

**IIM**Metallurgy
Materials Engineering

NEWSLETTER

THE INDIAN INSTITUTE OF METALS

(DELHI CHAPTER)

ANIL GUPTA

Chairman, Delhi Chapter

S. C. SURI

Chairman, Technical & Publication Cell

Issue No. 46/2011**Vol. XLVI "Monthly"****Date: 30.09.2011****Advisory Committee***L. Pugazhenthly
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This News Letter is containing brief on 3rd meeting of the Executive Committee of IM-DC held on 3.9.2011. The News Letter also contains the following Technical write-ups:

1. Mining Industry in India by Mr. Anil Gupta, Chairman, IIM Delhi Chapter
2. India Economy & Indian Steel Sector-A review for Fiscal 2010-11 by Mr. S C Suri, Life Fellow IIM & Vice Chairman, IIM DC
3. Interactive Session with Secretary (Mines) on "Mining Sector in India: Challenges and Opportunities in Decade Ahead"
4. Visit of Dr. Sanak Mishra, Past President IIM, to IIM Delhi Chapter
5. International Conference on Materials for Advanced Technologies in Singapore by Dr. A K Srivastava, Life Member, IIM Delhi Chapter
6. The News Letter also contains National and International news relating to ferrous & non-ferrous sector

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Jawahar Dhatu Bhawan, 39 Tughlakabad Institutional Area, M B Road

Near Batra Hospital, New Delhi-110 062

Tel: 011-29956738, Telefax: 011-29955084; E-mail: iim.delhi@gmail.com

Website: iim-delhi.com

Chapter News

Executive Committee Meeting

- (a) The 3rd meeting of the EC of IIM Delhi Chapter was held on 3.9.2011. The budget estimates of the following three cells were discussed in the meeting.
- 1 Asset Management Cell
 - 2 Relation & Development Cell
 - 3 Technical & Publication Cell
- (b) An EC team comprising Shri Raj Tiwari, Shri R K Gupta and Shri M P Sharma visited Punjab Engineering College, Chandigarh on 14.9.2011 to discuss the proposal of Award of Scholarships to the engineering students. The team also discussed the career opportunities for Metallurgical Engineering students in industry.

Mining Industry in India

Anil Gupta
Chairman, IIM Delhi Chapter

Mining Industry in India is an important economic sector which contributes significantly to the economy of India. India's minerals range from both metallic and non-metallic types. The total working mines were 2,854 in 2007-08 with 569 mines belonging to coal and lignite, 676 mines to metallic minerals and 1,609 mines to non-metallic minerals. There were 755 mines in public sector and the remaining 2,099 mines in private sector. India is an important exporter of iron ore, titanium, manganese, bauxite, granite, and imports cobalt, mercury, graphite etc. India's mineral resources of the country are surveyed by the Indian Ministry of Mines, which also regulates the manner in which these resources are used.

The Ministry oversees the various aspects of industrial mining in the country. Mining in India comes under both the federal and state supervision. Coal Mining Companies in India are almost exclusively government owned because of the government Coal Mines Nationalization Act in the 1970s.

Mineral Production of India

The total value of mineral production (excluding atomic minerals) was around \$25 billion during 2007-08. In the total value of mineral production, the fuel minerals contributed the major share of Rs.70,336 crore or 61%. The rest accrued from metallic minerals at Rs. 24,038 crore or 21 %, non-metallic minerals, Rs. 3,446 crore or 3% and minor minerals Rs.16,695 crore or 15% (Source Indian Bureau of Mines)

Fuel Minerals

The value of fuel minerals in 2007-08 was at Rs. 70,336 crore. The production of coal at 457 million tonnes, lignite at 34 million tonnes, petroleum (crude) at 34 million tonnes and natural gas (utilised) at 32,274 m cu m.

Metallic Minerals

Among the principal metallic minerals, iron ore contributed Rs. 18,495 crore or 77%, chromite Rs. 2,020 crore or 8%, manganese ore Rs. 1,098 crore or 5%, lead (concentrate) & zinc (concentrate) Rs. 1,080 crore or 4%, bauxite Rs. 526 crore and copper (concentrate) Rs. 383 crore or about 2% each, gold Rs. 283 crore or 1%. The remaining was jointly shared by silver and tin concentrates. The production of iron ore at about 206.45 million tonnes, Manganese Ore was 2.6 million tons, Gold only 2.8 tons, Bauxite 23.1 million tons, Chromite 4.8 million tons and Copper concentrate at 159 thousand tons.

Mining Reserves of India

India has significant sources of coal (fourth-largest reserves in the world). For bauxite, titanium ore,

chromite, natural gas, diamonds, and limestone. India ranks 3rd in production of coal & lignite, 2nd in barites, 4th in iron ore, 4th in bauxite and crude steel, 7th in manganese ore and 8th in aluminum (source Wikipedia).

In India, 80 per cent of mining is in coal and the balance 20 per cent is in various metals and other raw materials such as gold, copper, iron, lead, bauxite, zinc and uranium.

Mining Industry in India Issues

One of the most challenging issues in India's mining sector is the lack of assessment of India's natural resources. A number of areas remain unexplored and the mineral resources in these areas are yet to be assessed. The distribution of minerals in the areas known is uneven and varies drastically from one region to another. The accidents in mining are caused both by man-made and natural phenomenon, for example explosions and flooding. The main causes for incidents resulting in serious injury or death are roof fall, vehicular accidents, falling/slipping and hauling related incidents. In recent decades, mining industry has been facing issues of large scale displacements, resistance of locals, environmental issues like pollution, corruption, deforestation, dangers to animal habitats.

India Mining Policies

The Government of India has enunciated National Mineral Policy, 2008 which includes policy measures like assured right to next stage mineral concession, transferability of mineral concessions and transparency in allotment of concessions. New Exploration Licensing Policy (NELP)-VIII was announced by the Government of India in 2009 offering 70 oil and gas blocks covering a sedimentary area of about 163,535 sq km comprising 24 deep water, 28 shallow water and 18 on-land blocks

MINING COMPANIES

Privately owned Indian Mining Companies

Hindalco Industries Ltd. – With a market cap of Rs.29,000 crores, revenue Rs.5,900 crores & NPM 7.7% (Dec'10), Hindalco Industries is an industry leader in aluminium and copper. The metals flagship company of the Aditya Birla Group is the world's largest aluminium rolling company and one of the biggest producers of primary aluminium in Asia. Its copper smelter is the world's largest smelter at a single location. It is a metals powerhouse with high-end rolling capabilities and has a global presence in 12 countries. The company's copper unit, Birla Copper, produces copper cathodes, continuous cast copper rods and other by-products, such as gold, silver and DAP fertilisers. Birla Copper also produces precious metals, fertilisers and sulphuric and phosphoric acid. Hindalco's major products include standard and speciality grade aluminas and hydrates, aluminium ingots, billets, wire rods, flat rolled products, extrusions and foil.

In 2007, Hindalco Industries Limited acquired Novelis (a spin-off from Alcan Inc). Novelis Inc. is the world's leading aluminium rolled products producer based on shipment volume. The company produces an estimated 19 per cent of the world's flat-rolled aluminium products and is the number one producer in Europe and South America, and the second largest in North America and Asia. Novelis is also the world leader in the recycling of used aluminium beverage cans. Hindalco Industries Ltd, also owns 51% of Aditya Birla Minerals Ltd. Hindalco-Almex Aerospace Limited (HAAL) is a joint venture between Hindalco Industries Limited and Almex USA Incorporated. The company manufactures high-strength aluminium alloys for applications in the aerospace, sporting goods and surface transport industries. Hindalco holds 70% equity while the balance 30% is held by Almex.

VEDANTA GROUP COMPANIES

Vedanta Resources – It is an LSE-listed diversified FTSE 100 metals and mining company, and India's largest non-ferrous metals and mining company based on revenues. There are other operations in Zambia and Australia. Vedanta Resources is engaged in copper, zinc, aluminium

and iron ore businesses, and are also developing a commercial power generation business. There has been a significant growth in recent years. Revenue from the businesses increased from \$3,701.8 million in 2006 to \$7,930.5 million in 2010. The acquisition of Sesa Goa (51% of ownership) in 2007 marked the entrance in the iron ore business. Sesa Goa is engaged in the exploration, mining and processing of iron ore. The Indian copper business of Vedanta Resources is principally one of custom smelting and is operated by Sterlite (54% of share capital). The zinc business is owned and operated by Hindustan Zinc Ltd, India's leading zinc producer. Sterlite owns 64.9% of the share capital of HZL. The aluminium business is primarily owned and operated by BALCO. Sterlite owns 51% of the share capital of BALCO. Vedanta Aluminium also contributes to the aluminium business. The company owns 70.5% of the share capital of Vedanta Aluminium, with Sterlite owning the remaining 29.5%.

Vedanta recently entered India's Oil and Gas Business through its intention of acquiring India's second largest private listed company Cairn India though it still is awaiting for a government clearance. Vedanta which is India's biggest Mining Company recently ran into a major controversy for violating environmental, forest and tribal laws at a mine in Niyamgiri hills in the mineral rich poor state of Orissa. The mining permit was cancelled despite strong support from the provincial government. A number of top investment funds have sold all their Vedanta shares on ethical concerns.

Sesa Goa Ltd. – It is India's largest producer and exporter of iron ore in the private sector and is on route to be in the league of top four iron ore producing companies in the World. Apart from Iron ore it also produces pig iron and metallurgical coke. It has a market capitalisation of Rs.12,000 crores, revenue of Rs.1,700 crores & NPM of 49% (Dec'10). Sesa Goa Ltd was acquired by the Vedanta Resources in 2007, which owns 51% of the company. It was India's largest producer-cum-exporter of iron ore in the private sector by volume in 2007, according to the Federation of Indian Mineral Industries.

Sterlite Industries (India) Ltd. – Another Vedanta Group company with a market cap of Rs.27,000 crores, revenues of Rs.4,000 crores & NPM 7% (Dec'10), Sterlite Industries is one of the fastest growing private sector companies. It is India's largest non-ferrous metals and mining company and is listed on the BSE and NSE in India. It is the First Indian Metals & Mining Company to list on the New York Stock Exchange. The primary business consists of Aluminium, Copper, Zinc, Lead and Commercial Energy. The Indian copper business of Vedanta Resources is operated by Sterlite. The Vedanta resources owns 54% of Sterlite Industries' share capital. Sterlite was India's largest metals and mining company based on net sales in 2008.

Hindustan Zinc - India's leading zinc producer with a 79.7% market share by volume of the Indian zinc market in 2008, according to the Indian Lead Zinc Development Association & world's second largest integrated producer of zinc & lead, with a global share of approximately 6% in zinc. Hindustan Zinc is an integrated mining and resources producer of zinc, lead, silver and cadmium, with a market capitalisation of Rs.64,000 crores, revenues of Rs.3,000 crores & net profit margin of 54% (Dec'10). The core business comprises of mining and smelting of zinc and lead along with captive power generation. Hindustan Zinc is a subsidiary of Sterlite Industries which owns 64.9% of the share capital of HZL.

Public sector Enterprise (Government Owned Companies)

1. **NMDC Ltd.** – It was incorporated in 1958 as a Government of India fully owned public enterprise. NMDC is under the administrative control of the Ministry of Steel, Government of India. NMDC is involved in the exploration of wide range of minerals including iron ore, copper, rock phosphate, lime stone, dolomite, gypsum, bentonite, magnesite, diamond, tin, tungsten, graphite, beach sands etc. It is India's single largest iron ore producer and exporter, presently producing about 30 million tons of iron ore from 3 fully mechanized mines. NMDC has the only mechanized diamond mine in the country with a capacity of 1 lakh carats per annum in Madhya Pradesh.

2. **National Aluminium Company Ltd.** - Incorporated in 1981, as a public sector enterprise of the Government of India, National Aluminium Company Limited (Nalco) is Asia's largest integrated aluminium complex, encompassing bauxite mining, alumina refining, aluminium smelting and casting, power generation, rail and port operations. With a market capitalisation of Rs.24,000 crores, revenues Rs.1,400 crores & net profit margin of 17% in 2010, Nalco is now India's 2nd largest aluminium company
3. **Hindustan Copper** – incorporated in 1967, Hindustan Copper Limited is a public sector enterprise of the Government of India. It is India's only vertically integrated copper producing company encompassing mining, beneficiation, smelting, refining and casting of refined copper metal. It is under the administrative control of the Ministry of Mines. The Company markets copper cathodes, copper wire bar, continuous cast copper rod and by-products, such as anode slime (containing gold, silver, etc.), copper sulphate and sulphuric acid. More than 90% of the sales revenue is from cathode and continuous cast copper rods. The company is supposed to come out with an IPO soon.
4. **MOIL** – MOIL is the largest Manganese Producer in India with around 1.1 million tons production in 2010. The Company is planning to increase production by around 10% each year to reach 1.5 million tons by 2014. The 69 million tons of reserves that the company has is of high grade ores. The Company accounts for around 50% of the Ferro Manganese production in India. The Company has set up JV with Indian Steel PSUs to set up value added manganese alloys production for the Steel Industry. The company came out with an IPO in 2010.
5. **Coal India Limited (CIL)**- The State owned Giant Coal Producer dwarfs the other companies through its sheer size, scale, cost and reach. The company has fared poorly in the current year after its IPO as its production growth has almost come to Zero. However it sells coal at such a low cost, that it could easily raise prices of coal in select categories to meet its financial goals. One of the safest investments in the stock market. It possesses high level of cash, low valuation compared to global peers and has a huge room to raise coal prices in the future.
6. **Neyveli Lignite Corporation** is a PSU like NTPC and is also involved in lignite mining company in India. The company is mainly based in the southern state of Tamil Nadu and mines some 24 million ton of lignite per year.
7. **Singareni Collieries Company Limited (SCCL)** is a PSU jointly owned by Andhra Pradesh and the Federal Government. The company is involved in mining coal in the Godavari Valley region, with reserves of around 8 Billion Tons with production of around 50 million tons a year.

Others – Other smaller companies are SMIOR, Mangilal Rungta, Bombay Minerals, Prabhu Das Vithal Das, OMC, MML and Industrial Development Corpn. of Orissa Ltd (IDCOL), Hutti Gold Mines, Indian Rare Earths Ltd, Uranium Corporation of India, Bharat Gold Mines. Note Steel companies like SAIL, Tata Steel and others have big captive mines of chromite, coal and iron ore which they use for their captive consumption.

Exploration of Resources: Problems faced

Mining industry in India has been progressing at an annual rate of 4% to 5% during the last three decades. It appears that the concept of 'growth at all cost' has become the order of the day. This is rather too heavy a price to pay for development's sake. This 'mad rush' to produce gives way to unsustainable developments.

As far as mining is concerned, the price for progress has also been quite high. The late Shri S Mohan Kumarmangalam, the then Minister of Steel & Mines, had given a scathing but vivid description of the coal industry scene in his book 'Coal Industry in India'. This was generally true of smaller units especially spread over in the Jharia and Raniganj fields.

"Workers were cheated of their legitimate dues. Slaughter mining, lack of conservation and unscientific mining methods remained characteristic of large areas of the industry. The mine owners

successfully prevented any further progress towards implementation of the numerous recommendations of the different committees made over the years. 'Lathials' or musclemen protected the interests of the mine owners. Rampant corruption, forced labour, dubious and duplicate records, under-reporting of production, non-payment of full wages, extended hours of shift, lack of safety and welfare measures, robbing of pillars of coal, selective, seasonal and shallow depth mining in a haphazard manner etc. seemed to be the guiding principles of a large number of private collieries."

Violations of mine safety laws were widespread. The extensive fires and collapses were the result of unscientific mining practiced over the years and the cost to the nation was considerable in the shape of loss of coal reserves and in controlling fires. Mine ventilation was poor, support inadequate, safety equipment conspicuous by their absence. The hazards to which workers were exposed to had been a matter of severe criticism. A dangerous situation had developed and the Government could no longer remain a passive spectator. This paved the way for nationalisation of the coal industry during 1971-73. Though the situation since then has improved considerably in some of the areas, many problems of the past remain and need to be addressed. Quest for development has to go hand in hand with rapid industrialisation, and mining has to remain an important cog in the wheel of development. It is expected that accentuated efforts on mining shall be witnessed in the years to come. As the mine operators begin to look forward for ways and means to improve efficiency and cut costs, safety considerations certainly assume more and more important position and emerge as significant factor even purely on economic considerations. Side by side modern society is also tending more and more to demand a safe and decent work environment, as a social need. Thus, results are being demanded. Tools and skill are available, and achievement with tremendous humanitarian and economic benefits are within the realm of practical possibility.

Information extracted from website

Indian Economy and Indian Steel Sector – A Review for Fiscal 2010-11

S C Suri

Life Fellow IIM, Vice Chairman IIM-DC

Indian Economy

The Indian economy has recovered from the aftermath of global financial crisis in 2008-09 when the GDP dipped to 6.8%. The economy recovered to GDP growth rate of 8% in 2009-10. Revised estimate for GDP growth for 2010-11 is 8.5%. The revival in growth was on account of Agriculture sector which rebounded with a growth of 6.6% for 2010-11, after near stagnant growth for the past 2 years. Services posted a growth rate of 9.4% while industry at 7.9% showed signs of slowdown in the second half of the fiscal.

Manufacturing sector which grew at double digit rates in the first 2 quarters, slowed down to 6 & 5.5% respectively in Q-3 and Q-4. In the steel consuming segments, capital goods sector grew at 9.3% as against 20.9% in the previous year. Construction which had a growth of 9.7% in 2009-10 slowed down marginally to 8.1% in 2010-11.

Inflation continues to be an area of concern. Oil prices which were below US \$ 80 per barrel till September, 2010, sharply increased to US \$ 114 per barrel in March, 2011. Despite RBI following a tight monetary policy, demand side pressure in the economy continues to be major area of concern.

In the area of foreign trade, exports at \$246 billion in 2010-11 grew at 37.5% mainly on account of engineering goods and petroleum products. Imports at \$350 billion, grew at a rate of 22% in the above period.

The GDP growth rate for 2011-12 has been projected between 7.5 to 8.0% for 2011-12. Although Govt. managed to contain the fiscal deficit to 5.1% from the budgeted level of 5.5% on strength of tax buoyancy and one time receipt from 3G spectrum allocation, inflation continues to be an area of concern.

STEEL SCENARIO

Global Steel Industry

The global steel production which had declined on account of the intervening global financial crisis, showed a sharp pick-up in 2010. As per World Steel Association, world crude steel production reached a record level of 1414 million metric tons in 2010, a growth of 15% over 2009. All the major steel-producing countries and regions showed double-digit growth in 2010. The world finished steel consumption estimated at 1283 mmt for 2010, grew at 13% over the previous year.

Among the major steel producing and consuming nations, India is attractively positioned with its vast resources of iron ore and low costs underpinning its supply-side competencies, while the low per-capita consumption levels and strong growth drivers in the end use sectors ensure reasonably stable growth prospects.

World Steel Association (WSA) has projected a growth rate of around 6% p.a. for the next 2 years for global steel consumption. China will continue to be the dominant steel consuming nation in terms of its contribution to the incremental steel demand. However, its growth rate will moderate to around 5%.

World steel production (Million Metric Tonnes)

	2004	2005	2006	2007	2008	2009	2010	%2010/2009
Europe of which	339.8	333.8	355.1	364.5	342.2	265.5	314.9	18.6
EU (27)	202.5	195.6	207.0	209.7	198.0	138.8	172.9	24.6
EU (15)	169.1	165.1	173.2	175.2	167.6	117.2	147.2	25.5
CIS	113.4	113.2	119.9	124.2	114.3	97.6	108.5	11.2
North America of which	134.0	127.6	131.8	132.6	124.5	82.4	111.8	35.7
United States	99.7	94.9	98.6	98.1	91.4	58.2	80.6	38.5
South America	45.9	45.3	45.3	48.2	47.4	37.8	43.8	15.9
Africa	16.7	17.9	18.7	18.7	17.0	15.2	17.5	15.4
Middle East	14.3	15.3	15.4	16.5	16.6	17.7	19.6	11.0
Asia of which	512.5	595.5	672.3	756.9	771.0	804.9	897.9	11.6
China	282.9	353.2	419.1	489.3	500.3	573.6	626.7	9.3
Japan	112.7	112.5	116.2	120.2	118.7	87.5	109.6	25.2
Australia/New Zealand	8.3	8.6	8.7	8.8	8.4	6.0	8.1	35.5

Top 10 steel Producing Countries (Crude Steel in MT)

Rank	Country	2010	2009	% Change 2010/2009
1	China	626.7	573.6	9.3
2	Japan	109.6	87.5	25.2
3	US	80.5	58.2	38.5
4	India	68.3	63.5	7.6
5	Russia	66.9	60.0	11.5
6	South Korea	58.5	48.6	20.3
7	Germany	43.8	32.7	34.1
8	Ukraine	33.6	29.9	12.4
9	Brazil	32.9	26.5	23.8
10	Turkey	29.1	25.3	14.6
	Top 10	1149.7	1005.1	14.3
	World	1413.6	1230.9	15.0

In 2010, top 10 countries accounted for 81.3 per cent of the total global crude steel production. India moved up to become the 4th largest producer in 2010 from 5th position in 2009 and recorded a growth of 7.6 per cent in 2010 over 2009.

Short range outlook for apparent steel use, finished steel (2010-2012) as per WSA

Regions	2010	2011 (f)	2012 (f)	2010	2011 (f)	2012 (f)
European Union (27)	144.8	151.8	157.5	21.2	4.9	3.7
Other Europe	29.6	32.8	35.2	23.8	11.0	7.3
CIS	48.5	52.1	56.7	34.3	7.5	8.9
NAFTA	110.3	122.3	130.0	33.0	10.9	6.3
Central & South America	45.8	48.8	52.8	36.4	6.6	8.3
Africa	25.9	25.1	27.4	-3.6	-3.1	9.1
Middle East	45.3	46.5	49.9	7.2	2.6	7.3
Asia & Oceania	833.6	879.9	931.1	8.4	5.5	5.8
World	1283.6	1359.2	1440.6	13.2	5.9	6.0
Developed Economies	373.1	392.0	406.8	24.7	5.1	3.8
Emerging & Developing Economies	910.5	967.2	1033.8	9.1	6.2	6.9
China	576.0	604.8	635.0	5.1	5.0	5.0
BRIC	698.9	738.8	784.7	8.0	5.7	6.2
MENA	60.6	60.5	65.3	2.4	-0.1	7.9
World Excl. China	707.6	754.5	805.6	20.7	6.6	6.8

(f) Forecast

Indian Steel Sector

As per World Steel Association, India was the world's 4th largest producer of crude steel globally in 2010 with a production of approx. 68.3 MT of crude steel. According to JPC estimates, the finished steel consumption of carbon steel in India grew by 10.8% in 2010-11 over the previous year. There was a reduction in both finished steel imports as well as exports as domestic steel producers expanded to cater to emerging demand. Long products viz. bars and rods and structurals performed strongly with high consumption growth. The growth in consumption of flat products was modest.

Over the past few years, consumption has been primarily driven by the continuous increase in infrastructure related investment, leading to higher demand for steel. However, the country's per capita consumption is still one of the lowest in the world, presently at 51.7 kg per capita versus 427 kg for China and a global average of approx. 203 kg, leaving a high potential of steel demand with increase in per capita consumption linked to higher income growth. At present, the Indian steel industry faces a supply deficiency as capacity building has lagged growth in consumption. Large green-field projects have not been set up in India over the past few years due to regulatory, social and infrastructure bottlenecks. Capacity additions in the short term are primarily brown-field projects by existing players.

(Information extracted from: SAIL Annual Report 2010-11)

Interaction Programme of Mining Sector – Challenges and Opportunities in the Decade Ahead

The Indian Institute of Metals – Delhi Chapter and International Trade and Exhibitions Events Pvt. Ltd. (ITEE) organized an interactive meet with Shri S. Vijay Kumar, Secretary (Mines), Government of India, on 27th September 2011 at India International Centre, New Delhi. The theme of the interactive meet was "Mining Sector – Challenges and Opportunities in the Decade Ahead". Around 60 participants from different organizations participated in the deliberations. The Secretary (Mines) was welcomed by Shri K V Rajan, Chairman, ITEE.

In his presentation Shri Vijay Kumar highlighted the importance of minerals as they constitute the valuable natural resource since they form a basic raw-material for the development of infrastructure,

capital goods and basic industries. He also stated that as a major resource for development, the extraction and management of minerals has to be integrated into the overall strategy of the country's economic development. He was of the view that exploitation of minerals has to be guided by long term national goals and perspective.

Shri Vijay Kumar presented the basic features of the New National Mineral Policy which covers the following key issues.

- 1 Regulation of minerals
- 2 Role of the Central and State Governments
- 3 Role of Geological Survey of India in survey and exploration of minerals
- 4 Compilation of data base of mineral resources as a resource inventory
- 5 Conservation of Minerals
- 6 Scientific methods of mining
- 7 Mining as an industry with appropriate linkages
- 8 Manpower development
- 9 Infrastructure development
- 10 Financial support for the mining sector
- 11 Mineral Development and protection of Environment
- 12 Relief for displaced persons
- 13 Role of Research and Development
- 14 New Technologies for mineral processing and beneficiation
- 15 Development of equipment for mine development

Shri S. Vijay Kumar was of the view that mineral wealth is a major resource for development and is a non-renewable source in the long run. Therefore, there exists a strong need for a well-planned programme of survey and exploitation.

Shri Vijay Kumar also stressed about the need of constituting a Technology Group, which should have a detailed evaluation regarding the possibility of using leaner ores. The technology group should also study the possibility of using of large quantity of iron ore fines that are available at different pit-heads so that this resource base could be efficiently utilized in the form of sinter / pellets. In this context, he welcomed the involvement and participation of IIM in the constitution of such R&D and Technology groups.

The participants had detailed interaction with Shri S. Vijay Kumar after his presentation. The Secretary gave his observation and response to the various queries / comments raised by the participants. The technical content of the meeting was extremely good.

Visit of Dr. Sanak Mishra, Past President, IIM

Dr Sanak Mishra, Past-President, IIM and Vice President ArcelorMittal and CEO, India Greenfield Project, visited the Institute on 15th September 2011 afternoon. He was accompanied by Shri Manoranjan Ram, member EC. Dr Mishra was taken round the various floors of our building. He visited the Lecture Hall, Board Room and the Library. He also visited the offices of the UNDP, Engineering Council of India and India Lead Zinc Development Association.

He was briefed about the various activities undertaken by our Chapter in the last 2-3 years.

He was happy about the activities of the Chapter. He promised to visit our Institute more frequently. He agreed to deliver a talk in the Institute in the near future. He appreciated about the upkeep and cleanliness of the Institute building.

Ten Facts about Chanakya & His "Arathashastra"

Raj Tiwari
Life Member, IIM Delhi Chapter

- Fact One : Chanakya was born in 3rd Century B. C. in India
- Fact Two : He was also known as Vishnugupta and Kautilya
- Fact Three : He was King Maker who brought down "Nanda Dynasty" & made his own student "Chandragupta Maurya" as an Emperor.
- Fact Four : Chandragupta was "dasiputra" still his one of the wives was Chanakya's daughter.
- Fact Five : Chanakya plotted the defeat of "Alexander the Great" in India.
- Fact Six : At that time India was divided into number of small kingdoms. It was Chanakya who created single nation "Aryavartha" by merging all these various kingdoms into one under Chandragupta Maurya. The same was done after independence by Sardar Vallabhabhai Patel to build India as one nation.
- Fact Seven : Chanakya has documented his life long experience in the books "Arathashastra and Chanakya niti".
- Fact Eight : "ARTHASHASTRA" means "scripture of Wealth" but it contains knowledge about every subject and so it is also called "Wealth of knowledge"
- Fact Nine : The complete "Arathashastra" is composed of 6000 sutras which are divided in 15 books having total 150 chapters and 180 topics by Chanakya himself.
- Fact Ten : Out of 15 books of "Arathashastra" six books are dedicated to art of warfare. It means, in today perspective it is management of powerful organization. He emphasizes importance of Intellectual power, Man power, financial power and above all power of morale and ethics in any organization.

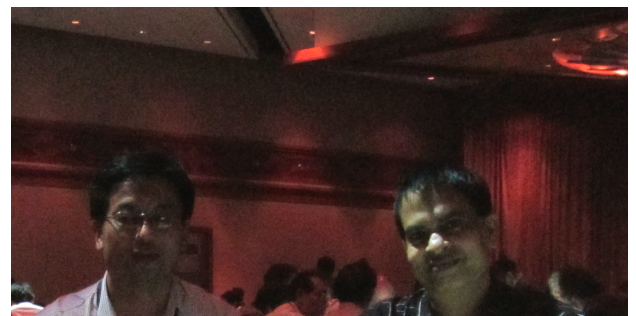
A brief on International Conference on Materials for Advanced Technologies Singapore, June 26 to July 01, 2011

Dr. Avanish Kumar Srivastava
Member, IIM Delhi Chapter &
Principal Scientist
National Physical Laboratory, New Delhi

The International Conference on Materials for Advanced Technologies (ICMAT-2011) was organized by the Materials Research Society of Singapore (MRS-S) in association with National University of Singapore (NUS), Nanyang Technological University (NTU) and Institute of Materials Research and Engineering (IMRE).

There were forty technical symposia covering almost all the aspects of Materials Science, Engineering and Technology.

