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INTRODUCTION

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Glossary of Terms in processing of minerals and ores

Shri S C Suri
Chairman, IIM-Delhi Chapter &
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Beneficiation

Beneficiation is the processing of minerals or ores for the purpose of – (i) regulating the size of a desired mineral produce; (ii) removing unwanted constituents; and (iii) improving quality, purity, or assay grade of the desired mineral produce (MCDR).

Exploration

- **General Exploration** involves the initial delineation of an identified mineral deposit. Methods used include surface mapping, widely spaced sampling, trenching, and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation. The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure, and grade. The degree of accuracy should be sufficient for deciding whether a Prefeasibility Study and Detailed Exploration are warranted (UNFC).
- **Detailed Exploration** involves the detailed three-dimensional delineation of a known mineral deposit through sampling, such as from outcrops, trenches, boreholes, shafts, and tunnels. Sampling grids for drilling are closely spaced such that size, shape, structure, grade, and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required (UNFC).

Mineral

A mineral is a naturally occurring substance that is solid and inorganic and representable by a chemical formula, and has an ordered atomic structure. It is different from a rock, which can be an aggregate of minerals or non-minerals and does not have a specific chemical composition.

Most but not all minerals are crystalline. Most but not all minerals have one or more metals as part of the substance.

Mineral resource

A mineral resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade, or quality and quantity that there are reasonable prospects for eventual economic extraction. (International Council on Mining and Metals, i.e., ICMM)

Mineral reserve (or Ore Reserve)

A mineral reserve or an ore reserve is the economically mineable part of a mineral resource (ICMM).

Mineral ore

An ore is a type of rock or rocky material that contains sufficient minerals with important elements including metals that can be economically extracted from the rock through mining operations. An ore body is the assemblage of such rocky material.

Mineralization

Mineralization is the process of formation of a mineral out of unmineralized material or concentration of the mineral above its normal abundance due to geological processes involving heat, pressure, chemical action, sedimentation, etc.

Mineral occurrence

An indication of mineralization, that is worthy of further investigation. The term mineral occurrence only indicates presence of one or more minerals but does not imply any measure of volume or tonnage, grade or quality and is thus not yet part of a mineral resource (UNFC).

Mineral deposit

A mineral occurrence of relatively higher concentration.

Mining operation

A mining operation is any operation undertaken for the purpose of wining (i.e., recovering) any mineral. It generally includes extracting the ore and then processing it to recover the minerals in the ore (MMDR Act 1957).

Mining lease

A lease granted for the purpose of undertaking mining operations, and includes a sub-lease (MMDR Act 1957).

Prospecting

It means any operation undertaken for the purpose of exploring, locating, or proving mineral deposit, including geochemical and geophysical surveys, and drilling (MMDR Act 1957).

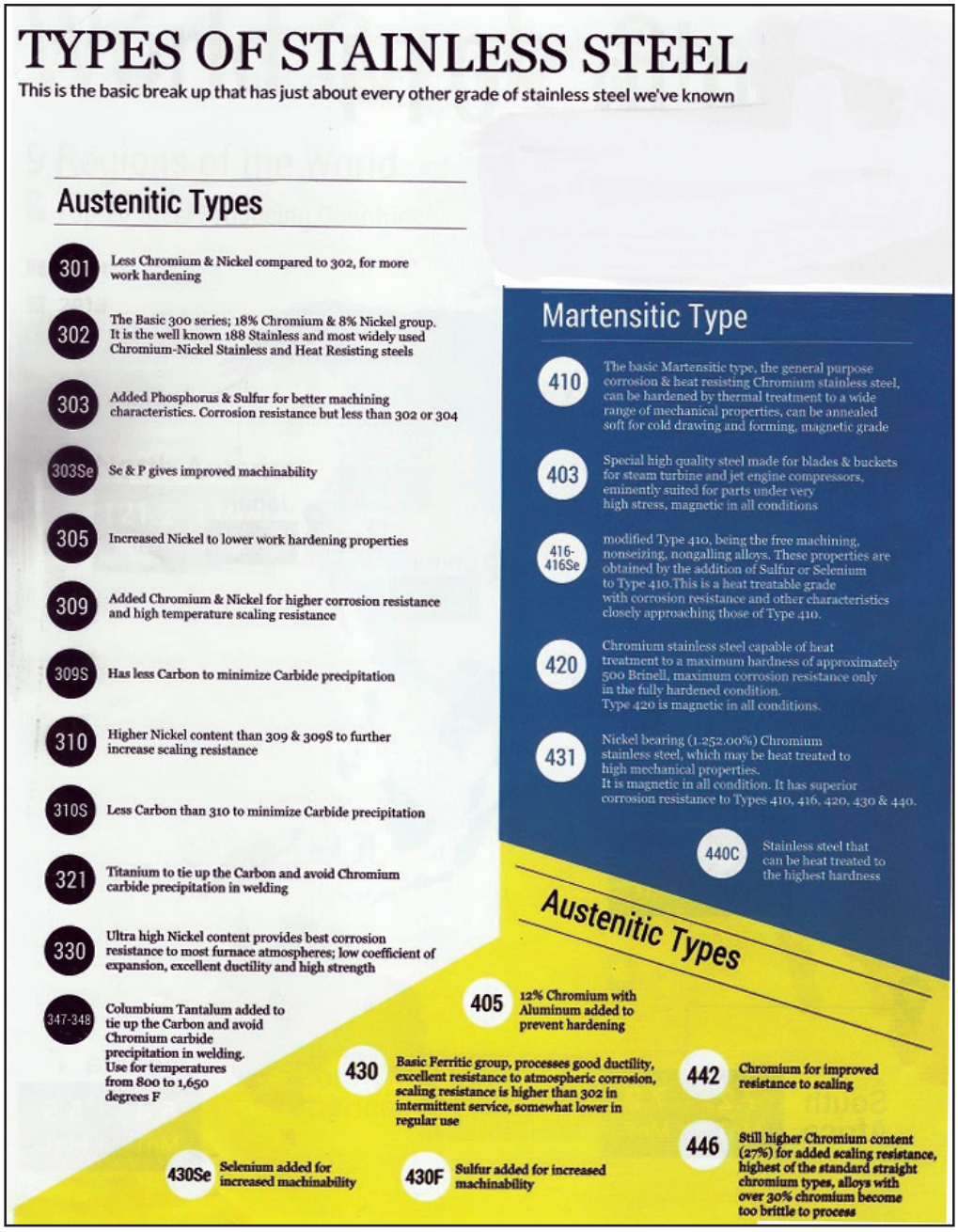
Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential. The methods utilized are outcrop identification, geological mapping, and indirect methods such as geophysical and geochemical studies. Limited trenching, drilling, and sampling may be carried out. The objective is to identify a deposit which will be the target for further exploration. Estimates of quantities are inferred, based on interpretation of geological, geophysical, and geochemical results (UNFC).

Note: A prospecting license granted under the MMDR Act permits general exploration as well as detailed exploration.

Reconnaissance

Any operations undertaken for preliminary prospecting of a mineral through regional, aerial, geophysical, or geochemical surveys and geological mapping, but does not include pitting, trenching, drilling, or sub-surface excavation (MMDR Act 1957).

A reconnaissance study identifies areas of enhanced mineralization on a regional scale based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, as well as geological inference and extrapolation. The objective is to identify mineralized areas worthy of further investigation towards mineral deposit identification. Estimates of quantities should only be made if sufficient data are available (UNFC).



Source: Steel 360

Environment-friendly recycling of lead batteries – Global & Indian scenarios

By

L. Pugazhenthy

Executive Director, India Lead Zinc Dev Assn
Past President, The Indian Institute of Metals

Lead batteries have become an integral part of our daily lives and its usage is increasing worldwide over the years in diverse sectors like transport, telecom, energy, IT, services etc., India has been witnessing double digit growths in the battery sector due to the expansions in automobiles, invertors, UPS, electric vehicles, solar energy etc., At the same time, the battery which contains lead metal as well as sulphuric acid, has health & environmental implications, because of the associated harmful effects and hence the product has to be handled safely.

Global Scenario

Lead usage in 2013, worldwide was 11.2 million tonne and the production amounted to 11.18 million tonne only. Lead mine production however, was 5.4 million tonne. During the year 2014, lead demand would grow by 4.4%, driven mainly by the growth in China where usage is forecast to increase by 7.4%. China, currently accounted for just over 45% of the world usage, followed by US and Europe, both at about 15% and then India and Republic of Korea at just over 4% each. The global lead production, over the years, has seen a distinct-change in the sense that the secondary (recycled) lead production keeps growing steadily (Fig-1).

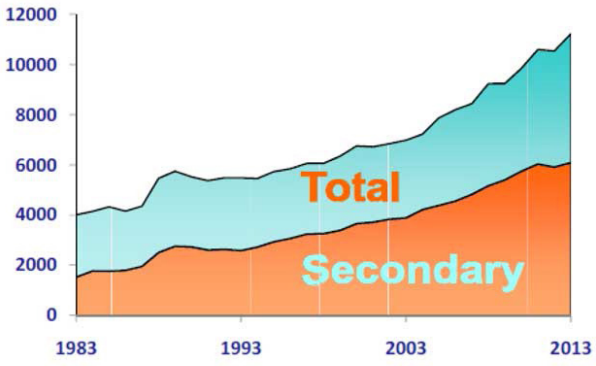


Fig-1: World Total and Secondary Lead Output (ILZSG)

In many countries such as the US, South America, Europe, Australia etc. there is a strong awareness among the citizens to return the old batteries for environment-friendly recycling. As per their environmental legislations, there is an organized collection arrangement for used lead batteries, recycled by a very few eco–friendly processing units only, and the recycled lead goes into the assembly of new batteries. Unlike in our country, it is always recycled through pyro-operations (Fig-2). Both the collection rates and lead recovery are fairly high, with very little emission into the environment. The industry adopts a "voluntary initiative approach", leaving very little work for the regulatory bodies for monitoring, implementation etc.,

Fig-2: Rotary Furnace

Indian Scenario

In order to encourage safe and best practices in dealing with lead batteries, the Ministry of Environment & Forests brought out several measures from the year 1999 for an organized collection of used lead batteries for recycling them in an eco–friendly way and reusing the recovered lead metal in manufacture of new batteries.

In Dec 1998, ILZDA organized the "International Conference on Lead & Zinc Recycling – Technology & Environment" at Delhi. The conference deliberations gave birth to the formation of a CORE GROUP (MoEF, CPCB, CII, ILZDA, Ministry of Mines, Ministry of Industry & Indian Battery Manufacturers Assn). The Core Group, after a series of deliberations, decided to create an appropriate framework for ensuring a "close loop" arrangement for collection and environment–friendly recycling of used lead batteries.

Regulating lead battery auctions

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Notifying Battery (Mgmt & Handling) Rules

↓

Regn Committee for Eco–friendly Lead Recyclers

↓

Strict implementation of the norms & rules

↓

Monitoring/ Fine tuning for improvements

In the earlier days, the auctions were attended by metal traders, scrap merchants etc., and they were picking up the used batteries and feeding backyard recyclers. Therefore, the new regulation insisted that only registered/ authorized lead recyclers could participate in the auctions (dissuading the middlemen, traders etc.,) so that the lead recyclables go to the eco–friendly recycling units only.

After a series of "CORE GROUP" meetings for two years, the MoEF brought out "Battery (Management & Handling) Rules 2001 which covered all stakeholders ie., manufacturers, dealers, importers (of new batteries), battery assemblers, reconditioners, auctioneers, individual consumers and bulk consumers; the main aim is to collect the old battery against the sale of the new battery on a "one-to-one"– basis and to ensure that they are processed by registered eco– friendly lead recyclers only. B(M&H)R also mandated that battery manufacturers and dealers should file returns with the SPCBs on the no. of batteries collected; SPCBs should send these returns to the MoEF so that there is a clear picture on the national collection inventory. The B(M&H)R also encouraged setting up collection centres across the country for used lead batteries. The battery collection targets fixed in the rules are: I Year (2002) : 50%, II Year (2003) : 75% & III Year : 90%.

Ultimately the aim was that India should collect 100% used lead batteries back and send them for environment–friendly recycling only.

The Regn Committee at MoEF and later at CPCB, consisting of experts from the industry, MoEF, CPCB, ILZDA, scientific institutions etc., used to go through the applications of lead recyclers, visit the plants for effecting improvements and finally gave registration/ authorization to such eco–friendly units.

Even after the implementation of the B(M&H)R, the backyard lead recyclers were thriving and active because the battery dealers were diverting the collected batteries to the traders and backyard recyclers. In order to control this trend, the battery dealers in the country were asked, through an amendment in 2010, to get themselves registered with the respective State Pollution Control Boards and to file returns. The returns would indicate the no. of collected batteries and also its pathway ie., they are being sent to registered environment–friendly recyclers only.

Likewise all the importers of new lead batteries were also mandated, through the same amendment in 2010, that they should also get registered with the State Pollution Control Boards and file returns providing info on the no. of new batteries imported and sending the collected old batteries to the registered lead recyclers only.

In the same year 2010, the Registration Committee on Hazardous Wastes was shifted by MoEF from CPCB to the State Pollution Control Boards, for implementation.

Since then, the collection and recycling of used lead batteries has received serious setbacks and currently one is not happy with the current state of affairs. Two steps forward and three steps backward, that is the pathetic plight now. All the good work done in the earlier years has vanished and backyard recycling seems to be active once again.

Way Forward

India has a limited capacity for primary lead production (Hindustan Zinc Ltd, 185000 tonne per year). The lead demand as per the Planning Commission, for the year 2013-14 was 464,000 tonne and this is bound to go up to 568000 tonne by 2016-17. The secondary lead production in India should form about 85-90% of our lead consumption. In any case, even with the official lead demand figure that is much lower, there is a huge demand–supply gap and this is the opportunity that exists for the recycling industry.

The country has introduced excellent initiatives for an organized collection and environment–friendly lead battery recycling. We should take them to logical conclusions by taking the following remedial measures:

- Strict enforcement/ monitoring by SPCBs
- Focus dealers & importers
- Dissuade role of traders
- Tighten backyard smelting
- Encourage collection centres
- Stringent customs clearance (imports)
- Continue awareness programmes
- Provide incentives for green recycling
- Recognize & motivate clean operators
- Introduce cleaner recycling technologies
- Implement occupational exposure precautions

The above measures should make India a country adopting "Sustainable Development" in the lead industry in letter and spirit.

LATEST DEVELOPMENTS IN FLOTATION CELLS AND TECHNOLOGIES

-AN UPDATE

A comprehensive and up-dated article on flotation process, technologies and flotation machines developed along with recent advances and progress made in this field during last 100 years since the first commercialisation of flotation process for beneficiating and separating minerals in the mining industry with global perspectives.

By O P Gupta**
Executive Committee Member,
IIM, Delhi Chapter

Introduction and history of flotation

Flotation is one of the most popular methods of separating minerals from ore during processing and has now proven to be the most universal tool for concentrating & selective separation of minerals. Infact, flotation has been the heart of the mineral processing industry for over 100 years.

Although flotation was patented to Haynes in 19th century, its first industrial uses were in the early 20th century in the year 1905-06 at a BHP Zinc mine in Australia where operations were successful to produce zinc concentrates from sulphide ore. In the United States, the first application of flotation was in the year 1911 in Montana on Zinc sulphide ore and by the year 1916, the application spread to Copper, Lead & Zinc, all sulphide ores, mainly in United States.

Since then, flotation has gradually moved to a predominant role in mineral separation to meet the more finely disseminated ores. Not only has this been true for sulphide ores to which the process was first applied commercially but also for most non-sulphide ores as well. Another factor has been the broad applicability of the process with respect to particle size, it is effective from 8 to 10 mesh to below 10 m. Further, more so than for any other separation process, flotation has almost no limitations in separating minerals as it can utilize the wide range of surface chemical differences among minerals, and wide range of reagents. On the other hand, gravity, magnetic or electronic mineral separating processes are either applicable to particular minerals or to a restricted number of mineral combinations.

Presently, flotation process is applicate to scores of ore-minerals, major applications in treatment of copper ores, copper-cobalt ores, Lead & Zinc ores, Nickel sulphide ores, Tin ores, Iron ores, Phosphate ores, Potash, Fluorspar, Coal (Anthracite & Bituminous) etc.

In India, Flotation was first introduced about 60-65 years ago at small size plants of Hindustan Copper's Ghatshila mine (that time under Indian Copper Complex) to treat Copper Sulphide ore and at Hindustan Zinc's Zawar mines (that time under Metal Corporation of India) to treat Lead-Zinc sulphide ores. Subsequently, after taking over by Govt. of India and formation of public sectors and development of open cast mining, the size of mining operations and flotation plants has grown to bigger scale with manufacturing of flotation cells locally.

**Formerly worked with Hindustan Zinc Ltd (A Vedanta Group Company); Zambia Consolidated Copper Mines Ltd in Zambia; Kenya Fluorspar Company Ltd in Kenya and McNally Bharat Engineering Co. Ltd in India and carries a rich experience in minerals processing & beneficiation.

1. Principles of Flotation Process

Flotation is method of concentrating solid minerals in a relatively finely divided state. It is in a sense, a method of gravity concentration in water in which the effective specific gravity of certain of the ore minerals is substantially decreased by causing air bubbles to attach more or less tenaciously to particles of that particular mineral, where upon they float on the separating medium while the un-effected minerals sink. When the selected mineral is separated in the froth, the operation is called "froth flotation". Thus, froth flotation is a process of selectively separating hydrophobic materials from hydrophilic ones. This is the usual principle of flotation by which the selected useful mineral is separated from rocky gangues.

After crushing & grinding to effect liberation as well as reduce to a size for effective flotation, a wide range of mineral separation have to be effect by the use of the proper regulating and collecting reagents. The addition of these chemicals (known as frothers & collectors) facilitate the formation of stable bubbles and attachment of selected mineral particles to the same over the interface medium and selected & stabilised mineral froth is continuously separated.

2. Flotation Cell

Flotation cell or flotation machine is an apparatus developed for using flotation process and achieving its desired functions in a mineral beneficiation plant. Flotation cell is constructed in the form of a tank (cylindrical or square/rectangular) with stalled mechanisms of slurry feeding, aeration, slurry agitation & mixing; dispersion and froth collection & transportation.

Flotation takes place in a series of tanks or cells, the size, shape and number of which are dependent upon the retention time needed to achieve the desired recovery and the level of aeration required to sustain the froth. Most of the commercial flotation technologies have developed or re-designed methods of contacting air bubbles and reagentised mineral particles in the pulp phase. It is however in the froth phase that the essential processes of particle transport to the concentrate launder and drainage to remove gangue entrainment occur.

A flotation machine and its contents in continuous operation comprise a system in which ore, water, air and variety of chemicals in small quantities are introduced continuously; from it flow continuously two or more streams of products. The overflow stream is usually a froth carrying a load of solids which is different in mineralogical character from that of the other product streams and of the feed stream. The underflows are suspensions of the residue of the feed solid in the balance of feed water.

Determination of the distribution of the added chemicals in this product streams has been the key to the understanding and control of the process. Additions of these chemicals/reagents have a variety of functions, such as frothers, collectors, depressants, activators & PH modifiers.

Developments in monitoring equipment and changes in tank features have helped in advance flotation cells resulting in higher mineral recoveries, lower operating costs and more efficient use of energy.

3. Flotation Circuits

In most of the flotation plants, the complete flotation process is accomplished in three stages, namely roughing, scavenging and cleaning/re-cleaning cells, to achieve the desired metallurgical results i.e. concentrate grades for mineral quality and recoveries for efficiencies. Each stage/circuit has predetermined cells configuration. In the rougher-scavenger circuit, the stress is given to maximize mineral recovery, while in the cleaning stages stress is given to

maximize the concentrate grade & quality. In most of the cases, this final concentrate grade is achieved in several stages (usually 3 or 4) of cleaning. Achieving high concentrate grade is always on the expenses of loosing on recovering and achieving high recovering on the cost of loosing concentrate grades. Hence, a balance is always to be striked between the concentrate grade and recovery to optimise the separation metallurgy in a flotation plant.

4. Design and types of flotation cells

a) The Flotation Cell's design considerations

The aims in design & development of a flotation machine are high recovery, high grade of concentrate and economy of installation & operation with automated process control. The essential functions of a flotation machine are to effect attachment of flotable particles at an interface and thereafter to lead attached & un-attached particles to different discharge ports. Good design is that which brings about the performance of these functions in such a way as to satisfy the above aims.

Froth flotation has been in use for well over 100 years and by now, the design of the machines used have reached a high lev el of perfection.

There are many types of cells, designed as per shapes of tanks and aeration mechanism. These types of cells include circular, rectangular and self-aspirating & forced aeration cells and flotation columns. Certain types of cells specialise in recovering certain types of minerals from different grade ores.

b) Circular/ Cylindrical

Circular cells are generally preferred as they exhibit better kinetics than their rectangular counter parts. Circular cells also improve mixing & air dispersion and offer greater flexibility in the layout of the flotation cells. Their cylindrical shape enables symmetrical flow patterns all around the tank and that further enables all kinds of optimisation including optimisation of energy consumption. It is also easy to control and automation is a natural part of cylindrical cells.

Also, circular cells reduce the amount of dead volume when compared to square or rectangular cells. Stagment regions and fluid channelling are minimized in the cylindrical tank design leading to an overall improvement in fluid dispersion. The circular design has proven to have better hydrodynamics and is more economical.

c) Mechanical (Forced aerated & self-aerated cells)

This is the most common type characterised by a mechanically driven bottom mounted impeller which agitates the pulp and disperses air into it. For aeration, machines receive air from a blower, while self-aerating machines use the depression created by the impeller to induce air. These types of machines are widely used in beneficiation of all kind of minerals including base metals, industrial minerals, Iron ore etc.

d) Column flotation cells

The essential feature of column machine is a counter current flow of air bubbles and slurry using property designed sparger system for beneficiation of various minerals in base metals, industrial minerals and also in coal beneficiation.

Column flotation offers mineral process engineers several opportunities to improve process economics significantly. Property designed and operated columns can deliver high

recoveries and concentrate grades, reduce reagent consumption, cut energy costs and lower capital expense. Columns are often as suitable for roughing service as they are for cleaning. Bubble generation is one of the fundamental elements of successful column flotation.

5. Large size flotation cells and gradual changes

With continuing trend of head grade decreasing in mining operations, more and more tonnage of ore will be required to be handled and treated to meet the demand of minerals. Thus, the demand of increasing size of mineral processing plant is also growing. Concentrators are now being designed on a very big scale in mineral rich countries. This is creating new trends in flotation plant design growing the need of bigger & bigger flotation machines.

As machine size increases, plant capital costs are reduced because machine weight and building volume are reduced: less banks and mechanism imply lower costs for electricals, reagents feeding, process controls, pumps and piping etc. Operating costs are reduced because of lower power consumption, reduced maintenance and operating personnel, reduced total cost of wear parts.

Now, therefore, instead of having a large number of smaller cells per row, the concentrator prefers to go for fewer cells of large size, without loosing on any metallurgical performance such as concentrate grades & mineral recovery. Thus, installation of bigger cells make a better economic sense in a beneficiation plant. In mechanical design also, these modern large flotation cells are generally simpler easier to maintain and cheaper to manufacture than their predecors.

Thus, the most noticeable change, over times in the industry, has been the increase in sizes of the flotation machines from the multiple small square cells that were initially used to the big size round cells used today that are the norm in large scale plants.

Some companies like F L Smidth, Outotec and Metso have developed flotation machines of upto to 600 m3 volume. Outotec has recently developed a bigger machine of 630 m3 capacity making it the largest cell in the world (the model of this machine is Tank cell-e630).

Operating experiences in Indian Plants of Hindustan Zinc (HZL)

For the 2000 TPD ore treatment capacity Lead-Zinc ore beneficiation plant of Mochia Mine project at Zawar, during the years 1971-72, the mineral processors at HZL had preferred small size flotation cells of 40 to 60 cft, the 60 cft cells in roughing & Scavenging operation and 40 cft in cleaner & re-cleaner application. They selected these sizes of cells after lot of consultation with several mineral dressing experts in USA, Australia and Canada. All these cells were self-aerated mechanical type of "WEMCO-FAGERGRANE" make, the plant had run successfully with these machines delivering desired metallurgical results.

During the years 1977-78, in another mining project of Balaria Mine of Zawar, the senior mineral processing engineers of HZL preferred to go for 100 cft size flotation machines for the same capacity plant of 2000 tpd. These cells were also self-aerated type mechanical machines of "WEMCO" make.

In another project of HZL's Rajpura-Dariba mine, during the years 1980-81, the flotation machines selected was of comparatively bigger size of 300 cft in a plant of 3000 tpd ore treatment capacity. With these bigger cells also, the plant was running very well delivering the desired mineral recovery, concentrate grades and plant Thru' put.

Later, at the HZL's Rajpura-Agucha mining project during late eighties, the company had gone for 600 cft machines which also produced excellent results in a plant of use tpd capacity.

Thus, HZL had gone cautiously for selecting the flotation cell sizes with gradual increment. For comparatively small underground mining operations of 2000-3000 tpd capacity, the biggest size

preferred was of 300 cft (8 m3) while for open cast mining project of 4500 tpd, 600 cft (16 m3) cell was found big enough.

At present, the mining activities in India particularly of base metals, are not considered large as compared to the activities overseas. May be in future, with changes in the mining act by the Govt. of India, bigger operations may come-in and during that time, large size flotation machines may be anticipated.

At ZCCM's Chambishi copper mine in Zambia

During early eighties, at the copper sulphide ore concentrator of 7000 tpd ore treatment capacity at Chambishi mine in Zambia, the flotation machines used were of 300 cft (8 m3) of WEMCO-FAGERGRANE (self-aerated) make in Rougher & Scavanger's and 600 cft (16 m3) of 'DAVCRA' pneumatic type cells in cleaning applications. With these machines, the plant was running smoothly delivering desired plant Thru 'puts, concentrate grade and metallurgical recovery.

6. Reverse Flotation

Unlike direct flotation, where the desired minerals are floated, in reverse flotation the gangue minerals are removed as float froth, leaving the valuable minerals in the bulk pulp.

Iron and Phosphate plants use reverse flotation as a key technology for beneficiation.

Iron ores containing higher amounts of silica are being processed by reverse flotation to achieve the economic iron grades in the concentrate.

Phosphate beneficiation is also being challenged by worsening ore quality as the such deposits are being depleted. New phosphate development projects world-wide face higher levels of dolomite and other carbonates as well as higher levels of silica. Such ores use reverse flotation in the first stage of flotation in which gangue minerals are removed out as froth and valuable phosphatic minerals are depressed in acidic medium using phosphoric acid as the depressing agent.

While traditional chemicals dominate direct flotation reagents, reverse flotation requires novel chemicals as collectors.

In India also, reverse flotation technology is being used at the phosphate beneficiation plant of Rajasthan State Mines & Minerals Ltd (RSMML)'s Jhamarkotra Mine, near Udaipur.

7. Manufacturers of Flotation Machines

Internationally, the key manufacturers of flotation cells are named as below:

Outotec (Earlier known as Outokumpu)

Outotec supply their propriety "Tank cell flotation cells" equipped with their patented Float Force energy saving flotation mechanism. They supply complete range, 5 m3 onward. Under their latest creations, they have developed flotation machine of 630 m3 effective volume (Tank cell-e 630) which is, according to them, is the world's largest machine. Outotec also has a large range, of Skim Air Flash flotation cells for feed rates upto 2400 dry tons per hours.

b) F L Smidth

They offer complete range of cells of "Dorr-Oliver" forced air mechanism design and "WEMCO" with naturally aspirated mechanism design. They have developed 600 m3 cell under their Super Cell-600 series designed around a universal tank with interchangeable options of WEMCO & Dorr-Oliver mechanisms for applications in Copper and base metals, Gold and Iron Ore.

c) Metso

Metso supply complete range of flotation cells of 'SALA' and 'Denver' design. They also have plans to go larger in size incorporating their flagship RCS flotation cells of upto 660 m3 for application in base metals, industrial minerals flotation. These cells are fully automated, circular in design.

Their Denver-DR type cells are still popular in small size range.

Metso also offer column flotation cells fitted with their patented Micro Cell sparger technology for application in cleaning stages of Copper and Molybdenum circuits as columns have the ability to produce a higher grade concentrate.

d) Delkor (Formerly Bateman)

Bateman with acquisition of Delkor, the product cell is now being marketed under brand-"Delkor' BQR" cells. They have been supplying machines of upto 300 m3 for application as roughers, scavangers and cleaners.

e) Eriez

Eriez flotation Group supplies flotation cells of "stack cell" concept patented by them which is an innovative technology resembling to column flotation for recovery of fine particles more efficiently. This technology can provide recoveries and product qualities comparable to column flotation system. Not intended to replace the need for column flotation, it does provide an alternative method to column like performance where space and/or capital is limited.

Eriez also owns the patent for a device known as the Hydro-float separator that it sells around the world which is used for recovery of coarse particles.

f) Prepquip

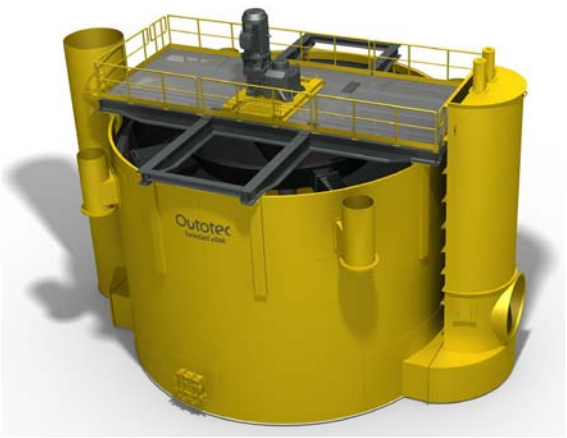
Prepquip is a South African based company and supply column flotation cells using their own developed sparger system for beneficiation of various minerals.

g) Indian Manufacturers

All the companies, except Prequip mentioned above, are represented in India through their Indian subsidiaries, most of whom manufacture/assemble these machines in their manufacturing facilities located in India and automation items sourced from their parent companies overseas.

8. Latest advances and developments in flotation cells

a) World's largest flotation cell of 630 m3 effective volume developed by Outotec as their new "Tank cell-e 630" model, designed to meet demand for increased capacity combined with improved production and energy efficiency, featuring Outotec's Float Force mixing technology.

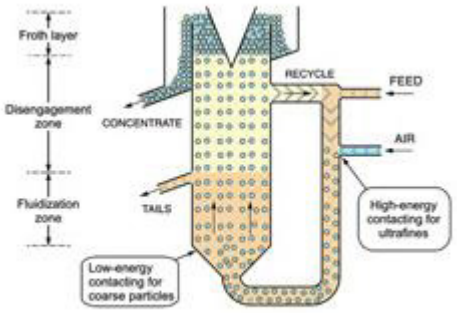


Typical installed power for this e-630 cell is 500 kW and specific power consumption is lower than that of small Tank cells. Outotec recommends using a variable frequency drive to enable optimization of better metallurgy and power consumption in these high capacity production units.

This "e-630" cell is particularly suitable for rougher & scavanger duties in Gold and base metals (such as copper) for high tonnage and high thru' put applications. The unit has a diameter of 11 m and lip height of approx. 7 m.

b) Fluidised Bed Flotation Cell

The fluidised bed flotation cell technology is patented by Professor Graeme Jameson of University of New Castle in Australia and is poised for a big revolution in mining industry in near future with potential to save huge money spent in energy consumption. This technology involves the contacting of particles by bubbles in a fluidised bed. Due to the gentle environment, coarse particles are able to stick to the bubbles and rise with them into a conventional froth layer; Selective recovery of valuable minerals is possible, with waste being rejected from the froth.



Fluidised Bed Flotation Cell Concept

The fluidised bed flotation cell has been developed to extend the upper particle size limit of flotation feed. A fluidised bed is formed in the lower part of the vessel. The particles in the bed are supported by a rising flow of fluid, which separates them from one another and allows them to move freely while remaining close together. Fine particles are elutriated out of the bed and are mixed with new feed and recycled.

Air is introduced into the cycle stream in a high intensity aerator, which simultaneously makes very small bubbles and brings them into contact with the flotable particles.

The bubbly mixture then flows into the fluidised bed, which is a low intensity environment favourable to the capture of coarse particles to attach to the bubbles. The particles-laden bubbles rise into a froth layer at the top of the vessel, from which they flow as product into a launder. The tailings discharge at a certain level in the vessel, which defines the top of the fluidisation zone. This device treats a mixture of fine and coarse particles.

This device will increase the upper particle size limit of flotation (as coarse as 600 μm) and drastically reduce the mining industry's energy consumption. In this theory, we can extract these coarse particles, we would not have to grind so fine and hence, we won't have to spend so much energy. When the upper particle size limit of flotation is extended, a two stage process could be envisaged in which the whole of the feed to the mill would be ground to a relatively coarse size, followed by primary flotation in a Fluidised Bed Flotation Cell.

The primary rougher concentrate would then be reground to the final size followed by a conventional rougher-cleaner circuit to produce final concentrate.

Saving would be achieved because the mass flow of primary flotation solids ground to the final size would be only a small fraction of the total feed to the mill. Whereas, in a conventional concentrate the whole of the feed to the mill must be ground to the final size. The lower the head grade of the ore, the greater the energy savings. This energy savings comes to almost 30-32% in a typical case of copper concentrator. Further, there would also be savings in mill linings and grinding media because overall energy per ton of final concentrate is reduced very much. Hence, the fluidised bed flotation cell is estimated to potentially cut total operating costs of an operation by reducing grinding energy by as much as half.

Professor Jameson is now working to bring the Fluidised Bed Flotation Cell to commercial reality by making an operational pilot plant that can be taken to a mine site for testing and for conducting commercial trials on real ores.

Conclusion

This article has dealt with all aspects of flotation: process, principles, cell design & shapes, types of flotation machines & their manufacturers, and recent advances in flotation technologies with emphasis on larger size circular flotation cells in global scenario. Installation of larger flotation cells will reduce capital and operational costs making better economic sense without compromising on concentrate grades and metallurgical recovery.

The recent development of Fluidised Bed Flotation cell as patented by Professor Jameson is being viewed as a future great revolution in flotation technology as it will result in huge power savings of upto 30-32% and cut operational cost and make the entire concentrate operation more profitable as this technology is developed to extend the flotation feed particles.

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Conversation of Steel 360 with Shri Vishal Agarwal, Vice Chairman & Managing Director, Visa Steel regarding Ferro Chrome Market

Q. *Indian Ferro Chrome industry is highly dependent on export market; do you see tougher times for Indian Ferro Chrome industry?*

A. The Ferro Chrome industry has grown significantly in India over the last few years, ever since the export tax on Chrome Ore was introduced. The export tax has encouraged value addition of Chrome Ore domestically into Ferro Chrome. India was earlier a large exporter of Chrome Ore & Chrome concentrates to China & Japan which is now being value added domestically. However, the Ferro Chrome industry in India has suffered this year due to uncertainty around availability of Chrome Ore. The prices have also been weak due to large capacity addition in China & weak demand from Stainless Steel Mills. The key in Ferro Chrome industry will be to control cost through Captive Mines and/or Captive Power.

Q. *OMC's plan to reserve 70% of total output for Odisha based units. VISA is amongst them; how much production do you expect from OMC in next 2-3 years?*

A. OMC is currently producing at 0.5 MnT pa Chrome Ore and Concentrates. With the intervention of the Chief Secretary, Principal Secretary to Government, Steel & Mines (who is now also the Chairman of OMC Limited) and a new Managing Director of OMC as well, we expect OMC to be able to ramp up this production back to approx. 1 MnT over the next few years. Industries in India are suffering big time owing to shortage of raw material and there's pressure on the government to scale up the production.

The Ferro Chrome Market

Global HC Ferro Chrome Supply (in MnT)

Country	2012	2013	2014
China	3.1	3.6	4.24
South Africa	2.89	2.9	3.69
Kazakh	1.08	1.1	1.11
India	0.95	1.05	0.96
Russia	0.3	0.3	0.3
Europe	0.28	0.4	0.56
Brazil	0.14	0.14	0.14
Zimbabwe	0.127	0.13	0.28
Turkey	0.073	0.07	0.07
Oman	0	0.01	0.05
Albania	0.015	0.015	0.01
Iran	0.015	0.015	0.02
Total	**8.97**	**9.63**	**11.43**

Source: International Chromium Development Association

India HC Ferro Chrome Capacity (in '000 tonnes)

Major Producers	FY15	FY16 (e)	FY20 (e)
IMFA	240	240	275
Balasore Alloys	118	218	250
VISA Steel	180	180	250
Tata Steel	100	100	150
FACOR	130	130	130
Jindal Stainless	130	130	130
Rohit Ferro	140	40	40
Others	198	198	198
Total	**1,236**	**1,236**	**1,423**

Source: VISA Steel

In the context of weak commodity prices globally, my sense is in the coming years, the margin will move back to value addition. During 2004-2014, a large part of margin in the value chain was in mining. But now, prices of commodities have crashed globally. India is an exception since production declined and therefore there was no correction. Globally, Iron ore prices have declined from USD 160 to USD 60, but in the domestic market Iron ore prices have increased during June to December 2014. With increase in production domestically, the price correction will happen eventually.

HC Ferro Chrome Exports (in MnT)

Country	2012	2013	2014
South Africa	2.89	2.9	3.31
Kazakh	0.87	0.9	0.85
India	0.49	0.55	0.49
Europe	0.26	0.27	0.35
Russia	0.18	0.2	0.1
Zimbabwe	0.17	0.17	0.2

Turkey	0.065	0.065	0.08
Oman	0	0.01	0.04
Albania	0.015	0.015	0.03
Iran	0.015	0.015	-
Total	**4.955**	**5.095**	**5.45**

Source: International Chromium Development Association

Q. *Isn't it true that for OMC's Chrome Ore prices, the major governing factor is the quantity that's put to auction?*

A. To some extent, yes. But more so it's the impact of shortage in Chrome Ore & Concentrates. Although, OMC is ramping up production, but there was a time when it was selling about 1 MnT of Chrome Ore and Chrome Concentrates. Now, the production is down to 0.5 MnT. In addition, Tata Steel's mines are closed which has taken another 0.5 MnT pa of Chrome Concentrates off the market, with higher availability of Chrome Ore from South Africa, prices have softened.

Q. *What are the growth prospects for Ferro Chrome industry in India?*

A. In the last few years, there has been an uncertainty in the domestic availability of raw material – Chrome Ore and Coal. In this uncertainty where existing capacities are under-utilized, nobody is looking at expansion. I think this is a phase of consolidation. Plants without Chrome Ore Mines or captive Power will need to consolidate with those having captive Mines and/or captive Power. Once the availability of raw material increases and there's an opportunity for setting up new value addition, then we'll see growth. In my view, the period during 2014-16 is seemingly the consolidation phase of the industry and between 2017-20 we can expect growth.

Q. *Ferro Chrome manufacturers are mostly selling to China; their capacity has increased. Is it that Indian producers have to find other markets than China?*

A. Our focus is on quality and developing niche grade products, preferred by Japanese and Europeans customers. Due to our experience in international trading; we have this unique strength. I think that companies in the time to come will need to specialize into niche products and develop new markets. China will continue to be a large market, and India will have a natural advantage to service this market as well.

The market for export from India include Japan, Korea, US, Europe and China. The strategy to spread volumes in these markets and among companies in that market. We at VISA Steel want to make sure that we're present in all these markets. Realization from these markets may vary, but we want to have a presence. We will ensure that a certain percentage of our volume is placed in each of these markets irrespective of price. For a sustainable business, one cannot take an opportunistic approach and keep switching among markets for short term profits; we don't follow that principle.

Global context on Ferro Chrome

Q. *Is South Africa ramping up production?*

A. In South Africa, power remains a challenge as it is getting costlier, and they've other issues such as IR problems/ strikes. They'll continue to be significant player because they're feeding a large part of Chrome ore to China, South Africa has very large Chrome ore reserves and that'll be able to sustain them. In addition, the South Africa Rand has also depreciated, which makes exports favourable. Out of the total global reserves of Chrome ore, about 75% is in South Africa. Chinese dominance in Ferro Chrome is largely due to South African Ore supplies.

I believe at some stage, South Africa shall put a tax on Chrome ore export. There's no tax now because the Power is insufficient for the Ferro Chrome plants. When the power situation improves, they may impose export tax and in that case, it'll continue to make Ferro Chrome but the day there'll be an export tax, that's when they'll try and look for a substitute source of Ore or import more Ferro Chrome.

Q. *We get to hear that Ferro Alloy business might go to Oman in the future; is this possible?*

A. Oman has advantage of cheap Power but has limited grades of Chrome Ore. They still have to import Ore to the tune of a significant percentage to blend with the local Ore. Oman will have some Ferro Chrome production to value add local Chrome Ore, but the volumes are small in the global context. They may have an advantage of power but they've disadvantages such Coke & water. The main producers will be China, South Africa, Kazakhstan and India.

Q. *Can European antidumping duty & Malaysian dumping of Ferro Alloys in India be a threat?*

A. The threat from Malaysia is for Manganese Alloys not on Chrome. There is a lot production capacity which will impact supply / demand scenario. There is a threat of antidumping on Indian Manganese Alloys in Europe. However, I'm really not in a position to predict if it'll take a month or a year. It's really difficult to guess. If depends on how well the case is represented and what the Europeans authorities feel. But, for Manganese Alloys sector, this is a threat.

Q. *Will 2019 be a 'Boom' period?*

A. There are so many global factors at play that it is difficult to predict a boom or bust. As we see it now, global commodity prices have fallen. Each commodity has its own reason to fall but if we look at the entire basket of commodities, all prices have fallen. So when I think of a 'Boom' I think it will also be related to overall commodities' cycle. I feel the raw material prices will remain weak and gradually the margin will move back to value addition. Because during the boom period, many mine expansions were planned; now there's surplus raw material, mines have not yet reached their peak production capacity. Once there's an improvement in margin for value addition then it'll be interesting to see how prices have.

Q. *How will amendments in MMDR Act change the game of mining in Odisha?*

A. MMDR (Amendment) Ordinance will ensure that the new leases for minerals including Iron ore are granted in a transparent manner to the existing mineral based industries through auction mechanism. This is an extremely positive development for the sector and the government needs to encourage mining and value addition together to make the 'Make in India' plan of Hon'ble Prime Minister a grand success. However, we understand that the provision for 'deemed extension / renewal' was not discussed with stakeholders in the draft stage and there may be some confusion between State Governments and Central government because of this issue.

Plans of VISA Steel

Coal Block

VISA Steel plans to bid for Coal Block for its Captive Power Plant and Sponge Iron Plant. Their Steel Plant is located at Kalinganagar, Odisha and most logical source for Thermal Coal requirement is Talcher Coalfields of MCL in Odisha. Unfortunately, a number of Coal Blocks in this area, which were earlier allotted to Steel Plants for their CPPs & Sponge Iron Units have been diverted for IPPs. As such, in the first round of bidding, there is no Coal Block available for unregulated Sector

like Steel in the Talcher region of Odisha. Therefore, the Company is evaluating various other options for bidding for blocks in West Bengal, Chhattisgarh & Jharkhand.

Other Plans

We asked Vishal Agarwal about the next 5 years plan and he replied, "Currently, our priority is to resolve the raw material situation for the existing operations. Once this is resolved, we have a clear cut path. Our Special steel business can grow from 0.5 MnT to 1 MnT, Ferro Chrome can grow from 0.18 MnT to 0.25 MnT and for the Coke business, we've plans to grow from 0.4 to 0.8 can be scaled up at the same location and another 0.8 at a different one. This is what we've planned for the next 5 years."

India and Odisha, in spite of being a land rich in natural resources, is suffering from raw material shortage. Mr. Agarwal in the interview also agrees that presently, the need is to make the best use of what we already have. From May'14 onwards words like lease cancellation, mining restrictions, shortage of raw material, Iron Ore imports, Chrome Ore imports etc. have been discussed. But January 2015 onwards, thankfully, talks about ordinance, mine auctions, resumption of mining, drop in prices etc. have begun.

In context to Indian raw material scenario, what could be the possible trade-off between policing and not using? Pros & cons of the two, is still debatable on economic grounds. Had India gained or lost more by closing the mines to clear the mining mess or by not using the resources and industrial units closing down due to shortage of raw material? The shortage of raw material in the industrial sector has gone to an extent that the commodities like Iron ore or Chrome Ore, which were once exported, are today imported to the tune of 11.4 MnT and 0.2 MnT respectively this financial year till Jan'15. On the good side, the shortage of raw material has been a critical factor that has challenged the Companies to do cost cutting. A few have adopted consolidations but others had to close down. Perhaps, India has learnt about this trade off in the hard-way; now, it's time to revitalize the capacities, which are lying dormant across the Country.

Source: Steel 360

Statistics

INDIA IMPORT – FERROUS SCRAP IN December'14 (QTY IN MT)							
EXPORTING COUNTRY	**LUDHIANA**	**CHENNAI**	**JNPT**	**MUNDRA**	**OTHERS**	**DEC'14 TOTAL**	**NOV'14 TOTAL**
SOUTH AFRICA	31,414	10,000	14,312	4,097	17,247	77,071	75,869
UNITED KINGDOM	9,037	7,999	12,044	2,538	32,719	64,338	64,965
UNITED ARAB EMIRATES	20,099	281	19,692	1,911	19,480	61,465	54,475
UNITED STATES	2,309	1,268	7,841	859	12,820	25,096	29,641
OTHERS	44,157	75,617	28,227	15,715	55,989	219,705	179,123
TOTAL	**107,016**	**95,166**	**82,116**	**25,120**	**138,256**	**447,675**	**404,072**

INDIA IMPORT – FLAT STEEL HR & CR IN December'14 (QTY IN MT)							
EXPORTING COUNTRY	**MUMBAI**	**MUNDRA**	**KANDLA**	**CHENNAI**	**OTHERS**	**DEC'14 TOTAL**	**NOV'14 TOTAL**
KOREA	85,921	31,485	4,479	19,519	488	141,892	130,156
JAPAN	31,775	1,590	32,907	8,469	860	75,600	40,816
CHINA	21,396	13,252	-	5,445	20,208	60,301	51,885

ITALY	-	-	19,001	-	33	19,035	133
OTHERS	4,678	15,832	-	3,819	7,320	31,649	20,152
TOTAL	**143,771**	**62,159**	**56,387**	**37,252**	**28,909**	**328,478**	**243,143**

INDIA EXPORT – FERRO SILICO MANGANESE IN December'14 (QTY IN MT)							
IMPORTING COUNTRY	**KOLKATA**	**VISHAKHAPATNAM**	**RAIPUR**	**PETRAPOLE LCS**	**OTHERS**	**DEC'14 TOTAL**	**NOV'14 TOTAL**
JAPAN	5,982	5,923	-	-	-	11,905	15,914
ITALY	4,934	2,005	-	-	1,510	8,449	9,047
NETHERLANDS	5,405	1,073	-	-	-	6,478	3,388
TAIWAN	3,950	2,483	-	-	-	6,433	10,420
OTHERS	18,716	5,314	1,680	1,500	2,846	30,056	27,843
TOTAL	**38,987**	**16,798**	**1,680**	**1,500**	**4,356**	**63,320**	**66,612**

INDIA IMPORT – MANGANESE ORE IN December'14 (QTY IN MT)						
EXPORTING COUNTRY	**KOLKATA**	**VISHAKHAPATNAM**	**JNPT**	**CHENNAI**	**DEC'14 TOTAL**	**NOV'14 TOTAL**
SOUTH AFRICA	85,031	58,090	-	-	143,121	123,835
AUSTRALIA	19,311	42,515	-	-	61,827	53,618
GABON	16,150	4,800	-	-	20,950	16,804
TURKEY	4,316	-	-	-	4,316	-
OTHERS	1,068	269	249	200	1,786	5,145
TOTAL	**125,876**	**105,674**	**249**	**200**	**231,999**	**199,401**

INDIA IMPORT – COAL IN December'14 (QTY IN MT)							
EXPORTING COUNTRY	**MUNDRA**	**KRISHNAPATNAM**		**VIZAG**	**OTHERS**	**DEC'14 TOTAL**	**NOV'14 TOTAL**
INDONESTA	2,903,852	809,330	630,500	447,400	8,180,352	12,971,434	12,612,588
AUSTRALIA	-	252,900	563,900	975,100	2,365,807	4,157,707	4,344,447
SOUTH AFRICA	252,400	503,300	525,100	201,950	1,667,380	3,150,130	3,202,858
MOZAMBIQUE	-	-	17,464	-	202,300	219,764	182,500
OTHERS	75,000	247,698	-	79,500	881,595	1,283,793	1,996,997
TOTAL	**3,231,252**	**1,813,228**	**1,736,964**	**1,703,950**	**13,297,434**	**21,782,828**	**22,339,390**

Source: Steel 360

Plant Visit to Star Wire Industries, Ballabgarh on 14 February 2015 – A Brief Review

The Indian Institute of Metals – Delhi Chapter regularly organizes visits to eminent industries in and around NCR, for benefit of its members. In this series, a team of IIM-DC members visited Star **Wire Industries** at **Ballabgarh** on 14th February 2015, on personal initiative taken by Mr.O.P.Gupta, Member Executive Committee IIM-DC Chapter. The Visiting Team went around modern facilities of this Unit and had extensive deliberations with the senior officials.

Mr. Girish Sharma, AGM (Marketing) made a video presentation to IIM-DC members. Mr. Amarendra Jha, Sr.GM (Vertical Head - SMS, ESR, Hot Forge & BPS) discussed the various technical issues and took the Team around the Plant facilities and explained working of different Units.

Star Wire (India) Ltd. (SWIL) is one of the reputed mini steel plants in India. The company was taken over in 1981 by the present management and has progressed steadily to achieve excellence in its field.

SWIL is a manufacturer of Special Steels and is engaged in the development of Manufacturing Technologies for commercial production of very Special Steels indigenously. Steel Manufacturing activities involve melting of high quality steels through Electric Arc furnaces/ Electric Induction furnaces, followed by secondary refining processes at AOD/ VOD, Ladle Refining Furnaces, Vacuum degassing to produce high Quality Special Steel Ingots, which are further processed through Electro Slag Refining if required. These Ingots are used for manufacturing of forging, casting and rolled products for various industrial applications. SWIL is today recognized as one of the top producers of Special Steels in the Country and is well known for Quality, Reliability & Commitment to its Customers apart from its Innovative approach which has resulted in development of numerous Steel Products & contribute significantly towards Import Substitution in critical applications of Steel.

The plant is situated in 17 acres plot in Ballabgarh, about 37 kms from Delhi. A second plant at Chhainsa (~ 19 kms away) has additional modern facilities, spread over an area of 70 acres

MANUFACTURING PROCESSES

The major Manufacturing Processes at its 2 Units at Ballabgarh and Chhainsa are as follows:

- ✓ Steel Melting, Refining and Casting Ingots using Electric Arc Furnaces, Induction Furnaces, Ladle Refining Furnaces, AOD Convertor, VD/ VOD processes for Heat Sizes which can go up to 25/ 28 MT
- ✓ Electro Slag Refining Process using State of the Art Technology from ALD, Germany to produce ESR Ingots for very special applications.
- ✓ Casting Liquid Steel into Heavy Castings (Foundry Operations) weighing upto 100 MT single piece, for Power Sector & other Engineering Applications.
- ✓ Hot Forging of High Quality Ingots into Forged products, Semis through a 2000 MT Press as well as a pneumatic Hammer.
- ✓ Hot Rolling of Ingots/ Semis on various Mills: 20 Inch Mill, 18 + 14 + 10 Inches Mills, and 18 + 12 Inch Mills.
- ✓ Extensive facilities for Ingot/ Forged Product/ Rolled Product Conditioning & Finishing are available, e.g. Swing frame grinders for Surface Conditioning,

Hydraulic Presses for Straightening, Roller Straightening Machines, High Speed Band Saw machines for Cutting using HSS & Carbide blades, etc.

✓ Heat Treatment of Forged and Rolled Products (hardening, tempering, solutionising, annealing, spherodising etc.) in Batch type Bogey Hearth furnaces to do heat treatment of 10 meter long rolled product, as well as Continuous Hardening and Tempering Operations.

✓ Bright bar finishing operations including Straightening, Centreless Grinding, Peeling (more than 100 Centreless Grinders and Peeling machines) to produce Engine Valve Steels and other Bright Bar Grades of steel.

✓ Advanced Research and Development facilities where Steels and Materials can be tested for Mechanical, Physical, Chemical and Metallurgical properties. The laboratory is NABL approved.

PRODUCTS

Products manufactured by SWIL cater to the demands of a wide spectrum of industries like Power Equipment Manufactures, Steel Plants, Cement Industry, Petro-Chemical Industry, Earthmovers, Thermal Power Stations, Engine valve manufacturers, Railways, Ordnance factories, Defence, Aerospace, Para Military Forces and other Engineering Industries.

Some of the Product Segments are:

✓ Rolled & Forged Materials (ESR & Non ESR Grades) for Power Sector

- Turbine Blade Steel for Steam / Compressor / Gas Turbines.
- Blade Steel Material Grades such as: X12CrMoWVNb-N10-1-1 , X22CrMoV121, X20Cr13 (approved by NTPC)
- Steel for Steam Turbine Bolts, nuts, studs, spindles, bushes and other components in the operating range of 480 – 565oC.
- Non Magnetic Steel flats and bars for manufacturing of Tension bolts, Press fingers for turbo and hydro generators.
- Creep Resistant Steel for Armature Clamping Ring, Spring Forging and Winding Support Rings for generators.
- Stainless steel for Shroud Segments for Gas Turbines

✓ Engine Valve Steels

- High Alloy Creep Corrosion Resistant steel (21% Cr, 8%Mn, 0.4% N, 3-5% Ni) used for Exhaust Valve in IC Engines

- Martensitic Inlet Valve Steels for eg. EN52, SUH 11, SUH 3

✓ Bullet proof Steel patented as `Phantom Steel'
- Bullet proof Jackets
- Bullet proof Cars/ Personnel Carrier- TATA 713
- Bullet proof Helmets/Patka
- Bullet proof Mobile Posts
- Bullet proof Election Podium
- Bullet proof Sentry Post
- Bulb Bars & Welding Wire for Naval Ship Building
- Steel for Cartridge Case & Gun Barrel

✓ Forged products: (Dia 100 mm to 450 mm) for the following sectors:
- Energy Sector
- Aerospace Sector
- Tool & Die Steels
- General Engg: Industry

✓ Steel Castings up to 65 MT single pc
- Focus on Large Weight Castings for Thermal Turbines
- Exports: Alstom, Ansaldo, Siemens, Skoda, Toshiba and Fuji etc.
- Developed Critical castings for 250, 500 & 660 MW Steam Turbine for BHEL/NTPC Projects.
- Manufactured Castings for Super Critical Parameter Turbines up to 35 MT/each

✓ Ingots: for Nuclear & Aerospace sector, Tool & Die Steel, Power Sector, Engineering Sector
- Polygonal Single Piece weight 200 Kg – 22500 Kg
- Round Ingot (Dia 540 mm & 610 mm x 3300 mm length)

Some of the products are shown below:


Valves

Forged Product


Special Steels


Forged Ingots

Some of their domestic clients are –
Valve Steel (Rane Engine Valve Ltd. Chennai; Sriram Piston & Rings Ghaziabad; Kirloskar Oil Engines, Nashik; Vikram Valves & General Industries, Rajkot; etc.), Special Steel (MICO Bangalore & Jaipur; Sriram Fuel Injection Industries Hyderabad; Atlas Copco India Ltd. Pune; etc.), High Speed Steels (Miranda Tools Ankleshwar; Forbes Gohak ltd. Mumbai; Zenith ltd. Mumbai etc.), Forged products (Manugraph India; Triveni Engineering Mysore; Eleon etc.), Super Critical Material Grade Castings (BHEL ,TOSHIBA, L&T-MHI etc.)

Some of their Global Customers are – Toshiba Japan, Siemens Germany, Alstom Germany, Skoda Czech Republic, Technistar S.r.l.Italy, Ivam S.r.l.Italy, Paradowsay AMP S.J.Poland, Federal Moghul Valves South Africa, Edival S.A.Argentina, etc.

INTERACTIONS WITH SENIOR OFFICIALS

Activities of IIM Delhi Chapter were discussed with Mr. Amarendra Jha. Copies of IIM-DC Monthly Newsletter and IIM-DC Brochure were handed over. They were requested to participate regularly in all activities of IIM Delhi Chapter

The visit to Star Wire Industries, Ballabhgarh, ended with thanks to their senior officials for facilitating this visit.

NMDC eyes 100 mt iron-ore production by 2024-25

In order to support the government's target of raising the steel production capacity to 300 mt by 2025. NMDC aims to raise its iron ore production by more than threefold to 100 million tonne (mt) by 2025. While 90% of it will be produced in India, 10% will come from NMDC's Legacy Iron Ore mines in Australia.

"We are finalising plans to take a quantum leap in iron ore production to over 100 mt, in line with the government's target to raise steel production to 300 mt by 2025.

We hope to firm up detailed investment plans for this by March 2015," Narendra Kothari, Chairman-cum-managing Director of NMDC said. He was speaking at the CII's International Mining Machinery Exhibition and Global Mining Summit 2014.

"We would like to maintain our share in the domestic iron ore market," he added. The cash rich NMDC is not planning to go in for any major borrowing to fund its mega growth plans.

The country's largest iron ore producer, ended FY14 with a production of 30 mt. Mr. Kothari said NMDC has already firmed up plans to double its output to 65 mt by 2018. A substantial part of the hike in output will come from expansion of the country's own mines in Karnataka, and Chhattisgarh. NMDC's joint ventures with Jharkhand and Chhattisgarh states mineral companies is also expected to contribute significantly to the growth. Mr. Kothari said NMDC is planning to set up two new slurry pipelines having a capacity of 15 mt each.

Besides, the PSU is all set to start trial production at its new pellet plant at Donimalai in Bellary district of Karnataka by March this year. As part of its value addition and diversification plans,

NMDC has set up a 1.2 million tonne per annum pellet plant at an investment of close to Rs 600 crore at Donimalai. The company has also signed an Operation and Maintenance (O & M) contract with another public sector company KIOCL Limited, which has a considerable experience in operating pellet plants. Both the companies under the ministry of steel signed an agreement for O & M contract recently.

"We have started deploying our engineers at Donimalai to take over the operation of the pellet plant. We will commence trial production in March this year and the full commercial production would begin in the next fiscal," KIOCL sources said.

Pellet is a value-added form of low-grade iron ore and is used as a raw material in making steel, NMDC will produce blast furnace-grade pellets with 65% iron content in sizes between six and 16 mm. Steel plants across the country have been using pellet as raw material due to shortage of raw material.

For KIOCL, which has operated its pellet plant for nearly four decades, it would be a new business opportunity. The company had to shut down its iron ore mine in Chikkamagaluru district following the Supreme Court order in 2005. It recently set up a new O & M vertical.

"The contract will facilitate KIOCL to gainfully utilise its experienced manpower for operating the NMDC plants for mutual benefit of both the Central PSUs," Malay Chatterjee, Chairman and Managing Director of KIOCL, said.

Besides operating the pellet plant, KIOCL will also manage the iron ore beneficiation plant of NMDC, which is also being commissioned this year at Donimalai. NMDC, which was till now exporting and selling its low-grade ore, will feed it to the beneficiation plant and enrich it for use in its pellet plant. Apart from Karnataka, NMDC is also setting up a 2 million tonne per annum pellet plant at Bacheli in Chhattisgarh. Currently, an estimated 60 million tonne per annum pellets are produced in the country and hardly any material is exported.

Source: MMR

RINL aiming at 20 million tonnes – CMD

Mr P Madhusudan CMD of Rashtriya Ispat Nigam Limited said that RINL has a great future ahead and the capacity of the plant will be ultimately enhanced to 20 million tonnes from the present 6.3 million tonnes. Mr Madhusudan was speaking in the plant on the occasion of the thirty-third formation day. He said the expansion units were functioning well and in spite of the great setback suffered last year due to the cyclone Hudhud the RINL collective had shown great resilience and bounced back. He said that RINL would play a great role in the economic development and growth of Visakhapatnam and the new state of Andhra Pradesh after bifurcation. A festive atmosphere pervaded Ukkunagaram on the occasion. An exhibition was organized at the Trishna Grounds where schools in the Ukkunagaram Township and different departments of the RINL set up stalls showcasing their achievements. On the occasion, the RINL team played a 20:20 cricket match against a team of the Visakhapatnam Journalists' Forum at the Col CK Nayudu Ukkunagaram Stadium. The CMD himself donned the cricket gear and opened the innings for RINL. The VJF team won the match.

Source: Steel Guru

NMDC's price cut fails to cheer steel makers

The 11 per cent cut in iron ore prices for February, announced by the NMDC has not elated domestic steel makers. They feel there is scope for further reduction. This is the first cut in three months. NMDC's iron ore is still 53 per cent costlier than the material supplied by private miners at Odisha, who sell iron ore for Rs 1,800 per tonne. NMDC, the country's largest public sector iron ore producer, has reduced ore lump prices 11 per cent to Rs 3,750 a tonne and ore fines

prices 10 per cent to Rs 2,760 a tonne. However, after adding all taxes, freight and royalty, their material is almost at par with that of the landed cost of imported material. Imported ore is available at $64 a tonne (Rs 3,900, according to current exchange rates) on a cost-and-freight basis for 63.5 per cent ore, down $2 a tonne over the previous week.

On a year-on-year basis, prices in the international markets are down 48 per cent compared to $122 a tonne in January 2014. "The recent reduction of iron ore fines prices by NMDC by just 11 per cent are not in line with expectations. It is too little when compared to the drop in prices internationally (over 50 per cent from January 2014 to current levels). Further the price reduction by private miners in Odisha is much more than that of NMDC, which are down by 45 per cent to Rs 1,800 per tonne," H Shivramkrishnan, Chief Commercial Officer, Essar Steel India Ltd said.

Compared to landed cost of imported iron ore at Rs 4,450 per tonne, the domestic iron ore sold by NMDC costs between Rs 4,300 and Rs 4,500 per tonne after adding royalty, taxes and freight. "This means there is still large scope for NMDC to reduce their prices. Considering the fact that there is a muted demand for steel products in the country, the steel makers are not too impressed with the current reduction by NMDC," Prakash Duvvuri, head of research at OreTeam Research, a Delhi-based iron ore research firm said.

JSW Steel has demanded NMDC to reduce prices by at least Rs 1,000 per tonne. "There is no demand for steel in the domestic market. China and Russia are dumping steel and if we cannot match them it will be very difficult for us to operate in the current scenario. The steel industry will have to cut down production if NMDC does not reduce prices further," Vinod Nowal, Deputy Managing Director, JSW Steel said. JSW Steel has already indicated that it would continue to import for the next fiscal as well. For the current fiscal, it has imported 9.3 million tonnes till end of January 2015.

Don't ever find short cuts or compromise with your conscience.

"There is still big scope for NMDC to reduce their prices. They should sell Lumps at Rs 2,000 per tonne and Fines at Rs 1,600 per tonne. Because, we have to add royalty, taxes and freight before taking it to our plants. After adding all these, it works out to Rs 3,600 per tonne for steel mills," R K Goyal, Managing Director, Kalyani Steels Ltd said. "Indian steel makers continue to be burdened by very high iron ore fines prices by NMDC. This coupled with cheaper and unfairly traded steel imports riding on the back of sharply declined iron ore prices is hurting Indian steel industry leading to depressed prices of steel and adversely impacting CAD and excise duty collections," Shivramkrishnan added.

Source: Business Standard

Stainless crude steel production by major SUS Mills up by 5.7pct in Dec

TEX reported that the stainless crude steel production by 6 major stainless steel mills in December 2014 was 280,066 tonnes, up by 5.7% from 264,959 tonnes of the prior month. This represented a decrease of 12.5% versus the year-earlier month (320,008 tonnes). In December, the influence of production recovery at Shunan Works of Nisshin Steel Company Limited which finished a regular furnace repair (5th to 18th of November) was big, and Chiba Works of JFE Steel Corporation and Nippon Steel & Sumikin Koutetsu Wakayama also made a recovery in production. On the other hand, Kawasaki Works of Nippon Yakin Kogyo Company Limited made a cutback in production to a range of 20,000 tons as originally planned, and the Company is analyzed to have maintained this level in January 2015 as well. As the period from January to March is the one for settlement of accounts, all of producers, trading firms and customers have a policy to reduce in-hand stocks as of the end of March, but many of them think it should be lower than usual in this year

Discussion is an exchange of knowledge. Argument is an exchange of ignorance.

and some of the stainless steel mills started to adjust production during December. Besides, according to the special steel production plan for the period from January to March, although the production of stainless steel is expected to be up by 1.1% from the prior period for domestic consumption and up by 8.4% ditto for international export, the current demand from the auto industry is weak and therefore it is quite likely the production plan will be adjusted downward.

Source: Steel Guru

Is 300 mt steel capacity by 2025 an achievable target?

Even the most hardened optimist will find it difficult to visualise India, which managed to raise crude steel production by only 2.3 percent to 83.2 million tonnes (mt) last year, lifting steel capacity to 300 mt by 2025. Local steel demand is hardly growing and steel product prices are leaving little margin for producers. While the market has sapped enthusiasm of most steelmakers to grow capacity in a hurry, land acquisition challenges and regulatory issues continue to hold back many announced projects from taking off. Frustrated by delays in getting regulatory clearances and iron ore mines, Lakshmi Mittal had said some time ago: "India is not my top priority for investment."

In the meantime, Mittal's company, ArcelorMittal, in partnership with Nippon Steel & Sumitomo Metal, has bought a 5.3 mt steel finishing mill at Calvert in the US from ThyssenKrupp for $1.55 billion. In another significant partnership with Hunan Valin, ArcelorMittal commissioned a 1.5 mt high-strength automotive steel plant in China's Hunan province last year. The lesson is, whatever be the potential of the Indian market, foreign groups will want government decisions on land acquisitions and iron ore linkages in reasonable time for them to work here. Mittal revealed his waning investment interest in India in March 2013. His group has since made a breakthrough in the protected Chinese steel industry and also gained a firm foothold in the US automotive steel segment. The loss is India's.

South Korean Posco's plan to build a 12-mt steel plant in Odisha has been hanging fire since June 2005. The world was greatly positive about steel till the worst ever global financial crisis of 2008 dealt a blow to all commodities.

Remember, Mittal Steel bought Arcelor and Tata Steel acquired Corus in close succession in June 2006 and January 2007, respectively? Steel's gung-ho period soon thereafter came to an end. India failed to get foreign direct investment (FDI) in steel in any meaningful way during the industry's best times because of regulatory bottlenecks. What does not portend well for steel capacity growth is shelving of 10 mt Salboni project of JSW Steel in West Bengal for two reasons – failure to arrange iron ore supply from neighbouring states and local government not according independent power producer status to the company's proposed thermal plant. The company also drew a blank in Jharkhand where it wanted to build a 10-mt mill. However, with JSW's entrepreneurial spirit getting the better of setbacks in two eastern states, the company claims to be staying on course to lift capacity from close to 15 mt to 40 mt by 2025. Doubling of the Vijaynagar mill capacity to 20 mt and making Dolvi a 15-mt unit helped by large parcels of land that came with acquisition of Welspun Maxsteel will bring JSW close to its 2025 target.

Being the chairman of government-owned Steel Authority of India Limited (SAIL), Chandra Shekhar Verma is under the compulsion to make optimum use of huge surplus land with some of its integrated mills to pack in a whole lot of extra capacity to become a 50-mt group in 10 years. Industry leaders such as Tata Steel, Essar and Jindal Steel and Power, too, how rolled out major credible expansion programmes. Even then, 300 mt is too big a realisable target by 2025. Growing capacity through blast furnace-cum-basic oxygen furnace route is highly capital intensive and long gestation proposition. Moreover, since steel production through this conventional route requires the use of metallurgical coal not adequately found in the country,

government policy should be oriented to simultaneously give a push to making of sponge iron on a large scale for use as feedstock by electric arc furnaces (EAFs) and induction furnaces (IFs).

In India's steel production, the share of EAFs is 23 percent and that of IFs is 34 percent. A point of concern is production of both gas-based and coal-based sponge iron continues to fall. Sponge iron makers are not enjoying priority in gas and coal allocation, their overall capacity use has slipped below 50 percent. Many units are either closed or sick. "This, however, should not be the case since the country owns the world's fifth largest coal reserves. Virtually free of tramp, high degree of metallisation and negligible presence of sulphur and phosphorous make sponge iron ideal feed material for EAFs and IFs. Moreover, this intermediate product is an excellent substitute for steel melting scrap for which we are very largely import dependent," says Usha Martin managing director Rajeev Jhawar.

Source: Business Standard

Unprecedented iron ore crisis hitting Indian steel industry: ASSOCHAM

Apex industry body ASSOCHAM said that in the wake of the bans and restrictions imposed on iron ore mining in Odisha, Jharkhand and Karnataka, India's steel industry is likely to face unprecedented crisis due to extreme shortage of iron ore and cheaper imports from China and Russia.

In a note submitted to the government, ASSOCHAM has proposed an urgent intervention to correct artificially inflated iron ore prices in the domestic market by the non-captive miners.

ASSOCHAM Secretary General D S Rawat lamented that as against the international norm of efficient steel-making, Indian steel industries have no captive mines and are fully dependent on the domestic merchant miners.

He said: "Both private and PSU players in the states of Chhattisgarh, Odisha, Jharkhand, etc have been paying a very high cost for iron ore, ranging from $ 96-105 per ton landed, resulting in high production costs of steel ranging from $ 450 to $ 500 per ton, rendering them less competitive in the international market as well as in the domestic market because of cheaper Imports from China, Russia and other countries."

"As a result of such high Iron ore prices maintained by domestic producer, coupled with the crash in international iron ore prices and dumping by Chinese and Russian steel producers, domestic steel producers are left with no option but to resort to import of iron ore in order to maintain sustainability in the current market scenario and stay afloat," he said.

ASSOCHAM said: "While in India steel production has gone up from 65.84 million tons in 2009-10 to 81 million tons in 2013-14, iron ore production has gone down from 218.55 million tons in 2009-10 to 138 million tons in 2014-15. During the current year, the Indian steel industry has already imported 8.5 million tons of iron ore (April-December 2014) and total iron ore imports are likely to cross 12-13 million tons during FY 2013-14."

Iron ore production is reducing year upon year and leading to a situation where its requirement is surpassing the restricted production volumes currently being witnessed in India. While few de-bottlenecking steps have been taken recently by the government, the same has yet to produce results. Due to various restrictions imposed on iron ore producers in various states and closure of mines happening for various reasons, there is mismatch in demand and supply. As a result, few mines are operating, catering to the huge demand from the steel mills, sponge iron makers and pellet producers who have no captive iron ore sources.

ASSOCHAM said: "In order to continue their operation, the plants are forced to buy iron ore at a price determined and dictated by these producers. This has resulted in anomalous situation whereby while the world over all commodity prices, including Iron ore, are falling, domestic Iron ore prices are sustaining at a very high level.

It highlighted that the International iron ore prices have dropped by almost 50 percent from a peak level of $ 136 per DMT CFR China in November 2013 to the current level of $63-64 per DMT CFR. However, during the same period, domestic fines price increased by 17 percent from Rs 2,610 per WMT to Rs 3,060 per WMT in January 2015 on ex-mines basis.

Source: Steel Insights

Cheaper imports force stainless steel-makers to cut prices

Stainless steel manufacturers have cut prices to 7-10 percent below the cost of production, hit by cheap imports from ASEAN and free trade agreement (FTA) countries.

Stainless steel imports have witnessed a significant increase in the first nine month period between April-December of the current financial year. Against 307,266 tons in all of FY2013-14, total imports of stainless steel in the first nine months of the current fiscal have been 423,894 tons, an increase of almost 38 percent. Another 100,000-150,000 tons of further imports in the last quarter of FY-2015 cannot be ruled out, according to industry experts.

Of the total imports so far, China accounts for the lion's share of almost 35 percent. Imports have also increased from countries like Malaysia, Thailand and Vietnam where India has signed an FTA to import stainless steel duty-free with a mandatory value addition of 35 percent.

"There is no room for 35 percent value-addition in stainless steel. Mills in Vietnam and elsewhere are importing hot rolled sheets to convert into cold rolled which entail not more than 10-15 percent of value-addition. Thus, duty-free imports at the cost of domestic mills do not make any sense," said N C Mathur, President, Indian Stainless Steel Development Association (ISSDA), and an advisor to Jindal Stainless Ltd.

India's stainless steel industry has invested heavily in capacity addition over the last four years to over 5 million tons from 3.5 million tons.

China's stainless steel industry, meanwhile, has 7 million tons of capacity – largely with government support – since 2010 to 17 million tons at present. However, with demand increasing to 14.6 million tons, it still has a surplus of more than 2.5 million tons. While raw materials like ferro chrome are available at low prices, the government has also subsidized electricity and interest on working capital loans used for stainless steel manufacturing. This, in turn, makes the Chinese cost of production 30-40 percent cheaper than India.

India's largest stainless steel producer, Jindal Stainless, reported a loss of Rs 255 crore in the second quarter ended September 2014 on revenues of Rs 3,304 crore. During Q2, stainless steel sales volumes increased by around 1 percent to 2.64 lakh tons from 2.61 lakh tons a year ago.

"Other stainless steel producers have also incurred losses as they continued to rationalize prices to match with imported products. Ultimately, they produce stainless steel to sell," said Mathur.

In a letter to Prime Minister Narendra Modi, various stainless steel bodies have said that on account of huge surge in imports, particularly from China, at extremely low rates, the Indian stainless steel industry's capacity utilization has fallen to 55 percent with fear of further reduction if urgent steps are not taken."

On complaints from the industry, the commerce ministry has initiated an investigation into the impact of Chinese imports. Even as the inquiry is ongoing, domestic stainless steel producers have urged the government to levy an anti-dumping duty on Chinese stainless steel.

However, the user segment, largely comprising utensil manufacturers, have opposed levying any such duty, given that they now have access o stainless steel at a third of domestic prices. This, in turn, helps them in export markets.

In a letter to the Directorate General of Safeguards, Customs and Central Excise, the All-India Stainless Steel Industries Association Vice-President Anil Agarwal said: "Levy of any safeguard

duty will make stainless steel costlier which would make us uncompetitive in exports markets. In addition to a forex loss of Rs 2,500 crore, the safeguard duty levy will also put the fate of over 300.000 workers directly employed by the utensil industry at stake."

Source: Steel Insights

India retains fourth position in world steel order in 2014

With a total production volume of 83.20 million tons (mt), India remained the world's fourth-largest steel producing nation for the fifth year in a row in 2014 as well, according to data compiled by the World Steel Association (WSA).

In fact, there was no change in the world order of steel production in the past year with China remaining at the top, Japan second and the US at third position, producing 822.7 mt, 110.66 mt and 88.34 mt of steel, respectively.

India was in third position in 2009, but it has been at fourth place since 2010. The country's steel production was 68.97 mt in 2010, 73.47 mt in 2011, 77.26 mt in 2012 and 81.29 mt in 2013.

It might take years for India to position itself among the top two producers, which is currently being held by China and Japan respectively but with the ongoing expansions, it make take up the position enjoyed by the US within a couple of years as the gap between the two is just around 5 mt.

Production in the US has been hovering between 86 mt and 88 mt for the last four years. Steel production in India, on the other hand, has been on the rise.

India's present installed steel manufacturing capacity is around100 mt. almost all leading producers are raising their capacities aimed at cashing in on the wide gap between output and potential increase in the per capita consumption.

Top 10 Steel-Producing Countries

Rank	Country	2014 (MT)	2013 (MT)	% (2014/2013)
1	China	822.7	815.4	0.9
2	Japan	110.7	110.6	0.1
3	United States	88.3	86.9	1.7
4	India	83.2	86.9	1.7
5	South Korea	71.0	66.1	7.5
6	Russia	70.7	68.9	2.6
7	Germany	42.9	42.6	0.7
8	Turkey	34.0	34.7	-1.8
9	Brazil	33.9	34.2	-0.7
10	Ukraine	27.2	32.8	-17.1

Compared to the world's average per capita steel use of 225 kg in 2013, India's usage was at just 57.8 kg. Domestic steel makers are pinning hope on the proposed infrastructure spends of the government.

During 2014, world's steel production stood at 1,661 mt, up 1.2 percent from 1,642 mt produced in 2013.

Contribution from Asia was the highest at 1,132 mt followed by Europe at 313 mt, North America (121 mt), South America (45 mt), Africa (16 mt), the Middle East (28 mt) and Australia/New Zealand (5.5 mt), respectively.

Annual production for Asia was 1,132.3 mt of crude steel in 2014, an increase of 1.4 percent compared to 2013. China's crude steel production in 2014 reached 822.7 mt, an increase of 0.9 percent on 2013. China's share of world crude steel production decreased from 49.7 percent in 2013 to 49.5 percent in 2013. Japan produced 110.7 mt in 2014, a 0.1 percent increase from 2013. South Korea's crude steel production was 71.0 mt, an increase of 7.5 percent compared to 2013.

The EU recorded an increase of 1.7 percent compared to 2013, producing 169.2 mt of crude steel in 2014. Germany produced 42.9 mt of crude steel in 2014, up by 0.7 percent over 2013. Italy produced 23.7 mt in 2014, a – 1.4 percent decrease over 2013. Franc's crude steel production in 2014 was 16.1 mt, an increase of 2.9 percent. Spain produced 14.2 mt of crude steel in 2013.

In 2014, crude steel production in North America was 121.2 mt, an increase of 2 percent on 2013. The US produced 88.3 mt of crude steel up by 1.7 percent compared to 2013. The average capacity utilization in 2014 was 76.7 percent compared to 78.4 percent in 2013.

Source: Steel Insights

Govt. plans four steel plants

The Centre has said it will inject Rs 150,000 crore for building four new steel plants with a combined capacity of 20-24 million tons, in collaboration with the governments in four states.

"We have decided to build four new steel plants and four dedicated mining companies to feed these plants in four states partnering the respective state governments. We aim for 6 mt capacity for each plant," Union Steel and Mines Minister Narendra Singh Tomar said at Rourkela on the sidelines of an expansion review meeting at the Rourkela Steel Plant.

Based on investment of Rs 6,000 crore for each million ton of steel and associated cost for mining, the total investment will be in excess of Rs 150,000 crore.

"We have decided to form special purpose vehicles (SPVs) for each plant and mining companies. We are already holding discussions with state governments. I had positive discussions with Chhattisgarh and Odisha and will shortly hold talks with Karnataka and Jharkhand governments," Tomar said.

He said the plan for new capacity has been envisaged to boost the 'Made in India' focus and take the steel capacity of the country to 300 million tons by 2025. As per the plan, SAIL will invest in Chhattisgarh, Rashtriya Ispat Nigam Ltd in Odisha, NMDC Ltd in Jharkhand and Karnataka.

SAIL Chairman C S Verma said details of the SPVs are yet to be worked out but for each project, two SPVs will be floated, one for mining and another for the plant.

Tomar was confident that new reforms and transparency in the mining sector will help the steel industry come out of the current crisis. He said all mines will now be auctioned for the sake of transparency.

Now, with Mining and Minerals Development Regulation Amendment Ordinance, mineral producing states will have no additional power to stop inter-state mineral movement, Tomar said. This will help states like West Bengal in attracting steel plants that do not have iron-ore.

Presently, states impose restriction on inter-state movement of minerals to retain investment in their own states.

Source: Steel Insights

Indian coal imports fall 20pct in Jan due to lower demand from steel makers

As per mjunction data, the surging trend of coal imports in recent times snapped in January as shipments fell by 20% over the previous month due to lower demand from domestic steel makers. Mjunction said that India's coal imports in January stood at 15.73 million tonne as against 19.75

million tonnes in December, 2014. However, the January imports were 2% more than the 15.37 million tonnes imports in the same month of last year. Of the total imports during January this year, non-coking coal was at 15.91 million tonnes compared to 15.36 million tonnes in December, led by higher demand from country's fuel-hungry power plants, which have been battling fuel scarcity for a long time now. Indian power companies had imported 163 million tonnes steam coal out of the country's total coal imports of 210.55 million tonnes in 2014, accounting for more than 77% of imports. However, the fall in imports of January was mainly due to lower demand from the country's steel producers.

That man is the richest whose pleasures are the cheapest.

Collectively, they imported 2.4 million tonnes coking coal during the month compared to 3.2 million tonnes in December. Imports of metallurgical coke, which is also used by the steel firms, were down to 98,770 tonne from 1.76 lakh tonne. Petroleum coke imports also decreased to 4.78 lakh tonne from 6.9 lakh tonne in December, 2014. Mjunction said that there was no pulverized coal (PCI) imports in January as per the provisional compilation, as against 2.9 lakh tonne in the previous month. Anthracite coal imports on the other hand rose to 52,293 tonne in January from 33,190 tonne in December 2014. It said that India's imported coal stocks, including steam coal and coking coal at eight major and two private ports edged up 2.27% to 8.207 million tonnes in January-end against 8.025 million tonnes as on December 26th. According to the data, non-coking coal stocks at Kolkata, Paradip, Vizag and Mundra, as on January 23rd, fell by 17% to 3.1 million tonnes from 3.8 million tonnes as on December 26. Coking coal stocks increased sharply to 3.2 million tonnes against 1.9 million tonnes.

Source: Steel Guru

Union Steel & Mines Minister Shri Narendra Singh Tomar leads a delegation to Mining Indaba-2015 in South Africa

Shri Narendra Singh Tomar, the Union Minister for Mines and Steel is leading Indian delegation of mining fraternity to MINING INDABA 2015 at Cape Town, South Africa. Shri Rajinder Shukla, the Minister for Mineral Resources, Energy and Public Affairs, Government of Madhya Pradesh is also accompanying the delegation. Mining Indaba is an annual global event on mining in South Africa with 10,000 delegates participating from across the globe. Eighteen mining Ministers from countries like South Africa, Namibia, Ghana, Angola, Sudan, Nigeria, Gabon, Eritrea, Kenya, Mali and others are participating into the 2015 edition. The marquee highlight is the presence of Mr. Tony Blair, Former Prime Minister of Britain. The key objective of the Indian delegation was to highlight the recent amendments in the Indian mining regulations and project investment opportunities for foreign companies in Indian mineral sector. The agenda is to bring latest global technology in Indian mining sector. This would facilitate exploration, leading to unlocking of the huge mineral wealth in the country. India looks at African Continent as an opportunity for acquiring mineral assets. This would ensure continuous supply of minerals from abroad to supplement the domestic production; feeding the industries in their Make in India initiative.

On his first day of the visit, Shri Tomar along with other member of delegation met Professor Michael Katz, Chairman of M/s ENSafrica and Mr. Robert Appelbaum, Partner & Head South Asia of M/s Webber Wentzel; the two biggest law consultancy firms in the South Africa. He also met Mr. Tom Albanese, Chief Executive Officer, Vedanta Resources Plc (Black Mountain Group), and senior officials of Chamber of Mines of South Africa; the largest chamber for mining in African region.

The Minister highlighted upon the recent amendments made to the mining laws and regulations in India. He informed that these amendments would help in bringing in transparency in allocation of minerals through auction route. He also stated that to eliminate the delays in getting approvals and clearances there has been devolution of further powers to provincial governments. The

processes have been made simpler. In order to provide stability, the tenure of the lease has been extended to 50 years from the current lease life of 30 years.

He informed that further powers have been vested with the state governments with 31 additional minerals being completely delegated to the provincial governments, thus enhancing the list of such minerals to 54. He also informed the participants that a National Mineral Exploration Trust has been set up to enhance mineral exploration in the country. He also stated that the District Mineral Fund has been created for the benefit of the society affected by the mineral operations. He briefed that such initiatives would help in the long-term sustainable mining ensuring inclusive growth of the society. He urged the companies like Vedanta to carry on their good work and help create the brand India across the globe.

The participants welcomed the initiatives of the government to reform the Indian mining sector, they appreciated that recent amendments to the mining regulations will help in furthering the investment and growth of the Indian mining sector. They also appreciated the fact that India is the first nation in the world to grant minerals completely through the auction route.

The Minister asked the participants to explore opportunities around :

a) Exchange Visits and Participation in Mining conference / workshops organized by each other

b) Exchange of information and publication on mining laws, regulation, technology and management

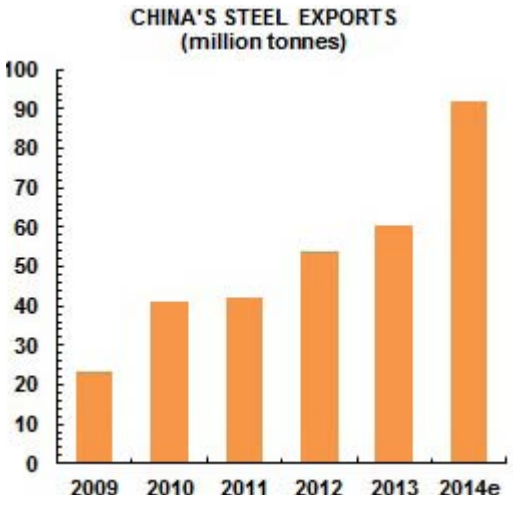
c) Promote and encourage joint ventures and cooperation between member units

d) Cooperation in skill development, upgradation of technology and managerial competence

Besides the Ministers; Shri Naresh Kumar, Joint Secretary, Ministry of Mines, Government of India Shri Sheo Shekhar Shukla, Secretary, Mineral Resources, Government of Madhya Pradesh, Shri Narendra Kothari, Chairman, National Mineral Development Corporation, Shri Nikunj Srivastava Private Secretary to the Minister and major industry associations like CII, FICCI and FIMI participated into the deliberations and discussions.

Source: Business Standard

China's Steel Exports to stay strong this year after record tonnage in 2014 –MEPS



Customs data shows total Chinese exports of steel products, last year, rea ched an "all-time" high figure of almost 94 million tonnes. This equates to a year-on-year increase of more than 50 percent. To put the latest figures into context, Chinese steel exports in 2014 were equivalent to 90 percent of the total output from the world's second largest producing nation – Japan, over the same period. The removal of tax rebates on boron-added steel exports is likely to result in a slight reduction in supply in 2015. This is because substitute alloying elements for boron are more costly – thus making the resultant alloy steel marginally more expensive in the market. However, Chinese mills have built up a solid customer base around the world through their ability to offer competitively priced steel products. They will be difficult to dislodge from their dominant position in global steel trade. Moreover, the latest steel export price reductions will help their cause. Product quality from the Chinese mills has improved significantly in recent years and is fit for purpose for a wide range of applications in the engineering and construction industries.

Source: www.wolrdsteel.com

Can PSUs handle prospecting?

There is doubt on the reality behind the government deciding to notify public sector units (PSUs) for prospecting work, to strengthen the mineral inventory database. Many experts feel these PSUs aren't technologically equipped - in the absence of geologists, geophysicists, drilling machines, etc, for wide-scale exploration. And, so, might have to subcontract to companies in global mining, equipment, technology and services (METS). Prospecting is a ground-level detailed exploration which is taken up only after you have first identified the area of mineralisation (known as reconnaissance). "Each PSU is short of the needed equipment. These companies do not have the capacity to do exploration," said a former senior mines ministry official.

> We judge ourselves by our capability, others judge us by our achievements.

Union mines and steel minister Narendra Singh Tomar announced recently on the PSU notification decision. From data shared by the ministry of mines, of a total land area of 3.28 million sq. km, only 570,000 sq km has obvious geological potential (OGP). As of 2012, according to the Ministry, only 5,046 sq km was under mineral lease, less than one per cent of the OGP. The prospecting work has been an insignificant part of the total area of the known mineral prospects and deposits. Another issue PSUs are likely to face is finances. Most mineral-rich countries prefer to outsource this job to METS companies, which get their capital from venture capital or hedge funds. For, this is a high risk and high reward business. "It takes years of drilling holes - one by one - to do prospecting. Till then (the data is found) everything is on hold. Which PSU can afford such immense costs?" asked the former official.

According to Anjani Agrawal, leader (metals and mining), EY India, for open cast mining, the prospecting costs are Rs 2,700-2,900 a sq metre in the case of coal or iron ore. Plus Rs 700 for logging and sampling charges, depending on the topography. "This is valid up to a depth of 100 metres only. For underground mining, it will be dependent on the depth of the deposits. For other minerals, it will be still higher," he added. "No mineral-rich country has developed its mining industry solely on the basis of government exploration. The government in these countries creates favourable conditions for the private sector to explore," said the Federation of Indian Mineral Industries earlier, on the mining ordinance. Kameswara Rao, leader (energy, utilities and mining) at PricewaterhouseCoopers agreed that the government companies will not have such reconnaissance and prospecting capabilities.

"PSUs will instead nominate specialist private METS companies. These companies are far better placed to generate the information and enhance the mineral data repository," he said. An

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- **What is prospecting?** It is a ground-level detailed exploration, taken up only after you have first identified the area of mineralisation (known as reconnaissance)
- Experts feel **PSUs aren't technologically equipped** – in the absence of geologists, geophysicists, drilling machines, etc, for wide-scale exploration
- They might have to subcontract to companies in global mining, equipment, technology and services (METS)
- From data shared by the ministry of mines, of a total land area of 3.28 million sq km, only 570,000 sq km has obvious geological potential
- As of 2012, according to the ministry, only 5,046 sq km was under mineral lease, less than one per cent of the OGP
- The prospecting work has been an insignificant part of the total area of the known mineral prospects and deposits
- Another issue PSUs are likely to face is **finances**
- Most mineral-rich countries prefer to outsource this job to METS companies, which get their capital from venture capital or hedge funds

expert, familiar with the working of PSUs, said successful exploration is always done on three axes - geological, economical, feasibility. PSUs are doing exploration only for geological data. "A mining company does not want to bid on (the basis of only) such data," he said.

Source: Business Standard

Disappointing end to mining activity in 2014

Continuing a yearlong trend, 2014 ended largely on a disappointing note for the exploration sector. The one bright spot was an increase in total financings by junior and intermediate companies over November, as they cashed up for the approaching exploration season.

As detailed in the just-published "Monthly Industry Monitor", the final month of 2014 mostly added to the gloomy market conditions that prevailed throughout the year for the international mining industry. December is a period that inevitably sees lower levels of exploration and resource announcements, and November was every bit as disappointing as expected.

At the end of 2014, the mining industry had a combined market capitalization of under US$ 1,300 billion, compared with over US$ 1,343 billion at the end of November and more than US $ 2,000 billion back in February 2012.

Reflecting the poor market conditions, SNL Metals & Mining's Pipeline Activity Index (PAI) declined for the third consecutive month in December, although only one of the four constituents of the PAI showed a month-on-month fall: there were drill announcements from only 111 projects, compared with 142 in November.

Although SNL Metals & Mining's indexed metals price improved slightly in December, ending a four-month decline, the net positive value of the industry's project milestone in 2014 was only US$ 501 billion, compared with US$ 645 billion in 2013. On an annual basis, the mining industry has just suffered its fourth consecutive year of declining net milestone values.

The other two PAI constituents – initial resource announcements and compared financings – both improved in December, but not enough to offset the seasonal slump in drilling.

Junior and intermediate companies' fundraising more than doubled from November to US$ 334.8 million in 49 financings, as some explorers cashed up for the coming season. Despite the month-on-month increase, December's total fell short of the US$ 463 million raised in December 2013, and was the lowest December total since before SNL began tracking financings in 2008. The 2014 total of US$ 5.55 billion in 329 financings was moderately short of the US$ 5.92 billion in 399 financings in 2013.

There were four initial resources announcements in December, with a total in-situ value of US$ 11.79 billion – mostly from NGEx Resources' Filo del Sol project in Argentina. The year ended with a total of 50 new resources valued at US$ 130.6 billion, compared with 68 in 2013 valued at US$ 87.1 billion.

Source: MMR

Iron Ore continues to play spoilsport for the Indian steel industry: ICRA

ICRA expects the domestic steel players producing steel through the blast furnace route to benefit from the continuing weakness in international coking coal prices, a trend which has already been observed in the financial results posted by a number of companies in the first quarter of 2014-15 (Q1FY15). Mr. Jayanta Roy, Senior Vice-President and Co-Head, Corporate Sector Ratings, ICRA stated "Coking coal prices have declined by around 16% in the first quarter of 2014-15 (Q1FY15) over the previous quarter, and the same contract prices have been rolled over in Q2FY15. This followed a 13% decline in coking coal prices over the whole of FY14". With

the exchange rate remaining largely stable in FY15 till date, the price decline has provided a relief to the blast furnace operators in the country, which import coking coal for producing steel.

Domestic iron ore production however continues to suffer in spite of the lifting of bans from mines in Karnataka and Goa. The continuing short supply situation in the country has been further aggravated by the recent closure of iron ore mines in Odisha, although temporarily. While some of the mines, which were initially under the purview of this ban, have been allowed to commence operation subsequently, production is yet to resume at the other merchant mines (which had accounted for around 15-20 million MT of iron ore production in FY14) in the state. Therefore, ICRA expects the domestic iron ore to remain in short supply for the steelmakers without captive sources of ore at least in the near term, which may affect their capacity utilisations. Even though international prices have seen a sharp decline in recent months driven by a weakening of demand from China, and prospects of higher supply following capacity expansions by large global mining companies, the domestic iron ore prices remained at an elevated level due to the shortage. "An upward revision of royalty rates on minerals, as announced by the Government, and higher railway freight rates would further impact the cost structure of steel players", states Mr. Roy.

On the demand front, ICRA expects the domestic steel demand to recover gradually from H2FY15 on the back of a somewhat better performance of the Indian economy. Although domestic steel consumption growth declined in the fourth consecutive year to 0.6% in FY14 from 3.3% in FY13 and has remained at nominal level during the current year as well, ICRA believes that the apparent bottoming out of the growth rates of some of the demand drivers including automobiles, and the new Government's focus on infrastructure and construction sectors as highlighted in the budget point to a likely pickup in steel demand going forward. However, significant project off-takes remain uncertain in the immediate term.

Reduced coal costs, coupled with end product prices hikes in the fourth quarter of FY14 enabled the consolidated operating margin of the industry (a collection of 7 large Indian companies in the steel sector, together accounting for over 40% of the domestic capacity) witness a sequential improvement from 20.5% in Q3FY14 to 21% in Q4FY14 and even further to 21.9% in Q1FY15, despite an increase in other costs like freight. While most of these large players are well capitalised on a standalone basis, reduced asset turnover and increased working capital intensity of operation kept the overall business returns on a declining trend in FY14 as reflected by a return on capital employed (RoCE) of 11.2% in FY14 as against 13.3% in FY13. The prevailing high interest rates have impacted coverage ratios, with interest coverage declining to 3.4 times in Q1FY15 from 3.81 times in FY14 (and 4.52 time in FY13).

Stable international prices and exchange rates in the current year and weak domestic demand conditions forced Indian steel players to partially roll back price hikes announced in Q4FY14. However, rising costs have made a number of players to announce price hikes again in coming months. ICRA believes that near term margin outlook for the steel industry would depend on the sustainability of such hikes. However, for a sustained recovery of RoCE levels, domestic demand conditions have to improve meaningfully.

Source: MMR

India steel consumption lags the global average by 4 times

Business Line reported that from 110 million tonne to 300 million tonnes by 2025, reads the Steel Ministry's vision document. At 60 kg per capita, the country's steel consumption lags the global average by over four times, however, even at today's subdued volumes it contributes nearly 4% to the nation's industrial output. Despite the uninspiring history and the huge capital investments involved, the 300 million tonne target may not be over-ambitious, if the government is able to back its talk with appropriate action. Topping the industry's wishlist is a 25% safeguard duty on the

imports of all semi and fully finished steel products, liberalising capital flows to new steel projects, extending benefits currently enjoyed by the infrastructure sector and preferential allocation of natural minerals for meeting its captive production needs. Integrated steel projects are clearly of national importance, it is time for policy makers to acknowledge this and fast track approvals. Any delay in

responding to the threat of imports from China and Russia may derail India's plans of spurring the growth of the domestic manufacturing sector and may even turn the industry sick. In recent years, the industry has built up a huge excess capacity for manufacturing pellet and should, therefore, be allowed to export it freely, unhindered by duties or punitive rail freights. This will give the industry a much-needed boost. Also, the government must aim to soften rail freight rates given that Indian businesses already fork out far more on logistics as a percentage of their turnover compared to their peers in China or in any developed economy. Similarly, the global slowdown in demand has forced many transnational steel majors to push into India for sales creating a glut that has seen the price crash by 20% in the last two months. The resultant crisis has placed even India's large steel makers under stress and led to the closure of several medium and small units. Sure, steps like the recent amendments to the MMRDA Act have kindled a sense of relief among steel makers with regard to raw material security. But much more needs to be done. Otherwise, the 2025 vision will be just a dream.

Source: Steel Guru

Swiss gold exports to India cross Rs 1.2 Lakh crore

Switzerland's gold exports to India crossed Rs 1.2 lakh crore in 2014 even as concerns persist over bullion being used to channel illicit funds into the Indian shores.

The value of precious metal imported from Switzerland touched 17.1 billion Swiss francs (over Rs 1.2 lakh crore) during the 11-month period from January till November end in 2014, according to Swiss government. Last November alone saw import of bullion worth over 2.9 billion Swiss francs (around Rs 20,000 crore) from Switzerland. In the preceding month too, gold exports from the Alpine nation remained at similar levels, latest data from the Swiss Customs Administration showed.

More than 457 kilograms of gold was exported from the Alpine nation to India during January-November 2014 period. At the end of November 2014, India remained the biggest destination for gold exports from Switzerland. According to latest figures from the Indian government, gold imports surged over six-fold to $ 5.6 billion (over Rs 35,000 crore) in November.

Source: The Times of India

31 Major minerals to be renotified as minor ones

The government has decided to notify 31 major minerals as minor ones, Mines Minister Narendra Singh Tomar said recently.

"This is being done to devolve more power to the states and, consequently, expedite the process of mineral development in the country," Tomar said, speaking on the sidelines of the 54th meeting of the Central Geological Programming Board (CGPB).

State governments are allowed to make rules to regulate the grant of quarry leases, mining leases or other mineral concessions in respect of minor minerals. "These 31 minerals account for 55 percent of the total number of leases and nearly 60 percent of the total leased area," stated the ministry.

The minister said to strengthen the mineral inventory database, the government was planning to notify public sector undertakings for prospecting.

According to the recently promulgated Mines and Minerals (Development and Regulation) Amendment Ordinance, the government can grant non-exclusive reconnaissance permits for any mineral.

Reacting to Goa miners' demand to reduce the export duty, the minister said the coastal state's case was different from that of other states and there should be a distinct policy for Goa.

"We have made a presentation to the finance ministry regarding this," he added.

Earlier, there were 24 listed minor minerals such as building stones, gravel, ordinary clay, ordinary sand, and limestone used for lime burning and boulders, among others. The total number of minor minerals will now become 55.

The 31 minerals to be added to the list include agate, ball clay, barytes, calcareous sand, calcite, chalk, China clay, clay (others), corundum, diaspore, dolomite, dunite/pyroxenite, felsite, feldspar, fireclay, fuschite quartzite, gypsum, jasper, mica, quartz, sand (others) and shale.

Source: Business Standard

Tin smelters agree to cut shipments

Nineteen tin smelters in Indonesia agreed to limit monthly exports rather than stop them completely in order to push up prices to $ 19,500 a tonne. Producers will review sales volumes every month depending on market demand, Jab in Sufianto, Chairman, Association of Indonesian Tin Exporters, said. Tin is the worst performer on the London Metal Exchange over the past 12 months as stockpiles climbed and Indonesian suppliers faced increased competition from other countries.

Source: Hindu Business Line

New base year propels 2014-15 Indian GDP estimate to 7.4%

India's Central Statistics Office, which had revised its base year to 2011-12 and released revised annual estimate of National Income and other macroeconomic aggregates on 30th January 2015, has released advance estimates of National Income for the financial year 2014-15, at constant (2011-12) and current prices. According to the advance estimates for GDP calculation based on the new methodology, signifying an improvement in the macro indicators, the economy is projected to grow at a much faster rate of 7.4% in the current fiscal as against 6.9% in 2013-14

Growth Rates of GDP	Constant prices	Current prices
Annual 2014-15 (Advance)	7.4	11.5
Q12014-15 (April-June)	6.5	12.8
Q2 2014-15 (July-Sep)	8.2	12.8
Q3 2014-15 (Oct-Dec)	7.5	9.0
		Constant Prices - 2011-12

Source: Steel Guru

Is the future in Korean Steel?

There's a new material in development, with great potential for making bike frames. It's lighter, and easier to work with than titanium. It's as strong as steel. It may eventually be as cheap as steel. Because it's (wait for it)… steel. 'But how is this possible?' I hear you cry. Never fear! I shall tell you. In the dim and distant past, aluminium was mixed with steel in an attempt to impart some of

You cannot strengthen the weak by weakening the strong.

the former's properties – namely lower densities. This always resulted in brittleness, or issues with ductility. Now, researchers from the Pohang University of Science and Technology have finally mastered the technique. They've added (in varying proportions) aluminium, nickel, chrome, manganese, and carbon to iron, and liberally festooned "nanometer-sized B2 intermetallic compounds" about the place, using nickel in the admixture, which apparently increases the ductility and makes for some metallic awesome sauce. The researchers are teaming up with the magnificently named POSCO (which was once the much more boringly named Pohang Iron and Steel Company) to have a go at forging the new wonder-stuff later this year. Clearly at present it'll cost rather a lot, but potentially with mass production, it's assumed that prices will come down massively, and potential applications will go up – including bike frames. The main issue with current alloys of aluminium and titanium is one of cost. Ti is very abundant, but extremely hard to extract, and requires lots of unfeasibly unpleasant chemicals to do so – so don't go thinking that Ti is particularly eco-friendly. Aluminium is extracted from ore using electrolysis, which is preposterously energy inefficient. This new steel will be potentially much easier to extract, easier to machine, weld and generally make things out of, and easier to recycle.

Source: www.metaljunction.com

Challenges in efficient waste mgmt poses an opportunity for MSMEs

Mumbai's population of two crore produces 500 gms of waste per capita, with such volumes of waste to be managed, caterings to its management has proved to be a failure posing both challenges and opportunities. Waste management is being mismanaged by the informal sector and to put it in order requires the involvement of the formal sector. It is thriving opportunity for the MSME sector to explore waste management", said Mr. U P S Madan, Metropolitan Commissioner, MMRDA in his opening remarks at the Regional Dialogue, Mumbai, third in the row of dialogues, leading to the 15th Delhi Sustainable Development Summit (DSDS 2015). The DSDS has been organizing Regional Dialogues at various cities change, waste management, etc. The topics identified for Regional Dialogue: Mumbai waste management and sustainable transportation which are pertinent for the city's overall economic development and growth. The Dialogue was jointly organised by MVIRDC World Trade Centre Mumbai, All India Association of Industries, World Sustainable Development Forum, TERI, Agence Francaise of Development and United Nations Development Programme. Mumbai has made pioneering efforts in the area of waste management making it stand out on the world map. However, much remains to be done with growing urban areas, Madan added.

While broadly outlining the issues facing waste management, Mr. G. S. Gill, Distinguished Advisor, TERI and Ex. MD and VC, CIDCO said that policy issues posed a major hindrance. Public policy was not clear, guidelines made in 2000 were not revised since then, and new emerging technologies. India was blindly following the practice adopted by the west failing to realize that the waste produced in India was different from theirs. Rural areas produce far less waste as compared to the urban areas. While the waste in the west was more to do with plastics and was recyclable Indian waste is more organic. It is important to segregate waste prior to disposal. One has to use technology best suited to the waste being produced. Dump grounds were fast filling and the question which lingered is how much land is needed for recycling. In an urban set up there is shortage of land, technology is expensive. The other challenge is how to make people to live near a dumping ground. Lastly, financing poses a major challenge. The question arises whether the waste management projects can be made viable through a PPP mode if other expensive forms of financing it are not feasible.

According to Mr. R B Gupte, Director, MSME Development Institute – the waste management sector was a fast growing one. E-waste needed much focus. It is generated in every household with the increase of technological gadgets. So, it is important to either reuse or dispose it. Although,

some amount of legislations has been passed in this area much still needs to be addressed. Issues that need to be addressed are hazardous chemicals that are released which need to be neutralized, skill mapping and development. There is a growing educated unemployed youth that can be engaged in this sector, which will also bring about income generation.

Mr. Suneel Pandey, Associate Director, Green Growth and Resource Efficiency, TERI spoke on the difference in treating waste here in India and abroad. The initiative in tacking the issue lies in decentralization. At the household level, there is a sense of apathy among people to segregate the waste. One needs to segregate prior to handing over waste. Value-addition is important while converting waste into usable and fuel efficient products. Treatment of waste poses a challenge. Skilled manpower is required, which could mean introduction of a curriculum in the education system.

Mr. Shantanu Roy, Senior Vice-president, Environmental Management Centre while elaborating on the initiatives taken so far said that they were sporadic and not on a sustained basis. Waste categorization was important based on the consumption levels. Urban local bodies need to take informed decisions on how to tackle waste management. India has six climatic zones which play an important role on the waste being produced. Technologies, structured approach, linkages between universities are some of possible solutions in addressing the issue. Also, waste was being generated form packaging of products. A possible way to address would be to either penalize or incentivize depending on who is the polluter and who is the controller. Procurement policy needs to be strategized. It was important to understand the quantum of waste, use suitable technology in managing it and propose a business case for it, Mr. Roy added.

Dr. Amiya Kumar Sahu, President & Founder, National Solid Waste Association of India addressed the basic issue of what comprises garbage and its value. Waste management is everybody's responsibility. Awareness of waste, segregation of it needs to be followed by everyone. It is essential to keep one's country clean to stay at par with developed countries. A creation of a Smart City is only possible if waste management is adhered to.

The second session deliberated on Sustainable and Smart Urban Transport for Mumbai – The Way Ahead. Addressing the growing transportation needs of the city Mr. U P S Madan, Metropolitan Commissioner, MMRDA said that the Government is working towards designing a transportation system that ensures sustainable and smart mobility. The MMRDA has proposed 450 kms of metro rail corridor besides 8.9 kms of mono rail corridor. The projects aspire to offer an efficient, convenient and environment friendly transportation system. A major network these corridors in the next 8 to 10 years shall benefit the city.

Given the changing income levels of the citizens, nearly 75% of the population relies on public transportation as against 80% population dependence earlier. Trains are a cheap, environment friendly and fast mode of transportation. The inhabitants of the city must be encouraged to use this mode of transportation by enabling better quality of services, Mr. Madan added.

Earlier introducing the session on 'Sustainable and Smart Urban Transport for Mumbai – The Way Ahead' Mr. Prakash, Distinguished Fellow, TERI, Former Member (Traffic), Indian Railway Board & Former Secretary to Government of India, said the term sustainable transport describes modes of transport planning which allows access to development needs of individuals, companies and societies in a consistent manner. The system needs to be affordable, operate fairly and efficiently and offer choice of transportation mode. The system needs to limit emissions and waste within the planet's ability to absorb them.

The public transportation system in Mumbai is heavily dependent on railways besides the bus provision and the much awaited metro and mono rail. However, the city needs to cater to the growing needs of the inhabitants by addressing issues as congestion, safety concerns discipline, etc.

Mr. Abhay Mishra, CEO, Mumbai Metro One Pvt Ltd said that an efficient public transit system should save time, be financially economical and environment friendly. The much awaited Metro Rail project intends to positively impact lives of the Mumbai citizens by meeting these criteria's. However, the Government has to adopt a transit oriented planning by redesigning roads considering walking aspects, stricter parking norms, eliminating road side hawkers and unauthorized constructions. Lastly, the long term Metro Rail project needs to be supported with intermediate plans for expansion of suburban railways, buses, etc.

Mr. Rakesh Saksena, Former Chairman, Mumbai Railways Vikas Corporation Ltd said that the city with a population of 22 million poses mobility challenge. Over 53% of the population relies on the railways for modal transportation. It is densely occupied with nearly 7.6 million commuters daily. The city has to focus on continuous capacity creation to meet the demand-supply gap. A comprehensive roll out of metro rail, mono rail and suburban trains is required. For the same political and bureaucratic ownership of the projects and sustained Government funding is the need of the hour.

Mr. Anirban Ghosh, Vice President, Sustainability, CSR and Ethics, Mahindra & Mahindra Ltd (Auto Farm Sector) said that sustainable mobility is the growing need of the city. It can be met with rapid capacity addition. In order to fund the same, CSR activities of the corporates must divert funds towards sustainable transportation.

Earlier in his welcome remarks, Capt. Somesh Batra, Vice-Chairman, MVIRDC World Trade Centre said that today's meeting is a precursor to the Delhi Sustainable Development Summit 2015. The summit will be examining topical environment and sustainable development issues which are a major cause of concern in India and world over. The discussions and debates during the Regional Dialogue in Mumbai will identify the challenges in efficient waste management for the city and sustainable and smart urban transport for Mumbai.

Dr. Annapurna Vancheswaran, Director, Sustainable Development Outreach. The Energy and Resources Institute (TERI) said Delhi Sustainable Development Summit over the years has become the foremost platform on sustainable development and we are truly delighted that the Summit each year sees the convergence of developed and developing countries; sharing and learning from their experiences to make the planet safer and more livable for all. The 15th edition of the Summit will be truly inclusive as it will have sub-national representation through the Regional Dialogues held in Bangalore, Chennai and Mumbai.

TERI organized a Regional Dialogue titled, 'Sustainable Urban Transport and Solid Waste Management in Mumbai. The Dialogue was organized in the run up to TERI's annual flagship event, the Delhi Sustainable Development Summit (DSDS), which was held in New Delhi from February 5 to 7. A series of Regional Dialogues were organized in the run-up to the Summit, which come in the wake of the new Government's two major announcements – 100 Smart Cities for India and Swachh Bharat Abhiyan. The first Dialogue was held in Bengaluru, which mapped smart city concepts and practices to reduce carbon footprint to ensure sustainable habitats, while the Chennai Dialogue deliberated on access to basic facilities, including clean drinking water and sanitation.

At the third and the last Dialogue in Mumbai, experts deliberated ways to tackle the ever – increasing traffic related problems in the city and also how the waste management can be streamlined.

Source: MMR

Only Hungry Minds Can Grow

Have you ever noticed how many people you know who are literally at the same place today as they were five year ago? They still have the same dreams, the same problems, the same alibis, the same opportunities. They are standing still in life.

It's as if people unplug their clocks at a certain point in time and stay at that fixed moment the rest of their lives. You are destined to grow, learn and improve. The biggest room in our lives is always the room for self-improvement.

A famous saying reads: "It's what you learn after you know it all that counts." I must admit that I am somewhat of a fanatic about this. I hate to have idle time-time in which I am not learning anything. Those around me know that I must always have something to read or write during any idle moment that might arise.

I try to learn from everyone. From one I may learn what not to do, while from another, I learn what to do. Learn from the mistakes of others. You can never live long enough to make all the mistakes yourself. You can learn more from a wise man when he is wrong than a fool who is right.

No life ever grows great, until it is focussed, dedicated & disciplined. "You will never change your actions until you change your mind." An important way to keep growing is to never stop asking questions. Life's most important answers can be found in asking the right questions.

The person who is afraid of asking is ashamed of learning. Only hungry minds can grow. It's true what one said, "Today a reader. Tomorrow a leader."

We should learn as if we will live forever and live as if we are going to die tomorrow. "Anyone who stops learning is old, whether this happens at 20 or 80. Anyone who keeps on learning not only remains young, but becomes consistently more valuable regardless of physical capacity." It's fun to keep learning. Learning brings life to your life. **"Once a bird asked a bee, after a continuous hard work you prepare honey but man steals it from you. You don't feel bad. The bee replied – Never, because a man can steal my honey, but he can never steal the art of making honey from me"**.

Learn from others. Learn to see in the challenges of others, the ills you should avoid. Experience is a present possession that keeps us from repeating the past in the future. Life teaches us by giving us new problems. Think education is expensive or difficult? Listen to Derek Bok: "If you think education is expensive-try ignorance.

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

Compiled by Shri K L Mehrotra
Vice Chairman – IIM-DC & Former, CMD – MOIL