

**S C Suri**  
Chairman, Delhi Chapter

**K L Mehrotra**  
Head, Technical & Publication Cell

## THE INDIAN INSTITUTE OF METALS DELHI CHAPTER

# NEWS LETTER

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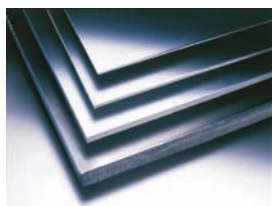


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**The Indian Institute of Metals – Delhi Chapter**  
Jawahar Dhatu Bhawan, 39, Tughlakabad Institutional Area  
M B Road, Near Batra Hospital, New Delhi-110 062  
Tel: 011-29956738, Telefax: 011-29955084  
E-mail: iim.delhi@gmail.com; Website: iim-delhi.com



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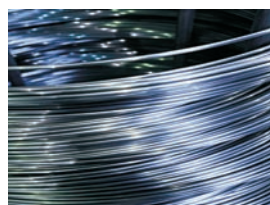
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#### Global service with a local touch from the house of invention & innovation: Outokumpu

We are the global leader in the advanced material business, with our combined heritage going back over 100 years to the very invention of stainless steel.

We are in a unique position to work closely with our customers and partners around the world, to create materials for the tools of modern life.

We believe in delivering best in product quality and technical expertise while becoming even better at customer orientation, speed and reliability.

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Outokumpu India Private Limited  
609- 612, Hemkunt Tower, Nehru Place. New Delhi – 110019  
Tel: 91 11 4651 8440, Fax: 91 11 46518439  
Email: Yatinder.suri@outokumpu.com , www.outokumpu.com



## INTRODUCTION

This Newsletter contains the following:

- 1 Chairman's Message
- 2 Presentation by Shri Lokesh Chandra, Joint Secretary, Ministry of Steel, on "Indian Steel Sector – Opportunities for South African Manganese Industry"
- 3 Jharia Rehab plan to access coking coal
- 4 Fresh view on Mining Bill by Government
- 5 Many national and international news items in ferrous and non-ferrous sector

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## CHAIRMAN'S MESSAGE



I am grateful to the Executive Council of Delhi Chapter of Indian Institute of Metals for reposing faith once again and giving me the responsibility of the Chairmanship of Delhi Chapter. I convey my sincere thanks to all the esteemed members of the Delhi Chapter for reposing trust in me to discharge the responsibilities for one more year.

The Chapter has been very active in the past few years in organizing many technical events and lectures delivered by nationally and internationally reputed personalities. The Chapter has organized events of holding an International Exhibition and Conference with well-known Exhibition Organizing Firms. Nine such events have been organized so far. The tenth event is scheduled from 4-7 September 2014 at Pragati Maidan, New Delhi. This is a landmark event of Delhi Chapter for which IIM Delhi Chapter can justifiably be proud of.

Delhi Chapter is privileged to have excellent infrastructural facilities. We have an excellent Lecture Hall and Board Room. These facilities must be made use of by our members for organising technical programmes. Besides this, we have a good library. These facilities have to be extensively used.

It is my earnest belief that Delhi Chapter has still not reached its full potential of technical excellence. I would request each member of the Executive Council to initiate one technical activity in 2014-15 so that this Chapter is able to further enhance its professional and technical potential.

I look forward to support and contribution of members of the Chapter to undertake the professional activities further. I have no doubt that with the cooperation of my members, the Chapter will attain new heights.

S C SURI  
CHAIRMAN



**Shri Lokesh Chandra, Joint Secretary, Ministry of Steel, gave a presentation on “Indian Steel Sector – Opportunities for South African Manganese Industry” in the 4<sup>th</sup> Annual Conference, International Manganese Institute, Capetown, South Africa held from 28<sup>th</sup> to 30<sup>th</sup> May 2014. The highlights of the presentation are hereby reproduced for information of the readers.**

#### Indian Steel Sector

- The Indian Steel Sector has been witnessing growth in the past few years.
- India is 4<sup>th</sup> largest producer of steel in the world.
- India is the world's largest producer of Sponge Iron.
- The steel intensive industries such as infrastructure development, construction, automobiles, etc. is poised to grow rapidly.
- These industries have demonstrated huge growth potential for steel in the domestic market.

#### Global Ranking of Indian Steel

(In Million Tonnes)

World Crude Steel Production in 2013			
Rank	Country	Production	% Change Y-o-Y
1	China	779.04	8.722
2	Japan	110.57	3.113
3	United States	86.96	-1.962
4	India	81.21	4.709
5	Russia	69.40	-1.454

World crude steel production in 2013 is 1582 million tonnes up by 2.39% when compared to production of 1545 million tonnes in 2012.

#### Share of Indian Crude Steel Production

(In Million Tonnes)

Year	Public Sector	Private Sector	Total	Share of Private Sector (%)
2008-09	16.37	42.07	58.44	72%
2009-10	16.71	49.13	65.84	75%
2010-11	16.99	53.68	70.67	76%
2011-12	16.48	57.31	73.79	78%
2012-13	16.36	61.53	77.89	79%
2013-14	16.78	64.76	81.54	79.5%

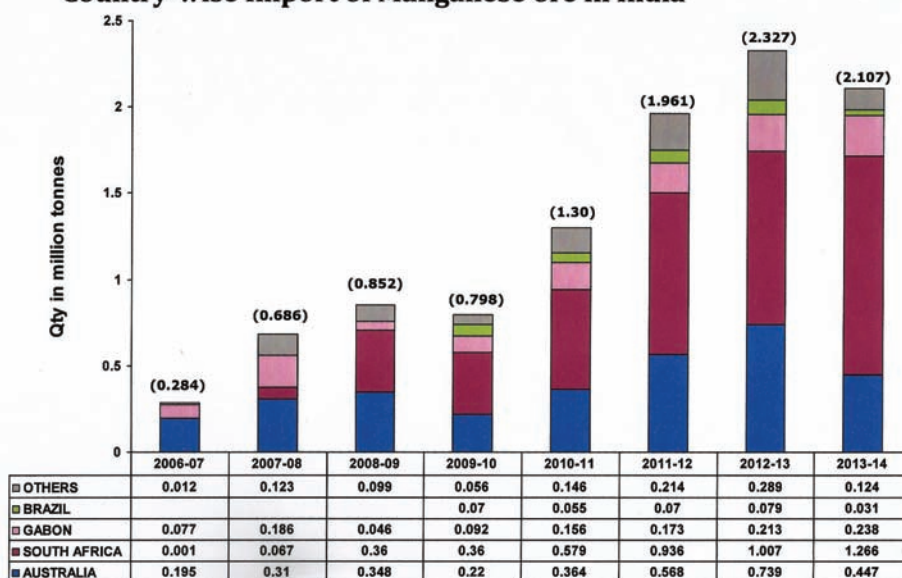
#### Projected Steel Production Envisaged by 2016-17

(In million tonnes)

Public Sector Projects	
Steel Authority of India Limited	20.75
Rashtriya Ispat Nigam Ltd. (Vizag Steel)	7.00
NMDC Ltd.	3.00
<b>Total Public Sector</b>	<b>30.75</b>
Private Sector Projects	
TATA	18.00
Jindal Steel Works (JSW) & Jindal Steel Plant Ltd. (JSPL)	23.20
Essar Steel	11.75
Bhushan Steel	6.45
Total Private Sector	59.40
Others	58.85
<b>Total</b>	<b>149.00</b>
Source: Report of the Working Group on Steel Industry for the 12 <sup>th</sup> Five year Plan (2012-2017)	



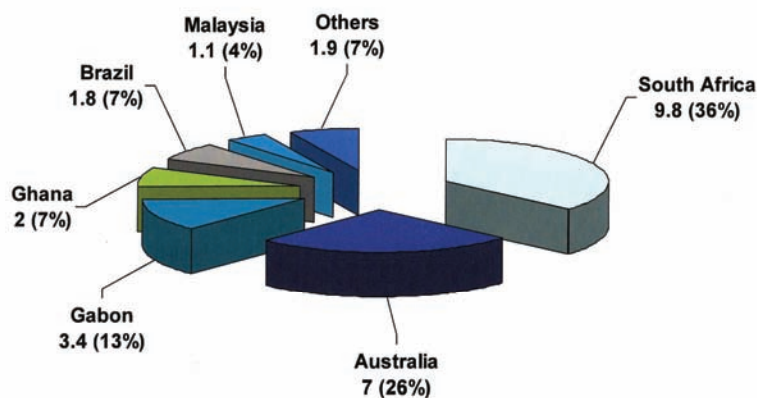
### Country-wise Import of Manganese ore in India



For 2013-14 the figure are extrapolated from actual of April 2013 to Dec. 2013

Source : DGFT

### EXPORTS OF MANGANESE ORE YEAR 2013



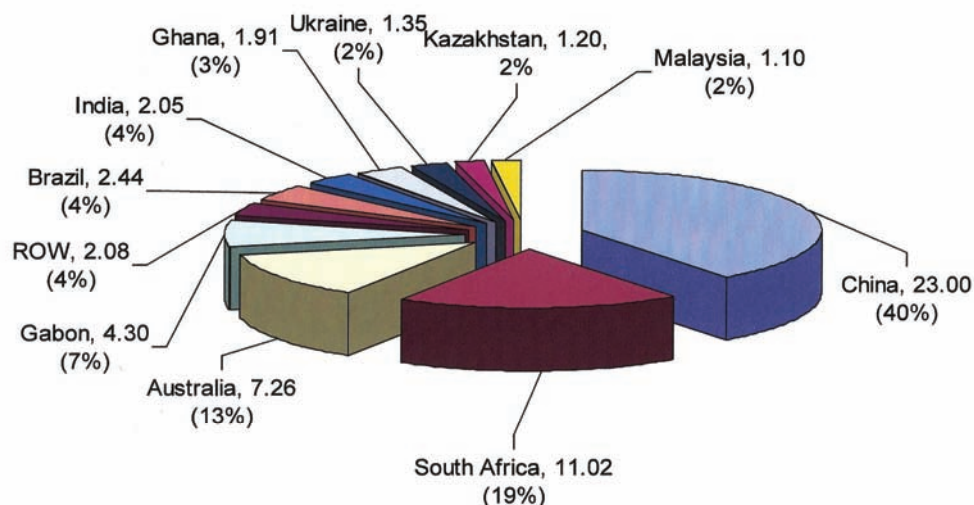
TOTAL EXPORTS WORLDWIDE : 27 MILLION TONNES APPROX.

### Country-wise Resources & Production of Manganese Ore

Country	Resources Million Tonnes in Mn content		Production	
	Million Tonnes	% Share	Million Tonnes	% Share
Australia	160	3	7.26	13
Brazil	51	1	2.44	4
China	100	2	23	40
Gabon	160	3	4.30	7
India	160	3	2.05	4
Kazakhstan	83	2	1.20	2
South Africa	4000	74	11.02	19
Ukraine	520	9	1.35	2
Others	141	3	5.085	9
Total	5375	100	57.705	100

Source: US Geological Survey/IMnI

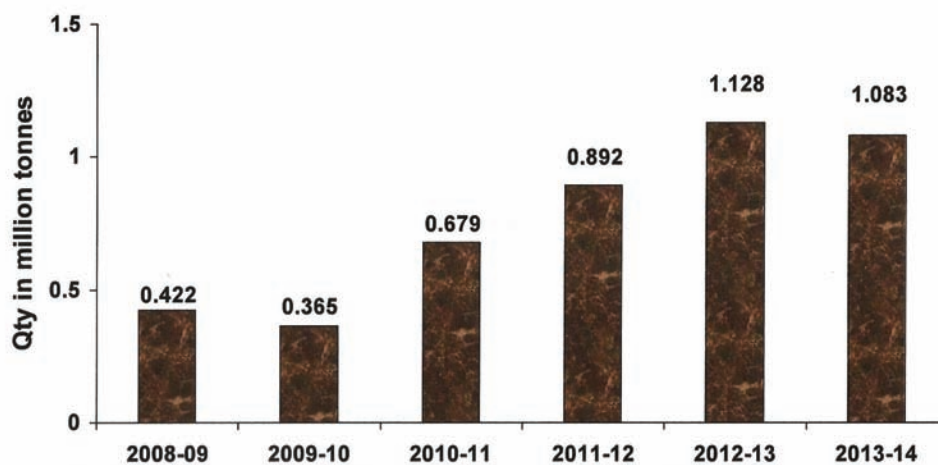
### WORLD PRODUCTION OF MANGANESE ORE (YEAR 2013)



Source : IMnI

Qty in Million Tonne  
and % share in World Production

### **Export of Ferroalloys from India (Ferro Manganese / Silico Manganese)**



For 2013-14 the figure are extrapolated from actual of April 2013 to Dec. 2013

Source : DGFT

- Given the intrinsic strength of the Indian economy, exhibited in the resilience shown during the global economic crisis post 2008 and the wide range of policy initiatives taken by the government over the recent period, the economy will revert to the high growth path once again.
- This will open up significant opportunities in the steel sector in India as also in the areas related directly or indirectly to it.
  - With the targeted capacity of 300 million tonnes of crude steel in next 10-15 years, the requirement of manganese ore will be around 10 million tonnes excluding manganese ore requirement for export of ferro alloys.

2. With the anticipated increase in steel production as well higher export of Alloys the gap between the Supply and Demand of Manganese ore will increase, necessitating higher imports.
3. The Average grade of Mn. Ore produced in India is low (Mn 32-33%). This necessitates imports of High grade Mn ore to blend with domestic quality of Mn ore for producing Ferro/Silico Manganese required for steel Industry. Besides above, India is also a major exporter in world for Silico Manganese.
4. The CAGR of import of Manganese Ore in India from South Africa during the last 7 years is 186.45% (from 800 Metric Tonne in 2006-07 to 1.27 Million Tonne in 2013-14). The trend is likely to continue.
5. There is a need for acquiring high/medium grade manganese ore property to supplement the manganese ore requirement. South Africa is a potential destination considering the high quality and quantity of its manganese ore resources.

### **Steel industry to face raw material shortage, says Ministry report**

The Steel Ministry foresees a raw material supply crunch due to environmental constraints, mining caps, inadequate infrastructure to move iron ore, and the strain on overall reserves position. A Ministry report 'Long-Term Perspectives for the Indian Steel Industry' says that if the target of 300 million tonnes of crude steel making capacity by 2025-26 is to be achieved, the country will have to work towards greater exploration, raising mining capacities and developing infrastructure, or else brace up for significant exports. The report also says the supply crunch will hit producers without captive mines, who will have to depend on small merchant markets. "In the absence of an export market and continued policy push for value addition, the merchant iron ore mining industry will go for value addition and consume much of the iron ore themselves. This will complicate the supply line further," the report stated. As per Ministry estimates, the projected ore demand by 2025-26 will be 346 mt, assuming an 8 per cent growth in GDP. The Ministry has thus recommended a relook at the policy framework to enable the steel industry to capitalise on the domestic resources and turn it into a competitive advantage. "Given that exploration efforts have been limited due to various constraints there are not enough mines to be allocated on captive basis to the new generation of steel producers," the report states. "Further, with the State Governments holding priority in allocating mines either to their own PSUs, the aggregate benefits from this policy framework will be limited." Similar concerns have also been raised about the shortage of coking coal in the country. But, despite the supply concerns of raw material for the steel industry, the Ministry said mega steel projects need to be set up in States such as Jharkhand, Chhattisgarh and Odisha to reach the 300 million tonne production target by 2025-26. "For realising the national mission of having steel capacity of 300 mt by 2025-26 an additional steel production capacity of 176 mt per annum in the eastern sector and 26 mt a year in the rest of the country is required," the report said. The additional capacity will generate 3.15 lakh of direct employment, the report added.

Source: Metaljunction

### **Steel ministry calls for expediting Jharia Rehab plan to access coking coal**

The Steel Ministry has pitched for expediting the rehabilitation plan for coking coal rich Jharia region in Jharkhand with a view to help domestic steel-makers use the vital raw material, which is getting wasted by burning away in underground fires. The Steel Ministry said that "Apart from the fact that these precious resources (coking coal) are not getting available to use and are getting burnt away in fires, the lives of those nearby are in constant risk. The process (rehabilitation) needs to be expedited by quickly identifying land nearby where the displaced people can be settled." The Steel Ministry said that "It is worth noting that Jharia Action Plan initiatives were taken about 15 years ago to develop the coking coal mines in the region which are either getting burnt away or wasted due to inability of the government to rehabilitate and resettle a large population settled in the mining areas." JRDA



needs 2,700 acres of land for resettling the 55,000 families from 595 sites. Jharia Rehabilitation and Development Authority (JRDA), the nodal agency for shifting the families of underground fire zone, admit that they didn't have any land at their disposal to rehabilitate the affected families.

Source: Steel Guru

### **Outokumpu's lean duplexes receive national technical approval in Germany**

Outokumpu's lean duplex grades LDX 2101® (EN 1.4162) and LDX 2404® (EN 1.4662) just recently received general approval AbZ (*Allgemeine bauaufsichtliche Zulassung*) by the German national building authority DIBt (*Deutsches Institut für Bautechnik*). This approval designed for the building industry means that manufacturers of building and construction components can use lean duplex grades and utilize their benefits without applying for a specific approval for the manufactured component. LDX 2101® and 2404® are Outokumpu's proprietary grades, developed in the Group's research center in Avesta, Sweden. The benefits of lean duplex include excellent mechanical properties, corrosion resistance as well as cost competitiveness. The approval covers lean duplex coil and plate products up to and including 30 mm thickness and bar products up to and including 40 mm diameter as well as all components manufactured from these materials. "This is an important milestone for the use of lean duplexes in building and construction, where lean duplexes have additional benefits. Leaner alloying together with added strength ensures highest value for money for our customers," says Thomas Kirchhartz, Technical Sales Manager at Outokumpu. "Having our LDX grades included in the AbZ that in Germany is still considered superior to comparable European standards will certainly be noticed also in neighboring countries."

Source: Outokumpu

### **OBITUARY**



Dr. Amit Chatterjee (69) breathed his last on 3 June 2014 at Jamshedpur after a short spell of pneumonial attack. A graduate in Metallurgical Engineering from Banaras Hindu University in 1966, Dr. Chatterjee obtained his PhD. and D.I.C. (Met) degrees from the Imperial College of Science and Technology, London. After working for two years at Thyssen, Germany, he joined Tata Steel in 1972 from where he superannuated in September 2012 as Advisor to the Managing Director.

Dr. Chatterjee was awarded the Doctor of Science (Engg), by the University of London in 1988 for his outstanding work on coal-based direct reduction and oxygen steelmaking. His host of honours include the National Metallurgist Award in 1977, the Sydney Gilchrist Thomas Medal in 1994 by The Institute of Materials, Application to Practice Award for the year 1997 by The Minerals, Metals and Materials society, USA: Tata Gold Medal by the Indian Institute of Metals in 1997, Distinguished Metallurgist Award for the year 2000 by The Institution of Engineers (India); Wharton Infosys Business Transformation Award in 2002, Platinum Medal of the Indian Institute of Metals in 2002. Dr Chatterjee was a Fellow of The Institute of Materials, England, The Indian Institute of Metals, India, The Indian National Academy of Engineers, and a Fellow of Imperial College, London. He was a Chartered Engineer of The Engineering Council, England. Dr. Chatterjee was mentioned as one of the 'Illustrious Alumni of Imperial College' in its booklet 'Imperial College, London - 100 Years of Living Science'.

He has over 550 publications to his credit and is also the author of several books on iron and steel, including an authoritative book on direct reduction of iron. A vibrant organiser and an excellent orator, Dr. Amit Chatterjee will be missed by IIM and the metallurgical fraternity.

### **Kenya seeks SAIL help for setting up steel plant**

PTI reported that Kenya has evinced interest to set up an integrated steel plant in collaboration with state run Steel Authority of India which can cater to the East African region. In a recent letter to Mr CS Verma chairman of SAIL, Mr Yogeshwar Varma India's High Commissioner to Kenya has said that local government has sought SAIL's collaboration to set up either an integrated steel plant or a steel

plant in Kenya. The African nation, which does not have any integrated steel plant so far, intends to set up the plant based on pig iron to be supplied by SAIL. The idea of setting up a steel plant comes following the country finding a large base of iron ore and coal in the Kitui province, which is around 160 kilometers east of Nairobi. Mr Varma has requested the Sail Chairman to send 3 to 4 senior officials to visit the country and assess the potential at the expense of SAIL. He has also written to TATA Group's Cyrus Mistry and Naveen Jindal of JSPL with the same proposal. An official in SAIL said that the company receives such proposals from various countries but a decision on investing in any particular country depends purely on its merits. SAIL had in 2011 expressed intention to set up four steel mills in Mongolia, South Africa, Oman and Indonesia involving USD 12 billion investment. None have come up so far.

Source: Steel Guru

### **Steel ministry wants SAIL to produce niche products for export**

The steel ministry has asked Steel Authority of India Ltd (SAIL) to look at niche steel products that command a premium and can be exported, as the public sector behemoth plans to roll out a massive Rs1.5 trillion phase II modernization and expansion plan (MEP) by 2015 end. The ministry has asked SAIL to seek technology joint ventures and engage with consultants to build a progressive vision on products and marketing. "Over the longer term, SAIL needs a technological vision by developing a product profile for the future. SAIL will have to decide what kind of mass commodity products they will sell and what kind of niche products they will sell," said steel secretary Mr. Mohan Kumar. "In mass market products the price is determined by the competition. In certain areas, I have asked them to make studies through consultants." For instance, SAIL is not able to produce steel for auto body parts, unlike private steel players. SAIL chairman C.S. Verma said that the company has set up an internal committee to plan the second phase of expansion, which will also look into more specialized products. The expansion will be funded through 50% debt and 50% internal accruals. The value-added products have been a thrust area for the company, Verma said, and SAIL is seeking joint ventures for auto products. Around 37% of SAIL's revenues are from value-added steel products and in the next year or so this will move up over 50%, Verma added. An ICICI Securities report notes that the company has witnessed subdued blended steel realizations in the past, with realizations down 3.9% year-on-year to Rs38,236/ tonne in FY14, versus Rs39,784/tonne in FY13. It states that the company is also undergoing a shift in the product mix, wherein it will start manufacturing more value-added products compared to the present mix that is skewed more towards basic products. "We expect blended realisations to remain flat YoY at Rs38,194/tonne in FY15E and increase thereafter by 1.3% YoY to Rs 38,680/tonne," the report adds. In comparison Tata Steel's India operations earns realizations close to Rs45,000/tonne.

The steel ministry has also asked SAIL to plan the next phase of expansion quickly and more efficiently by implementing total quality management. In a recent meeting, it froze all the dates for completing SAIL's delayed MEP phase I; it was to be completed by 2011, but will now be completed by 2015. This will take the company's production capacity from the present 13.4 million tonnes (mt) to 23mt by the end of 2015. "In the next phase of MEP we will add 27mt, taking our total capacity to 50mt," Verma said. The MEP phase I of SAIL's Bhilai, Bokaro, Rourkela, Durgapur, Salem and Burnpur plants have so far entailed investments of over Rs53,000 crore and will eventually cost the company an estimated Rs72,000 crore when it is complete. Steel ministry officials say that implementing the various projects in several different packages led to the delays. Implementing them through turnkey projects would have been a better idea, an official said. The ministry also wants SAIL to utilize better its assets, particularly its huge land bank, and consider alternative technologies like coal gasification to boost productivity. SAIL's expansion plans come with a huge price tag. Its balance sheet is getting stretched due to an increase in debt on account of the ongoing expansion and modernisation plan. The current gross debt and net debt (31 March 2014) stands at Rs25,648 crore and Rs22,792 crore, respectively. The second phase of expansions could further burden the company's finances.

Source: Metaljunction

### **Scientists develop technique for extracting gold from e-waste**

Scientists at the National Metallurgical Laboratory, a CSIR lab in Jamshedpur, have successfully developed the process for extracting gold from e-waste like used mobile phones, medical equipment and telecommunication devices. "We have various collaborations with national and international research institutes and companies for development of processes for recovery of various metals from e-waste," said Dr Manis Kumar Jha, the lead scientist of the team. "We started working on this gold recovery process development nearly two years ago. Now we have even transferred the technological know-how to M/s ADV co New Delhi and they have been working on it successfully," he said. One can extract about 350g of gold from 1,000 kg of PCB of mobile phones. "The quantity of gold depends on the type of mobile phones. A sophisticated mobile phone would have more amount of gold and obviously be expensive too," he said. Gold can also be extracted from some expensive medical equipment. Vinayachal Kishore, managing director of ADV technology more than a year ago and used it for our unit in Durg in Chhattisgarh. The technology works successfully. The gold that is extracted is more than 99.99% in purity."

Source: The Hindustan Times

### **Nalco plans to raise output**

Witnessing demand recovery, state-owned National Aluminium Company Ltd. (NALCO) has planned to increase aluminium output marginally. Recently, it reopened 10 aluminium-producing pots at its Angul smelter in Odisha. Last fiscal Nalco had reduced its capacity utilisation by a third because of the sluggish aluminium market and lower LME realisation and coal shortage. It had shut down 329 of its total 960 pots or 4.6 lakh tonnes a year of its smelter. Now operational pot numbers have gone up to 641. A Nalco pot can produce 1.37 tonnes a day. According to CMD Ansuman Das, "It's a small, but significant step" considering the change in the outlook. Nalco expects to make its 4-channel 25 km and Rs 190-crore fly ash slurry disposal project operational by December this year.

Source: The Hindu

### **Govt. may take a fresh view on mining bill**

The government is likely to take a fresh look at the Mines and Mineral Development and Regulation (MMDR) Bill, 2011, which has now lapsed. The new Bill proposed sharing of 26 per cent profits of mining with project-affected people. "The MMDR Bill (of 2011) is lapsed. The government has to decide on three things – either do nothing, keep the same Bill or pick up what is the best thing," Mines Secretary Anup Pujari said, when asked if a new Bill would be brought in. The UPA government in 2011 had tabled the Bill in the Lok Sabha, but it could not be passed. The Bill sought to introduce competitive bidding process to encourage the participation of private parties in the sector. The 1957 Act of the same name has already been amended several times and further amendments might not clearly reflect the objects emanating from the new National Mineral Policy. The Bill also sought to empower the state governments to constitute special courts for the purpose of providing speedy trial of the offences relating to illegal mining. Besides, it had provisions for empowering the central government to intervene in the cases of illegal mining. Confederation of Indian Industry (CII) has also asked the government to declare mining as a strategic and infrastructure sector, which is critical for the manufacturing growth of the nation. In a recent presentation to the mines ministry, it said critical steps such as following transfer of mining licences from one company to another seamlessly could be taken with almost immediate effect. It has also asked for a reduction in the role of GSI as an explorer and instead focus its activities in creating an environment which attracts exploration activity.

Source: Business Standard

### **An Overview of the Indian Pipe Industry**

Indian Pipe Industry has witnessed an expeditious growth in past years on increasing Pipe demand in diverse sectors such as Irrigation, Oil & Gas and Real Estate. Demand for Electric Resistance Welded



Pipes (ERW) Pipes and Special Pipes such as seamless, Helically Submerged Arc Welded (HSAW) and Longitudinal Submerged Arc Welded (LSAW) are increasingly catering the needs of Infrastructure, Agriculture, Oil & Gas and other segments. Urbanization, Infrastructure development and construction of resident & industry are facilitating growth of the Pipe industry in India.

### *Steel Pipes*

Steel Pipes, a long & hollow the produced from semi finish products such as Billet & Slab are classified as Cast Iron Pipe, Ductile Iron Pipe, Carbon Steel Pipe & Stainless Steel Pipe. Carbon Steel Pipes are available in either Seamless or Welded versions.

ERW Pipes are basically produced in some major cities such as Mumbai, Mandi Gobindgarh, Hyderabad, Raipur, Nagpur, Delhi, Chennai & Bangalore.

### *Grades of Carbon Steel Pipes*

Grade refers to divisions within different types of Seamless & ERW Pipes and designates mechanical properties such as minimum yield and tensile strength. Majorly, grades are classified into 3 parts namely Grade A, Grade B & Grade C. Grade A is easier to bend as it is softer steel and use in close coiling & cold bending. Grade B has higher tensile and stress values and yield strength than Grade A. It is best suited for machining operations. Grade C, which is available in ASTM-106, has higher tensile and yield strength than Grades A & B.

### *Applications*

Steel Pipes are widely used in the construction industry, and are also be found in a variety of manufacturing and industrial applications. In plumbing systems, steel pipe can be used to transport liquids & gases for commercial and residential buildings, as well as in municipal water supplies. It can also be used as components in mechanical system such as rollers in conveyor belts, compactors, bearing casing, casing for concrete pilings used in construction projects and high temperature or pressure manufacturing processes. Steel Pipes are also widely used for oil well casing, oil refinery equipment, delivery of fluids either gaseous or liquid, in a process plant from one point in the process, delivery of bulk solids, in a food or process plant from one point to another point in the process and for construction of high pressure storage vessels.

### *Primary Players of Pipe Industry*

**SAIL:** Odisha based Rourkela Steel Plant (RSP) is the only subsidiary of SAIL that produces high quality Pipes for Oil & Gas sector. RSP's Pipe mill manufactures two types of pipes namely ERW Pipes in 8-5/8" outer diameter to 16" outer diameter sizes and Spiral Welded (SW) Pipes in 18" outer diameter to 64" outer diameter sizes. **Essar Group:** Hazira (Gujarat) based Essar Pipe Mill has a combined capacity of 0.6 MnT HSAW & LSAW along with internal & external coating facilities of up to 2 mm square meters annually. **Jindal SAW:** Jindal SAW, one of the largest steel producers & exporters of India, manufacturers SAW Pipes using UOE technology. With a turnover in excess of INR 75 billion, the company is leading in India's tubular market. JSL has its presence in both global & domestic market and operates through its plants located at Mundra (Gujarat), Nashik (Maharashtra) and Kosi Kalan (Uttar Pradesh). The company produces SAW & Ductile Iron (DI) pipes at Mundra & Kosi Kalan, while seamless pipes are manufactured in Nashik. JSL also has pipe-coating plants at Mundra & Kosi Kalan.

