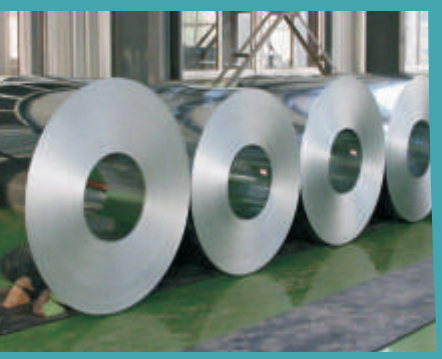

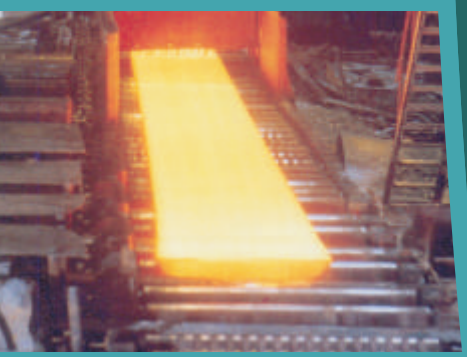

THE INDIAN INSTITUTE OF METALS
भारतीय धातु संसद

IIM
Metallurgy
Materials Engineering

SUMMARY & RECOMMENDATIONS OF

International Conference

on

Emerging Trends

in

Metals & Minerals Sector

5-7 September, 2014

Pragati Maidan, New Delhi

Organized by

The Indian Institute of Metals

Delhi Chapter

and Summary of

10th International Exhibition

MMMM 2014

4-7 September 2014

By

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RAMON has provided solutions, products and services for more than 400 steel enterprises in over 20 countries globally. Over 3000 strands of Automatic Mould Level Control System, 900 strands of Non-sinusoidal Oscillation System and 100 sets of Ladle Slag Detection System have been used successfully in global iron and steel plants.

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Date: Sep.4-7, 2014
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FOREWORD

The MMMM 2014 consisting of International Exhibition and concurrent Conference was held at New Delhi from 4th to 7th September 2014. While the Exhibition was held from 4th to 7th September 2014, the Conference was held from 5th to 7th September 2014.

I am delighted to say that the Technical Committee of Delhi Chapter of The Indian Institute of Metals has organised the International Conference "Emerging Trends in Metals and Minerals Sector" at Pragati Maidan, New Delhi, from 5th to 7th September 2014.

I had the occasion to interact with a number of delegates of the Conference to ascertain their feedback about the technical content of the papers presented at the Conference. I found the feedback quite encouraging. This feedback encourages us to undertake the technical activities. Needless to say that this could happen because of the tireless efforts put in by each and every member of the Technical Committee. The Committee members have done commendable job culminating in successful organisation of the Conference.

IIM DC has received a lot of appreciation from various quarters about the Conference. My special thanks to the following members who have taken a lot of pains to make the Conference a big success:

Shri K L Mehrotra
Shri V C Singhal
Shri R K Gupta
Shri G I S Chauhan
Shri A C R Das
Dr Vipin Jain
Shri Deepak Vaidya
Shri Gautam Bhatia

The above team has brought out a Summary of the Conference as also its Recommendations.

A Summary of the Exhibition and Conference is attached.

I hope this Summary and Recommendations will form a useful reference document for stakeholders of the Metals and Minerals Sector.

S C SURI
Chairman, IIM Delhi Chapter

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Danieli Corus recently commissioned the greenfield Blast Furnace No. 5 for the Rourkela Steel Plant operated by SAIL. This is currently the largest operating Blast Furnace in India. In addition, Danieli Corus and Tata Projects Ltd. were awarded the order for the turnkey supply of the No. 1 Blast Furnace for NMDC's greenfield integrated steel plant in Nagarnar, Chhattisgarh. This furnace will have an inner volume of 4506 m³, making it the country's largest upon completion. This is an essential step for India in achieving the country's ambitious plans to expand its steelmaking capacity to over 100 Mt/year in the near future.

With an excellent track record of over 35 years in India, we are ready to execute the NMDC project in a speedy and efficient manner. We have worked successfully with public companies such as SAIL and RINL as well as private companies such as Tata Steel, Bhushan Steel, JSW Steel and JSPL.

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DANIELI CORUS

PREFACE

The 10th edition of Metals, Minerals, Metallurgy & Materials (MMMM 2014) was organised at Pragati Maidan, New Delhi, from 4th to 7th September 2014. The event consisted of the Industrial Exhibition and Conference. While the Exhibition was held from 4th to 7th September 2014, the Conference was held from 5th to 7th September 2014.

Thirty seven technical papers were presented in the Conference. About 200 delegates from India and overseas attended the Conference. The Conference was slotted into six technical sessions and the inaugural and valedictory session. The papers presented in the Conference were loaded in a pen-drive and given to all the delegates who attended the Conference. A Souvenir consisting of various articles was published and made available to all the participants of the Conference. A cultural programme was also organised in this event.

We have prepared a Summary of the Exhibition and Conference along with the recommendations emanating from the papers presented. The Summary of the Exhibition and Conference is attached. The Summary indicates the broad spectrum of the topics covered in the Conference. I have received immense help and support from all my colleagues in preparation of this document.

The recommendations that have emerged from the deliberations of the Conference will require follow up action. These are being sent to the concerned Ministries of Government and concerned public/private sector enterprises. It is hoped that these recommendations will act a useful reference document for policy makers and others concerned with metals and mineral sector.

K L Mehrotra
Chairman, Technical Committee &
Vice Chairman IIM DC

JSPL Plant - Raigarh (Chhattisgarh)

Jindal Steel & Power
Taking India Ahead

Jindal Steel & Power Limited (JSPL) is a leading conglomerate with a significant presence in sectors like Steel, Mining, Power Generation and Infrastructure.

With an annual turnover of over US$ 3.3 billion, JSPL is a part of the over US$ 18 billion diversified OP Jindal Group. JSPL has expanded its steel, power and mining businesses to various parts of the world particularly in Asia, Africa, Middle East and Australia.

The company produces economical and efficient steel and power. From the widest flat products to a whole range of long products, JSPL sports a product portfolio that caters to most infrastructure & housing projects in the country. It also has the distinction of producing the world's longest 121 metre rails and can supply upto 484 metre long rails by welding four rails together, large size parallel flange beams, high strength angle irons for transmission towers and high strength earthquake resistant construction rebars.

JSPL aims to grow even faster and contribute substantially to India's growth progress and prosperity.

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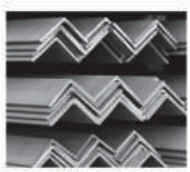
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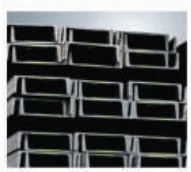
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Exhibition Summary

MMMM 2014 – A Grand Success

MMMM 2014, South Asia's leading Business Event for Minerals, Metals, Metallurgy and Materials Industry was inaugurated on 4th September, 2014 by Shri Narendra Singh Tomar, Hon'ble Minister of Steel, Mines, Labour and Employment, Government of India, New Delhi. The exhibition's inauguration was also attended by Shri Naveen Jindal, Chairman, Jindal Steel and Power Limited, a leading company in Steel Production and Power Generation in India as Guest of Honor. Shri Vishnu Deo Sai, The Hon'ble Minister of Steel, Mines, Labour and Employment, graced the event as Chief Guest in the valedictory session of MMMM Conference.

This Business Platform was well received by the Industry in India and abroad having the presence of 189 leading exhibitors from 31 countries across the globe.

MMMM 2014 has received an outstanding response from the industry with 8214 trade visitors from 18 countries visiting the exhibition.

The exhibition was co-located with 5 other industry events so as to cover the entire spectrum of products and services relating to Minerals, Metals, Metallurgy and Materials Industry to create a complete business platform for the industry professionals.

- UMEX – International Exhibition on Used Machinery
- IMEX – Exhibition on Machine Tools and Engineering products
- Tech India – Exhibition on Manufacturing and Production
- CWE – Exhibition on Cutting and Welding Equipment
- Mega Micro Small and Medium Enterprise (MSME) Summit – Conference on "Indian MSME's: Driver of Industrial Growth in India".

A few other highlights of this complete business platform are:

- Supported by 7 Ministries of Government of India and 19 major Trade Associations
- Invited Trade Delegations
- Presence of Mineral Rich States of India
- Launch of "World Metal Forum"- *WMF will be a* business-led forum with a target membership of *20,000 from worldwide metal and allied industries.*
- There day concurrent international conference on "Emerging Trends in Metals and Minerals Sector" by The Indian Institute of Metals- Delhi Chapter
- 3 Days Mega MSME Summit on "Indian MSME's : Driver of Industrial Growth in India"

The exhibition also saw a joint venture getting signed between Technomag Concast Pvt Ltd. and MCC Capital Engineering and Research Incorporation Limited to enhance their business turnover in India. The joint venture was signed and exchanged in the VIP Lounge of MMMM 2014.

The Mega MSME Summit which was a co-located event had the illustrious presence of the following dignitaries from the Central Government of India

- Sh. Kalraj Mishra, Hon'ble Minister of Micro, Small & Medium Enterprises, