.67	13.35
Zinc ore and concentrate	0.03	0.04

Source: Ministry of Mine

## CARBON FOOTPRINTS DON'T LIE: WORLD'S RICHEST 10% RELEASE 50% OF ITS CO<sub>2</sub>

*Person in Richest Half Emits 17.6 Tons CO<sub>2</sub>, That In Poorest 50% Just 1.57 Tons.*



As the rich countries of the West lock horns with the developing world at Paris on the question of who will cut how much carbon emissions, a new study by Oxfam shows the jaw dropping chasm between emissions of the two sides. The richest 10% people of the world are responsible for almost half of all global carbon emissions while the poorest 50% - some 3.5 billion people - cause just 10% of it in one year. Here's another way of looking at this: a person belonging to the poorest half of the world emits just 1.57 tonnes of carbon dioxide per year while a person belonging to the richest 10% emits 17.6 tonnes - over 11 times more. If you compare the richest 10% with the poorest 10%, the gap is mind-boggling. The carbon footprint of the richest is 60 times larger than that of the poorest at a global level. Why is this relevant to the Paris talks? Because in the smoke and mirrors of global negotiations, the commitment of

the rich countries to their own lifestyles - and its humongous carbon footprint - is so entrenched they are unable to give it up, forcing changes on the struggling poor of the developing world. This is all the more un-just because it is the developing world that is going to bear the brunt of extreme climate change effects, as a recent World Bank Study of 52 nations showed.

Oxfam has made these calculations for consumption rather than production as is normally done. In this way, what happens is that if a soft drink made in China is consumed in the US, the emissions in production, transportation etc. are counted in US. This is more logical as the reason for making the drink was a demand in US, as was its ultimate destiny. The vast majority of the World's richest 10% stay in OECD countries - North American, Western Europe, Australia, New Zealand and Japan. In fact, a third of them stay in the US. So the culpability of rich countries in emissions is reaffirmed, with the additional information that it is their profligate consumerism that is driving emissions.

Where does India fit into this? Oxfam's estimates reveal that per person emissions of India's richest 10% are about 2 tonnes, just a quarter of even US' poorest 50%, whose emissions are 8.57 tonnes. If you compare the poorest half of the population of India and the US, the contrast is even starker. India's poorest 50% have a mere 0.42 tonnes per capita emission while for the US it is 8.57 tonnes a year, over 20 times more.

This incredible equation shows the wide and deep chasm between consumption-driven emissions in the first world and the third world. It also shows

the locked down nature of the rich economies where even the poor cause more emissions than the rich of the third world.

So, what does it mean for the climate change negotiations in Paris While it is a global crisis and everybody has to chip in, the magnitude of the problem is directly linked to the lifestyle choices and economic trajectories of the rich countries. Without even going into the question of historical responsibility, even on the basis of current emissions, the scale of emissions, the scale of emissions from the richer bloc is orders of magnitude more than India and other third world countries. Hence, the richer bloc of countries need to not only make deeper cuts, they also need to pay more to compensate for the damage caused by climatic changes in the third world.

Source: Times of India

## Dare To Be What You Are

Think about it: Aren't most of the discontented people you know trying to be something they are not or trying to do something they're not supposed to do? Resolve to be yourself. A proverb asserts, "Wood may remain ten years in the water, but it will never become a crocodile." "Be what you are. This is the first step towards becoming better than you are."

"The curious paradox is that when I accept myself just as I am, then I can change". "He who has no opinion of his own, but depends on the opinions of others is a slave. To only dream of the person you are supposed to be is to waste the person you are." Nobody is so disappointed and so unhappy as the person who longs all of his life to be somebody other than who he really is.

The person who trims himself to suit everybody will soon whittle himself away. If you don't have a plan for your own life, you'll only become a part of someone else's. You can't carry two faces under one hat. Never wish to be anything but what you are. "It is better to be hated for what you are, than loved for what you are not".

"All good things which exist are the fruit of originality". There is only one life for you-your own. The person who walks in someone else's tracks never leaves his own footprints. "Until you make peace with who you are, you will never be content with what you have." Most of our challenges in life come from not knowing ourselves and ignoring our best, real virtues.

Most people live their entire lives as complete strangers to themselves. Don't let that happen to you. "The easiest thing to be in the world is you. The most difficult thing to be is what other people want you to be. Don't let them put you in that position." The opposite of courage is not fear. It is conformity. The most exhausting and frustrating thing in life is to live it trying to be someone else.

"My mother said to me, 'If you become a soldier you'll become a general, if you become a monk you'll end up as the pope.' Instead, I became a painter and wound up as Picasso," said the great artist. No one ever became great by imitation. Imitation is limitation. Don't be a copy of something. Make your own impression.

This is the Twenty-Second 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  
Chairman – IIM-DC & Former CMD – MOIL  
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