### *Welspun Group*

Mumbai (Maharashtra) based Welspun Corp is the world's 2<sup>nd</sup> largest manufacturer of large diameter pipes. Welspun Corp, a flagship company of USD 3 billion Welspun Group, operates a 1.65 MnT pa plant I Anjar (Gujarat), which is being increased to 2.1 MnT pa.

### *Secondary Players of Pipe Industry*

#### *Man Industries*

Gujarat based Man Industries is a leading manufacturer & exporter of large diameter Carbon Steel

Line Pipes, which are used for high pressure transmission applications. The company produces LSAW & HSAW Line Pipes and also different types of anti-corrosion coating systems.

#### PSL Limited

PSL Limited is India's largest producer of HSAW Pipes, having a production capacity of over 1 MnT. The company also has its Pipe mills in Sharjah, UAE.

Production of Large Diameter Pipes by Major Primary Manufacturers		
Production (MT)	FY13	FY14
SAIL	75,000	63,000
ESSAR	159,000	134,000
Others	1,772,000	1,824,000
<b>Total</b>	<b>1,931,000</b>	<b>1,958,000</b>

Source: Steel 360 Research

Primary Players' Statics			
Pipes (Large Diameter)	FY13	FY14	Remarks
Import	134,000	101,000	High domestic production
Export	137,000	109,000	High domestic demand
Production	2,007,000	2,021,000	High domestic demand
Availability	2,004,000	2,013,000	High domestic demand

Qty in MT

Source: steel 360 Research

Key Players & Areas of Operation			
Types of Pipes	Size (inches)	Raw Materials	Indian Players
Seamless	½-14	Round steel billets	Maharashtra Seamless, Indian Seamless Tubes, Jindal SAW
HSAW	18-100	HR Coils	Jindal SAW, PSL, Welspun, Man Industries
LSAW	16-50	Steel plates	Jindal SAW, Welspun, Man Industries
ERW	½-20	HR Coils	Maharashtra Seamless, Jindal SAW, Kesoram Industries

Source: Steel 360 Research

Some more secondary players are listed below	
Players	Location
Electrosteel Castings	Bokaro, Jharkhand
Kesoram Industries	Hooghly, West Bengal
Bansal Poles	Bahadurgarh, Haryana
Bhushan Steel & Strips	Derabassi, Punjab
Maharashtra Seamless	Raigad, Maharashtra
Surya Roshni Main Industries	Madhya Pradesh
Prakash Steelage	Mumbai, Maharashtra
Rajratan Global Wire	Madhya Pradesh
Zenith Birla	Khopoli, Tarapur & Murbad (Maharashtra)
Remi Edelstahl	Mumbai, Maharashtra
Siddhartha Tubes	Sarangpur, MP
Man Industries (India)	Anjar, Gujarat
Hariom Pipes	Hyderabad, AP

Source: Steel 360

## **New mineral spotted**

Scientists have discovered a new mineral in Western Australia that is unique in structure and composition among the world's 4,000 known mineral species.

The mineral 'Putnisite', described by a visiting research fellow at the University of Adelaide in *Mineralogical Magazine*, was found in a surface outcrop at Lake Cowan, north of Norseman in Western Australia.

The new mineral occurs as tiny crystals, no more than 0.5 mm in diameter and is found on a volcanic rock. It appears as dark pink spots on dark green and white rock which, under the microscope, appears as square, cube-like crystals.

It combines the elements strontium, calcium, chromium, sulphur, carbon, oxygen and hydrogen — a very unusual combination. It has yet to be determined if the new mineral will have any practical use, researchers said.

"What defines a mineral is its chemistry and crystallography," said Dr Peter Elliott, who is also a Research Associate with the South Australian Museum.

"By x-raying a single crystal of mineral you are able to determine its crystal structure and this, in conjunction with chemical analysis, tells you everything that you need to know about the mineral."

Source: The Hindu – Business Line

## **Mineral Development Scenario of Odisha**

Mineral Resources are finite and non-renewable but play a vital role in the economic, infrastructure and social development of the state and nation as well. Though mineral development in India dates back to 6000 years before present but the real growth started after independence. Odisha covering a land mass of 155507 sq. m. and with a coast line of 482 kms is endowed with vast mineral resources. The rich mineral wealth is attributed to its favourable geological set up. Seventy three percent of the state comprises of Precambrian rocks, Phanerozoic rocks represented by Gondwana super group and minor tertiary patches. Quaternary formations are also located in the state. In spite of having abundant mineral resources, the mineral development activities in the state are in cross roads. Several reasons can be attributed mainly due to lack of conclusive and decisive action by policy makers and regulatory agencies, propagation of misconceived ideas on mineral development by the non-mining personnel, lack of coordination between several functional agencies like mining, forest, revenue and environmental agencies. Efforts shall be made to properly address these shortcomings to achieve sustainable mineral development activities for the overall growth of the state.

### *Mineral Resources*

The status of reserves of different ores and minerals available in the state are as follows

Table-1: Mineral Resources of Odisha and India

Chromite	213	203	Jajpur, Dhenkanal, Keonjhar, Balasore	Metallurgical, Chemical and Refractory	95.31
Dolomite	7533	836	Sundergarh, Koraput, Bargarh		11.10
Fire Clay	705	175	Jharsuguda, Angul, Sundergarh, Cuttack, Sambalpur, Khurda, Mayurbhanj	Plastic, Non-Plastic	24.82
Graphite	169	5.4	Bargarh, Bolangir, Nuapada, Kalahandi, Phulbani, Koraput, Rayagada	Angul	3.20



Iron (Hematite)	14630	4760	Mayurbhanj, Keonjhar, Jajpur, Sundergarh, Nawarangpur	+58% Fe	32.54
Iron (Magnetite)	10620	0.21	Mayurbhanj, Keonjhar, Jajpur, Sundergarh, Nawarangpur	+45% Fe	6.00
Limestone	175345	1738	Sundergarh, Koraput, Malkangiri, Nawrangpur, Bargarh, Nuapada, Bolangir	Cement and Chemical Grade	0.94
Manganese	379	153	Keonjhar, Sundergarh, Rayagada, Bolangir, Kalahandi	B.F., Fe Mn., Si Mn., Battery	40.37
Nickel Ore	189	174	Jajpur, Mayurbhanj	0.5% Ni. Cut off	92.06
Platinum Group	15	14.2	Jajpur, Keonjhar	0.5 gm/tonne	94.67
Pyrophyllite	34	12.3	Keonjhar	Textiles, Ceramics	36.18
Quartz / Silica Sand	3238	69.7	Mayurbhanj, Keonjhar, Sundergarh, Bolangir, Jharsuguda, Subarnpur, Sambalpur, Boud, Koraput, Angul, Jajpur, Malkangiri, Kalahandi	Metallurgical	2.15
Quartzite	1145	58	Mayurbhanj, Keonjhar, Sundergarh, Bolangir, Jharsuguda, Subarnpur, Sambalpur, Boud, Koraput, Angul, Jajpur, Malkangiri, Kalahandi	Metallurgical	5.07
Ruby	5271 (Kgs.)	5271 (Kgs)	Sambalpur, Kalahandi, Nuapada		100
Silver	245	1.79	Sundergarh		0.71
Soapstone	312	0.7	Keonjhar, Mayurbhanj		0.22
Tin	86552	15.5	Malkangiri	+50 gms./ton cut off	0.02
Vanadium and Titanium Bearing Magnetite	24.8	4.8	Mayurbhanj, Balasore, Keonjhar	0.6 to 1.5% V2O5	19.35

Source: DG, GSI

### Mineral Exploration

Systematic and scientific investigations to locate various mineral deposits commenced in India with the creation of Geological Survey of India since 1851. Subsequently the search processes have been refined with the availability of modern exploration tools like aerial photos, satellite imageries, different software package and laboratory facilities with modern techniques. Exploratory agencies like Geological Survey of India, State Directorate of Geology, National Remote Sensing Agencies, Atomic Mineral Division and Mineral Exploration Corporation have initiated the mineral exploration activities. The entire state has already been covered by geological mapping in 1: 50,000 scale. Many important geological areas have also been covered under mapping in 1: 25,000 and 1: 12,500 scale. About 75,000 sq.km area of the state has also been covered by Airborne Geophysical Survey. All these exploratory activities have helped in outlining the mineral resources of Odisha.

## *Mineral Concessions*

Mineral development is normally guided by several mining laws. The major laws governing the development are as follows:

### *Central Law*

- ❖ Mines and Minerals (Development and Regulation) Act, 1957.
- ❖ Mineral Concession Rules, 1960.
- ❖ Mineral Conservation and Development Rules, 1988.
- ❖ Granite Conservation and Development Rules, 1999.
- ❖ Coal Bearing Area (Acquisition and Development) Act, 1957.
- ❖ Oilfields (Regulation and Development) Act, 1948.
- ❖ Petroleum and Natural Gas Rules, 1959.
- ❖ Forest Conservation Act, 1980.
- ❖ Environmental Protection Act, 2006.

### *State Law*

- ❖ Orissa Minor Mineral Concession Rules, 1990.
- ❖ Orissa Minerals (Prevention of Theft, Smuggling and other Un-lawful Activities) Act, 1989.
- ❖ Orissa Minerals (Prevention of Theft, Smuggling and other Un-lawful Activities) Rules, 1990.
- ❖ Transit Pass Regulation, 1973.

With a view to implement various mining legislations to effect optimum development of the mineral resources and to attract the investor, the National Mineral Policy had been framed in 2008.

Based on this, Odisha State Govt. has also proposed to prepare the mineral policy of Odisha aiming at utilizing the mineral wealth to optimum level which would naturally augment the economic growth of the State. Various objective of the policy shall be:

- ❖ To promote systematic mineral exploration with the adoption of modern techniques.
- ❖ To ensure sustainable development and conservation of minerals for future utilization.
- ❖ To promote mineral based industries thereby encouraging value addition and end use of minerals.
- ❖ To establish the compatible linkage between mines and mineral based industries for ensuring un-disrupted supply of raw materials.
- ❖ To promote investment friendly environment – need for the mining development.
- ❖ To simplify the procedure for grant of the mineral concession and the development of infrastructural facilities in mining areas.

## *Mineral Development*

### *Status of MC Applications*

Since 1984, 206 RML applications are pending with the government. Since 2000, 150 RP applications are pending out of which 21 applications are granted and executed, since 2005, but no work has been done in the area. 61 applications are rejected, 26 applications are recommended for grant, and 15 applications are for rejection. As on 31.08.2010, there are more than 4813 MC applications pending in the Collectorates of districts, 484 applications are pending in the Directorate of Mines and 756 applications are pending in the Steel & Mines Dept. of Govt. of Odisha.

This state of affairs with the mineral concession application needs a through interactive study with the Govt. of Odisha to assess the background on the status of the application.

### *Renewal of M.C. Application*

As per Rule 24-A inserted by GSR, 86 (E) dated 19.02.87, it is suggested that renewal application shall be made at least 12 months before the expiry of the subsisting lease. Rule 24A (5) provides that if a renewal application is not disposed within the specified period of 6 months, it shall be deemed to have been refused. Sub-rule 24A (6) introduced GSR 129 (E) dated 20.02.91 provides that if an application of renewal of mining lease is made within the time and not disposed before expiry of the lease, the period of that lease shall be extended for 1 year. Against the provision of deemed refusal, mining renewal application were filed before the mines tribunal of Central Govt. and the 'deemed refusal' was set aside by the tribunal. Sub-rule 4&5 have been omitted as only part of Sub-rule 6 reading 'not stated the approval of Sub-rule 5 since 01.01.93'. Thus, the approval of Sub-rule 5 cannot be invoked retrospectively to enforce the deemed refusal provision as such it can only constitute the application for renewal of mining lease pending for disposal during the period of 1987-94 deemed to have been refused and it cannot be regarded as illegal operation, made at least 12 months before the expiry of the subsisting lease. Rule 24A (5) provides that if a renewal.

Thus the Central Govt. inserted Rule 24 A (6) vide SGR 724 (E) dated 27.09.94 which read 'if an application for renewal of mining lease made within the time referred to Sub-rule 1 is not disposed up by State Govt. before the date of expiry of lease the period of that lease shall be deemed to have been extended till State Govt. passes the order thereon. This led to the situation that even after the extension of deemed operation of 20 years no order was passed by State Govt. either for grant of refusal. The lessee can continue to operate the mine subject to other valid statutory clearances. Dept. of Steel & Mines, Govt. of Odisha in its letter no. 7346 dated 06.10.12 addressed to Director of Mines was of opinion that the mining lease application for renewal during the period from 10.02.87 to 26.09.94 will be treated as deemed refusal as per the provision of Rule 24 A of MCR 1964. The State Govt. Misconceived in view of the court judgment. The letter further states that any mining lease belonging to public sector undertaking owned by the State and Central Govt. is deemed to have been refused under the aforesaid provision of law, the same may be reported by the State Govt. for renewal to Govt. of India for relaxation of the aforesaid provision of law by exercising the powers under Section 31 of MMDR Act 1957.

### *Status of Mining Leases in Odisha*

As of date, there are 600 mining leases granted for different minerals in the state, out of which, only 131 leases are in operation. Government has suspended 240 leases and 137 leases are temporarily discontinued making 377 leases non operative. 6 leases have lapsed whereas 40 leases are determined. 38 leases have not field for renewal and 8 leases were having temporary working permission. In addition, there are 160 quarry leases for dimension stones, out of which, only 90 are in operation. Most of the leases are not in operation for want of statutory approvals related to forest and environment. Set against this background the mineral production and dispatch thus achieved are as follows:

Year	Product in MT	Despatch in MT
2008-09	189.10	177.51
2009-10	198.29	184.30
2010-11	207.88	189.62
2011-12	185.22	171.95



Accordingly, the state has collected revenues as follows:

Year	Revenue in Cr. of Rupees
2008-09	1380.54
2009-10	2020.72
2010-11	3330.46
2011-12	4586.88
2012-13	4293 (till January 2013)

### *Prospects for Mineral Based Industries*

With the abundance of mineral resources the state has got additional strength for implementation of both large and small scale iron and steel plant, cement plant, fertilizer plant, ceramic and refractory units. The development of the mineral based industries shall play the key role in creating employment opportunity both in rural and urban sector and shall also be the major contribution for the state's revenue. Keeping pace with emerging scenario of liberalization and globalization of economic growth, the prospects for the growth of different mineral based industries in the state adding value to the basic raw materials are prolific. Since recent past the state of Odisha is keen to promote these industries and accordingly created industry friendly environment. Mega mineral based projects with huge projected investments to the tune of Rs. 400,000 crores are lined up in Odisha. This once implemented, shall also hold good prospects for boom in other services like banking, insurance, education and telecommunication etc. About 55 Memorandum of Understandings has been signed up between investors and Govt. of Odisha. As a result, the developments of industries in the following sectors are envisaged. Handling of weakness and threats are the challenges of this sector which need to be taken care to get assured raw materials for development of mineral based industries. The future growth of mineral industries in Odisha is expected to be based on the major minerals which are having substantial resources. The industries based on other resources are expected subject to availability of suitable technology and market. Growth of iron and steel, thermal power, aluminium, cement and titanium sectors are most likely to continue considering all the above aspects.

### *Infrastructure Supports*

Development and utilization of mineral resources need a compatible logistic supports like road, railways, port, power, communication, water etc.

#### *Roads*

In the absence of adequate railway network in the state, mining industries are fully depending on roadways for intra and interstate movement of minerals for the development of mineral based industries. The major mineral bearing areas of the state are located in Jajpur, Keonjhar, Sundergarh, Mayurbhanj, Koraput and Rayagada districts. However, thrusts are in the development of iron and chromite prospects in the state and for achieving better transport system, the following road networks may be demanded in the mineral sector.

Tomka-Mangalpur-Duburi	60 kms.
Naranpur-Bamnipal via Harichandanpur	70 kms.
Boula-Bangur-Soso-Bhadrak	33 kms.
Talcher-Sukinda	105 kms.
Panikoili-Rajamunda	230 kms.

Koira-Tensa-Barsuan	24 kms.
Bamebari-Koira	24 kms.
Talcher-Gopalpur	270 kms.
Duburi-Jajpur	16 kms.
Rairangpur-Sulaipat-Badampahar	29 kms.

Lack of budgetary support and scarcity of funds are the major hurdles for the development of the road network in the state. Attempts shall be made to develop and maintain the roads through the involvement of the private sector including foreign investors.

### *Railway*

The state has a railway network of over 820 km length of single line broad gauge, 860 km double line broad gauge and 55 km. of narrow gauge tracks. Out of this, railway line to Rajkharsuan-Joda, Barjamda-Roxai and Bargarh-Dunguri serve the purpose of transportation of mineral produce of the state. The proposed railway lines such as Talcher-Bimalgarh, Khurda-Bolangir, Jeypore-Malkangiri and Angul-Sukinda shall definitely add and facilitate the mineral transportation in the state.

### *Power*

The state of Odisha has a total installed capacity of 4426 Megawatt including thermal and hydro power. Requirement for mines and mineral based industries can be easily met from the available power in the state.

### *Port*

Odisha with 482 km. long coastal tract has got the added advantages for sea transport for both raw materials and finished products. Paradeep and Dhamra port at present are handling export of iron and coal etc. In addition proposals are in active implementation stages for construction of dedicated ports in Jatadhari, Gopalpur, Kirtania, Inchuri, Astarang and Chudamani.

### *Water Resources*

Water resources of the state are made of both surface and ground water. Surface water availability in the state at 75% dependable basis is about 95.54 BCM. The state has an annually replenishable net ground water resource of 2.1 million hectare meter (HM) of which 0.12 million hectare meter (HM) committed for domestic and industrial requirement till 2013. The average stage of ground water development in the state is assessed to be 18.31%. Considering the needs of irrigation and with judicious augment management practices, the ground water resources of the state can meet the substantial part of the water requirement of mining and mineral based industries. While assessing the availability of water for the existing and up-coming mining and mineral based industries, it may be noted that, there are 11 river basins contributing to the water resources potential of the state.

### *Epilogue*

In spite of having adequate natural resources like land, water, long coastline and abundant mineral resources, Odisha is still one of the backward states where 47% of the people live below poverty line. However, it is unfortunate that when the state of Odisha is poised for rapid growth through industrialization certain vested interest groups are creating impediments by misleading people. Their stress for development through agriculture definitely mismatch if one analyses that in 854 \$ billion economy in India only 1/5<sup>th</sup> contribution comes from agriculture. Efforts shall be made to have a balance between agriculture and industry. Growing opposition to land acquisition has also emerged as the major barrier for the growth of industrial sectors. Immediate measures shall be taken up by the

Government agency to adopt and implement Rehabilitation and Resettlement Policy 2006. Odisha can become a leading state with the enhancement of its economic growth through proper exploitation of its vast mineral resources, provided the following issues are properly and timely addressed.

- Adoption of modern technologies needed for mineral exploration establishing the resources potentials for each mineral.
- Creation of suitable database on available mineral potentials.
- Provision of investment friendly policies and environment to attract domestic and foreign investors to invest in exploration and exploitation.
- Adoption and implementation of quick disposal processes needed for obtaining mineral rights.
- Grant of mineral rights to the investors having both technical and financial competency.
- Preferential grant of mineral rights to the end users having competency in adoption of sustainable mineral development programmes.
- Creation of an authority to evaluate and control the price of the basic raw material commodities for the sustenance of the value added industries.
- Development of harmony in political consensus and appropriate professionalism to promulgate and implement various development policies of Orissa government.

Mineral Development, initiated with suitable exploration promoting scientific conservation plan to achieve sustainable growth plays a vital role in the economic growth of the state and needs total support from both regulatory and regulating agencies.

Description	Capacity
Iron & Steel Making Units	69 MTPA
Ferro Alloys	750 lakh TPA
Aluminium	0.71 MTPA
Thermal Power Plant	5700 MW
Titanium Industries	50000 TPA (Proposed)

GROWTH POTENTIAL ANALYSIS	
The SWOT Analysis of Mineral Sector Indicates the Following:	
Strength	Resources are available. Technical financial and managerial capacity exists with skilled manpower.
Weakness	Government policies, management of mineral concessions, statutory clearances and poor infrastructure.
Opportunity	Growing demand particularly from domestic market.
Threat	Coming from local people, political class, extortionists and criminal elements.

Source: MetalWorld

### **Congratulations!**



Dr. Vipin Jain, Senior Scientist at the Materials Physics and Engineering Division, CSIR-National Physical Laboratory, New Delhi; has been conferred *Doctor of Philosophy (Ph.D.)* at the 46<sup>th</sup> Convocation held at IIT Kanpur on 18<sup>th</sup> June 2014. Dr. Jain has graduated from the Materials and Metallurgical Engineering Department (presently Department of Materials Science and Engineering) of IIT Kanpur and the title of his Ph.D. thesis is “*Deformation Behavior and Superplasticity of AZ91C Alloy Processed by Equal Channel Angular Pressing and Friction Stir Processing*”.

Dr. Jain has been a *Fulbright Scholar (during June 2010-March 2011 at Missouri University of Science & Technology, Rolla, USA)* and *State Alumni* since June 2010. He has received *B.E* in Metallurgical Engineering from the University of Rajasthan, Jaipur (in 1994) and *M. Tech.* from IIT Kanpur (in 1996). He has acquired professional research experience at Electrical R&D Association, Vadodara (1996-1999); ARC International, Hyderabad (1999-2004) and National Physical Laboratory, New Delhi (since 2004).

Our heartiest congratulations to Dr. Jain who is presently *Joint Honorary Secretary* at the Executive Committee of the IIM Delhi Chapter.

### **Coal Gasification – an Effective Source of Industrial Heat**

Coal is the cheapest fuel for heat in industrial heating. In steel industry, many applications require heating and traditionally, furnace oil or natural gas is used for this purpose. But, the current rise in the cost of furnace oil and natural gas has made these fuels uneconomical. The steel industry related heating equipments like Pelletisation Induration Furnaces, Billet & Slab Reheating Furnaces or Heat Treatment and Annealing Furnaces are designed for liquid or gas. They cannot operate on direct coal firing. So, the right solution is to use coal, converted into usable gas. Coal gasification is the right technological solution for such processes, which provide coal gas generated from coal for heating. Iron ore Pelletisation is the need of the hour. Indian Iron ore industry is setting up large numbers of Pelletisation plants. But they are designed on very high cost furnace oil. Dev Energy has worked for last three years with all the major technology providers for Pelletisation and developed the coal gasification technological solution, to meet requirements of the industry. The coal gasification system is capable of delivering clean cold gas, with ambient temperature, tar and dust < 40 mg / Nm<sup>3</sup>, moisture < 4% and desired high pressure of 1.5 bar. Their system is already operational in 0.6 MnT pa Pelletisation plant in Bakura, West Bengal. The system is replacing 95% of furnace oil requirement. They have also supplied coal gasification to 2 Pellet plants of 0.2 MnT pa in Raipur, one 0.4 MnT pa Pellet plant in Raigarh and one 0.6 MnT pa plant in Keonjhar. All these plants are based on Grate-Kiln Pelletisation Technology. Now, they are erecting gasification system for 0.6 MnT pa Straight Grate Pellet Plant Technology near Hospet. This plant, after commissioning, will be the world's first Straight Grate Pellet plant with coal gasification as source of heat.

This technology of Dev Energy is in partnership with YISHENG Corporation in China, who is one of the largest and specialized coal gasification equipment manufacturers in China. They have supplied more than 1,000 coal gasifier systems in the world. In India, their systems are running successfully since 2003 and they have an experience of more than 10 years of implementing gasification technology. They have the infrastructure for manufacturing the first class of pressure vessels. Their team of experienced technical experts in India and China work tirelessly to provide heating solutions with



coal gas to more than 40 different type of industries including steel, glass, ceramic tiles, tableware, refractory, alumina and lime. Dev Energy provides complete turnkey solutions for conversion of coal into clean gas. The gasification system they provide is a Two Stage Cold and Clean Gasification technology system with two separate coal gas outlets. The upstage gas is generated at low temperature and Volatile Matter of coal is allowed to vaporize without cracking, thus generating high calorific value gas. The down stage gas is generated at high temperature and has maximum %CO and H<sub>2</sub>. The system generates coal gas with total calorific value > 1450 Kcal / Nm<sup>3</sup> which is higher by 20% when compared to the traditional single stage gasification. They use six stages of cooling and cleaning. The three stages of closed cycle indirect cooling including air cooler and indirect water cooler are used to cool the gas indirectly. The two stages of electrostatic precipitation are used to clean the gas of tar. Dust is removed by a cyclone. The need for water scrubbing is eliminated and all cooling is done without direct contact of water. This eliminates generation of fresh water into phenolic water.

A specially designed heat exchanger is used to vaporize the condensate moisture and phenols which are injected back to the gasifier's bottom. This technology of reusing the phenolic water helps save energy and use the by-product back in to the system. The tar produced by the process of dry Electrostatic Precipitation is at low temperature and free of moisture. It is useable as fuel with calorific value equal to furnace oil. This makes the total energy efficiency of coal to coal gas, and tar combined of 87%. The gasifier system is designed for bituminous coals with downstage gas line with vents to control the flow and temperature of gas in each zone around the diameter and a heat proof stainless steel central pipe in the centre. This helps in operations by monitoring and managing the bed situation better. The main grate base of the gasifier base is heat and abrasion resistant casting steel, Hydraulic drive system for the coal feeding and ash tray driving. The gasifier system has two high pressure steam drums for steam storage generated from the water jackets. This steam is used in the poking system to steam lock the poking holes in order to make the operations of bed easy and safe. They use the specially designed equipment to make the system more reliable. The coal feeding machine is Two Track Double air lock feeder system with complete auto hydraulic control. The effective height of ash tray is designed to keep the flow of ash from the system of the high ash Indian coals. The ash plough system is designed for two sided or three side discharges based on the percentage of ash in the coal.

The system is constant pressure generation system and the complete process is automated with PLC and SCADA systems. All blowers and pressure adders are in variable frequency drive to provide better control and to conserve electricity. The automation allows the system to operate with turn down range of 30-110% for the design capacity without much change in efficiency. The system is very safe as it maintains positive pressure at all times. All equipments are designed with water seals to act as water based safety valves. The sub equipments are provided with bypass to avoid/ maintain the sub equipment in case of failure. The flow lines of water, steam and air valves are all with standby and have blow off valves or non-return valves. The automation system is designed for complete online redundancy for all electrical and automation parts. The coal gas pipelines are provided with auto shut off valves and auto flares. The technology is approved by Pollution Control Board, because the process is designed with the use of indirect cooling and no phenolic water is generated. The condensate phenolic water is reused in the gasifier system. The system is designed with 100% water and steam reuse and no water of any type is discharged outside the system limit making it Zero Discharged System. They use a combination of civil work up to only 9m and up to 28m with steel, to provide stable structure and faster execution. The ash discharge is at 4m level to provide cleaner ground floor. The system is modular with standardized design for all sub equipments. The equipment is factory produced with strict quality controls. All equipments are shipped from the factory in one shipment eliminating the delays due to mismatch/delay in some parts. The success of the project is

not only in supply of the right technology and equipment, but also provides right operational training to the teams. They provide training to the operational and maintenance teams and also take up contracts for the same to ensure the project success.

Source: Steel 360

### **Attitude of Gratitude**

Do you count year blessings or think your blessings don't count? Do you have an attitude of gratitude? When you stop to think more, you'll stop to thank more. Of all our feelings, gratitude seems to have the shortest memory.

Cicero said, "A thankful heart is not only the greatest virtue, but the parent of all other virtues." The degree that you are thankful is a sure gauge of your spiritual health.

To lose, you don't have to have anything stolen from you; all you have to do is take everything you have for granted. Instead, when you count all your blessings, you will always show a profit.

Today, replace regret with gratitude. Be grateful for what you have, not sorry for what you have not. If you can't be thankful for what you have, then be thankful what you have escaped.

Henry Ward Beecher said, "The unthankful..... discovers no mercies; but the thankful heart... will find in every hour, some heavenly blessings." The more you complain, the less you'll obtain.

"If we get everything we want, we will soon want nothing that we get" (Vernon Luchies). If you don't enjoy what you have, how could you be happier with more?

The seeds of discouragement will not grow in a thankful heart. Erich Fromm remarked,, "Greed is a bottomless pit which exhausts the person in an endless effort to satisfy the need without ever reaching satisfaction.

Epicurus reflected, "Nothing is enough for the man to whom enough is too little." It's a sure sign of mediocrity to be moderate with our thanks. Don't find yourself so busy asking others for favors that you have no time left to thank them.

"Happiness always looks small while you hold it in your hands, but let it go, and you learn at once how big and precious it is" (Maxim Gorky). We should have the attitude of George Hubert, when he said, "Thou O Lord hast given so much to me, give me one more thing-a grateful heart." Don't find yourself at the end of your life saying, "What a wonderful life I've had! I only wish I'd appreciated and realized it sooner.

Thank God for dirty dishes; they have a tale to tell.

While other folks go hungry, we're eating pretty well.

With home, and health, and happiness, we shouldn't want to fuss.

For by this stack of evidence, God's very good to us.

**This is the first 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

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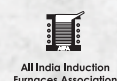
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## For Booking and Enquiries, Contact us at:

**Gagan Sahni**, Exhibition Director  
 Tel: +91-11-40828220 (D), Mob: +91-9810036183  
 Email: gagan.sahni@itei.in  
**Varun Sharma**, Project Head  
 Tel: +91-11-40828208 (D), Email: varun.sharma@itei.in  
**Smita Roy**, Confex Manager  
 Tel: +91-11-40828217 (D), Email: smita.roy@itei.in  
**Sandeep Arora**, Manager (Sales)  
 Tel: +91-11-40828227 (D), Email: sandeep.arora@itei.in



# Steely strategies to accelerate growth



▲ Loading system at SAIL Bolani Mines



▲ Wire rods at SAIL Burnpur



▲ Torpedo ladle at SAIL Rourkela

Maintaining its dominant position in the Indian steel market, SAIL is continually improving to reach new heights of world - class product portfolio with enhanced capacities, backed by sustainable processes & practices.



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