There were nine plenary lectures by distinguished scientists including four by nobel laureates, three theme



Professor Qing Zhang (Chairman-Nanodevices and nanofabrication) and Dr. A.K. Srivastava (Co-chairman-Carbon nanotubes, post treatment)

lectures and two public lectures by nobel laureates. The sessions on nanostructured oxides, interfaces, hetero structures and devices, synthesis and architecture of nanomaterials, nanodevices and nanofabrication and nanoscale patterning, assembly and surface modification were among few important scientific attractions. Some of the important lectures covered during the conference were challenges and emerging directions in spintronics, Transformation of today's energy system towards sustainability-challenges for materials science, Graphene: status and prospects, Semiconductor nanowires: a platform for nanoscience and nanotechnology, Ribosomes-RNA machines that survive evolution pressure. As an invited speaker I was directly involved to the symposia on nanodevices and nanofabrication which was chaired by Professor Qiang Zhang of Nanyang Technological University. In this symposia, I also co-chaired a session on carbon nanotubes. Overall it was an excellent experience to attend this conference.

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National & International News

L&T Plans to Invest Rs. 85000 Cr in Orissa

The company stated that the amount of Rs. 85,000 crores will be invested in aluminium, power and steel segments. At the sideline of ASSOCHAM's investors meet, L&T's president Sailendra Roy stated, "We have already given proposals to the state government. The company will proceed as soon as the state government clears the proposals." Mr. Roy said that out of the said amount, around Rs 30,000 crore would be spent to establish an aluminium facility. The said plant would be set up in association with Dubai based company. L&T is also eyeing to establish two thermal power stations with a capacity of 2,000 megawatts each. One of the company's power stations would be established at Dhamra in Bhadrak region, whereas the site for another power station is not decided yet. Mr. Roy added that a plan to set up a steel plant was also forwarded to the state administration. Moreover, Larsen & Toubro has pocketed deals worth Rs 1,610 crore from clients comprising Tata Steel and Indiabulls Power.

Source: Aluminium Association of India

Alcoa unveils 3rd generation aluminium lithium alloys and technologies

Alcoa has announced new aluminium-lithium alloy and structural technologies enabling airframers to "build dramatically lighter and lower-cost" short-haul aircraft "at significantly lower production risk than composite-intensive planes". "The decisions made in the past decade to build the first composite-intensive aircraft was a huge wake-up call for us," said Mick Wallis, president of Alcoa North American rolled products, referring to the development of Boeing's majority-composite 787. The announcement comes as Boeing is deliberating about whether or not to build a new small aircraft (NSA) to replace the Next Generation 737 or re-engine the company's best seller. Further, the decision is also surrounded by deliberations over material selection and whether or not the aircraft would have a primary structure that is a majority aluminium or composite or a hybrid of the two. "No

decisions have been made on what those materials will be on future products," said John Byrne, Boeing director of aircraft materials and structures, "But we are delighted to hear about the investments and advances Alcoa and other raw-material suppliers are making." However, Alcoa is working with Boeing to evaluate the potential for the third generation alloys and how to apply them for future products. Alcoa claims a 10% comparable weight savings of the lower density third generation aluminium-lithium alloys versus "composite-intensive" aircraft, citing the need for lightning and bird strike protection in a carbon fibre airframe, while delivering up to 30% cost savings to manufacture, operate and repair over the material lifecycle. Further, the new alloys can work within today's existing aluminium infrastructure, aiming to cut down on the initial non-recurring capital expenditure to industrialise a new aircraft programme.

Alcoa and Spirit AeroSystems partnered to validate manufacturing techniques and will display a joint manufactured demonstration panel at the upcoming Paris air show.

Source: Aluminium Association of India

New Steel Policy on the Cards

The government is in the process of framing a new steel policy to replace the existing guidelines and will soon appoint task forces to come out with reports to address issues hurting the sector's growth and propel projects.

The need for the new policy was felt in the light of the changing demand-supply scenario and concerns over rising imports, besides delays in mega ventures for capacity addition to bridge the supply deficit. "An in-principle decision to replace the National Steel Policy 2005 has been taken and a panel -- the Apex Committee on Formation of New Steel Policy; headed by Steel Secretary P K Misra, is working toward a blueprint of the policy" a Steel Ministry official in-the-know of the development said. Four task forces are in the pipeline for coming out with reports on economic considerations, technical, environmental and manpower issues, raw material security and infrastructure constraints affecting the steel sector, the official added.

Before coming out with the reports, the task forces will assess the industry's key concerns, including increasing raw material insecurity, constraints in expansion projects and infrastructure bottlenecks. Misra has already directed Steel Joint Secretary UP Singh to "soon convene a meet of all member secretaries of each task force committee and finalise the final constitution of the task forces." The 11-member apex committee has decided that the different task forces will have representation from the industry as well. The present policy had projected annual growth in steel demand at 6.9%, but in reality, it is growing at the rate of 9.2%. However, despite the growth, the country has been depending on imports, which became a key concern prompting the government to frame the policy aimed at faster setting up of projects.

The country's steel imports have risen sharply from 1.4 million tonnes in 2001-02 to 7.3 million tonnes in 2009-10. The domestic industry which has investments worth about Rs. 11.00 lakh crore in the pipeline, faces multiple challenges like green clearances, tribal protests and delays in land acquisition and allocation of mines to feed projects. South Korean major POSCO had entered into an agreement with Orissa in 2005 for setting up a 12-MTPA plant at an investment of Rs 54,000 crore, billed as the country's largest FDI. But the work is still to start on the project. Similarly the world's largest steel-maker, ArcelorMittal, had entered into a pact with the Jharkhand government in 2005 and in 2006 with the Orissa government to set up plants of 12-MTPA each at a total investment of about Rs 1.00 lakh crore. These, too, are yet to take off.

Source: AISRA

World Coal Market Re-centres on India

China's coal industry, the largest in the world, may be almost six times that of India's but its impact on world coal trade is smaller. Chinese domestic production has managed – just about – to keep pace

with demand. In India, that is not the case. Despite having some 8% of the world's proven black coal reserves, India's state-dominated coal sector is struggling to raise production in line with the rapid construction of new coal-fired power plants.

Buying coal from China, India and Indonesia are expected to account for 90% of coal demand growth by 2035, according to the International Energy Agency's World Energy Outlook 2010, OECD demand, by contrast, is expected to fall. But this is not about future demand, it is about today. Thermal coal consumption rose to 29.6% of the global energy mix in 2010, its highest level since 1970.

China may be the great producer and consumer of coal but out of all Asia, it is India that has emerged as the key player. Expectations are that China would soon turn into an increasingly large net importer of coal. Other Asian countries are expected to add significantly to coal demand, such as current exporter Vietnam, remain a few years of dependence on the global market.

This leaves India as Asia's most dynamic growth market, driven by urbanization, rural electrification, population growth and rising standards of living. India has returned to 8% plus annual GDP growth following the financial crisis and some forecasts suggest 10% can be achieved in the next few years. It is the world's fifth largest energy market, but has one of the lowest per capita levels of energy consumption. That is a recipe for long-term growth.

However, India's options for power are limited. It has nuclear and relatively newly-discovered gas resources, some of which have recently been brought on-stream. It has also built significant LNG importing capacity. But it has been unsuccessful in its plans to facilitate international gas import pipelines. Moreover, compared to other countries, its shale gas reserves, as outlined by US Energy Information Administration report World Shale Gas Resources: An Initial Assessment of 14 regions outside of US, are relatively unimpressive. India's technically recoverable shale gas resource was estimated at 63 Tcf, compared to China's 1,275 Tcf or Argentina's 774 Tcf. That leaves coal, which means power, and power means development. India has huge proved reserves and even more that is harder technically to recover. For a country at India's stage of development, and with its limited state of natural resources, coal imports are bound to increase availability. Whatever the environmental implications, historical legacy of carbon emissions is not India's, and it is a foolhardy politician that puts relatively abstract concept of emissions and future climate change above everyday reality of the struggle to develop.

Demand Contraction

This dynamism contrasts sharply with the situation in the OECD. Emissions legislation, coupled with environmental oppositions to new coal plant, has and is decimating the number of coal-fired units that utilities would be building, if fuel and capital cost considerations were the only forces at work. OECD demand for coal is expected to fall under three of the IEA's forecast scenarios out to 2030.

But just because local demand may fall, that doesn't mean production has to go the same way. According to US consultancy ICF International, US coal exports will double by 2018, as Asia impacts the supply and demand balance in global markets. With respect to the thermal and metallurgical coal market, the group's Integrated Energy Outlook projects strong US export growth through 2018, as China and India seek incremental supplies from abroad to fuel their economies.

In December last year, the Brattle Group produced a report that said new Environmental Protection Agency regulations could lead to the retirement of 50-67 GW of US coal plant, about 20% of total installed coal plant capacity. US coal demand would fall in this scenario by 15% by 2020. A report from FBR Capital Markets suggested between 30-70 GW of plant faced retirement, depending on natural gas prices and regulations. While to a certain extent alarming, the report highlights the vulnerability of coal demand to regulation and the possibility that coal plant retirements will outstrip new additions.

In Europe, in 2008, more wind capacity was installed than gas, both of which outstripped coal by a

wide margin. Gas and wind remains the leaders in 2009. In 2010, there were 53 GW of CCGT power plants in advanced development or under construction in Western Europe, 17.2 GW of offshore wind and a further 31 GW of other non-coal projects. By contrast, coal-fired projects amounted to 28.5 GW. Over the period 2008-2010, about 26 coal-fired schemes were suspended or cancelled. With the phasing out of coal subsidies in most European countries and the adoption of ambitious emissions targets, Europe's politicians have lost interest in coal; the region's utilities are being forced to follow suit.

Infrastructure investment

Coal's declining prospects in the OECD set against Asia's insatiable appetite is causing producers thousands of miles away from their potential customers to sit up and take note. Cargoes of US coal have started to land regularly on Indian shores, to be followed by Russian material, in a market that has already become the most important in growth terms, if not quantity, for South Africa's export capabilities.

How far reaching the change is in trade patterns can be seen from US coal producers attempts to move their coal to the US west coast top access Asian markets. At least three US coal producers have plans and agreements in place to export Powder River Basin coal from the American heartlands to Canada's Ridley terminals. This is a journey of more than 2000 railroad miles before the coal even leaves the North American land mass.

It doesn't even matter if this coal never reaches India, because as India sucks in imports, it creates supply vacuums in its wake in both Asia and Europe. US coal may head to China as Indonesian exports are diverted to India. The indirect effects of Indian coal demand can be traced like a web around the world. US exports are expected to rise significantly in Europe, as South African coal is redirected to the growing power and steel markets of Asia. The change in demand centers is causing a fundamental reorientation of trade patterns.

If US producers are keen to build out new transport infrastructure, so too are Australia's miners. Predicted on the boom in Asian export markets, Australia added 13.4 million tonne per annum of new mine capacity in 2010 in the state of Queensland. Projects in New South Wales added 9.5 mtpa in 2010. NSW should see a further 11.5 mtpa capacity from two new mines in 2011. Further upstream, private mineral exploration expenditure in Australia has been rising steadily in recent years, apparently unaffected by the financial crisis and subsequent recession. In 2009/10, coal exploration expenditure amounted to A\$321.1 million (US\$343.2 million), up from A\$297.3 in 2008/09 and more than double the A\$123.8 million seen in 2004/05, according to the Australian Bureau of Statistics.

Source: MMR, July 2011

Competition heats up for steel Cos: Crisil

A study of 274 secondary steel firms by rating and research agency Crisil revealed that one in every seven steel companies would be adversely impacted by intensifying competition, in the wake of on-going capacity expansions by primary steel producers. The impact will largely be on those operating in southern and eastern India, where most of the incremental capacities are coming up. Secondary steel firms produce steel using induction or electric arc furnaces and dominate the 31 million tonne (MT) long steel segment of the 62 MT steel market in India. These players have small capacities, but collectively command 75 per cent of the steel long products market, given their low logistics costs, access to key raw materials, and superior regional markets positions, said the report. Primary producers, which use blast furnaces to produce steel, have traditionally focused on flat products, and account for only 7.5 MT of the long products segment. Over the next four years, however, primary companies, such as Steel Authority of India Ltd and Rashtriya Ispat Nigam Ltd, plan to nearly double their finished long product capacities through expansions, mainly in Southeast India.

Source: Business Standard, 22 September 2011

EXPORT DUTY ON IRON ORE MAY AGAIN GO UP

Steel Minister, Mr. Beni Prasad Verma, said the duty of iron ore might be raised again, to discourage exports. "We have increased the export duty from five per cent to 20 percent. We may increase it further," he said in response to a question in Parliament on the subject. The rise had been made in the current financial year's budget announcement, despite warnings from mining firms about a spur to commodity prices. Mr. Verma said around half of what was produced in the past three years had been sent outside the country. The proportion was 49.7 per cent of the 212.9 million tonnes produced in 2008-09, 53.7 per cent of the 218.6 million tonnes output in 2009-10 and 46.9 per cent of the 208.1 million tonnes produced in 2010-11. On ore supply to government-owned steel makers, Mr. Verma said Steel Authority of India met its entire need from captive mines. Other state-owned companies supplied by NMDC, also a public sector unit.

SOURCE: Business standard, Aug 2011

Challenging times for Indian steel industry

There are strong challenges before the steel industry of India. India has been the fourth largest producer of steel in the world and has also been attracting a lot of foreign direct investment. A few issues would need to be attended to if India wants to be counted as one of the major and most economical producers of steel. The three areas that need to be improved are the infrastructure and organize capital.

The condition of the infrastructure facilities of the steel industry in India is not at all conducive to a sustainable growth and development of the steel industry of the India. The methods that are adopted for the creation of wealth in the Indian steel industry are also supposed to act as hindrances to the growth and development of the Indian steel industry. The Indian steel industry has also not been able to draw the best professionals in the steel industry and that has been a major drawback of the industry. The design institutions in India have not been successful at recruiting the best of engineers and metallurgists in India. This has affected the technological aspect of the Indian steel industry. The experts are of the opinion that this issue has to be countered in order to reduce the dependence on the overseas technological assistance.

The growth of Indian steel industry and its share in global steel production could have been higher if they were not limited by major deficiencies in various fundamental areas. While investment in infrastructure is rising appreciably, it remains well below the desirable level. Power, a critical input for any industry, hampers steel production at many locations. Power deficiencies have prompted many firms with heavier energy demand to produce their own electricity.

"If a man thinks that his happiness is due to external causes and his possessions, it is reasonable to conclude that his happiness must increase with the increase of possessions and diminish in proportion to their diminution. Therefore if he is devoid of possessions, his happiness should be nil. What is the real experience of man? Does it conform to this view?"

- Raman Maharshi

The earth is made of iron. There is no shortage of iron in the longer term. However, today over 70 per cent of the total seaborne trade in iron ore is dominated by top few companies such as Rio Tinto and BHP Billiton. As a result, the steel industry has seen a dramatic increase in the price of raw materials, including iron ore. Since our domestic raw material supply is insufficient to meet the domestic demand, a huge quantity of raw materials, especially coal, is required to be imported. Steel scrap is also being imported in large quantity. Indian steel producers are also eager to acquire overseas assets to ensure steady supply of coal. Steel producers major are also trying to adopt new technology to ensure that their plants can be run on iron ore fines and non-cooking coal, both

available abundantly within the country. At present, steel blast furnaces in India run only on iron ore lumps and coking coal. With uncertainties in the global commodity markets and sharp fluctuation in prices – with the recent floods in Australia being an example – Indian steel producers are eager to go for new technologies that will ensure uninterrupted supplies of raw materials.

Another important infrastructure in terms of transport and freight capacity is its inadequacy in the country and is a serious impediment. Although the country has one of the world's biggest rail network, its poor service hampers efficient supply of goods. The story is similar for port and airport facilities. Even though India is capable of producing steel at a good rate and also increase the volume of production there is not enough land available to support such activities. One of the major reasons for such problems is the consistently increasing population.

Another major challenge for the domestic steel industry is that it is facing threat from cheap imports as import duties of steel in India are low. Import pressure is consequently leading to pressure on margins of the domestic companies on account of lower steel realizations. The methods that are adopted for the creation of wealth in the Indian steel industry are also supposed to act as hindrances to the growth and development of the Indian steel industry. The Indian steel industry has also not been able to draw the best professionals in the steel industry and that has been a major drawback of the industry. Regulatory hurdles and land acquisition are major challenges for the steel industry. Delays in granting environmental clearances by the Ministry of Environment and Forests had resulted in several major projects being stalled in recent years. However, after industrialists and foreign investors raised the issue strongly, the government has become proactive. The 12 million tonne plant proposed by South Korean major Posco in Orissa has got approval. The project direct investment in a single venture, has been hanging fire since 2005. Posco is also keen to set up a small project in Karnataka.

SOURCE: Business standard, July 2011

Indian firms bid billions for Afghan iron ore mining contract

Indian firms are bidding billions of dollars for a contract to mine iron ore in a central district of Afghanistan. A consortium led by the state-run Steel Authority of India (SAIL) could invest up to US\$6 billion (Dh22bn) in the mine, railroads and a steel plant in a race with China to lock in raw materials for two of the world's fastest-growing economies. The contract for the Hajigak mines in Bamiyan province is potentially the single biggest foreign investment project in Afghanistan. India is Afghanistan's biggest regional aid donor and sixth largest overall. It has pledged \$2bn in projects, from constructing a new parliament building to laying a motorway to Iran. Jawad Omar, a spokesman in the Afghan mines ministry, said a 7,000-strong mine protection force is being raised to protect mine sites, including Hajigak. So far, it is mainly Chinese and Indian firms that have shown interest in mining Afghanistan's resources. China's National Petroleum was last week chosen as a preferred bidder for an oilfield in northern Afghanistan, taking the country a step closer to a second major deal after winning a \$4bn copper project in 2007. Exploration at Hajigak is due to start next year and development will take four to five years.

Moral inquiry and political activism start where reason is missing. When righteous people suffer and wicked people flourish, we begin to ask why. Demands for moral clarity ring long, loud bells because it is something we are right to seek. Those who cannot find it are likely to settle for the far more dangerous simplicity, or purity, instead."

Moral Clarity: A Guide for Grown up Idealists:
Susan Neiman

P R Chandna
Life Member, IIM Delhi Chapter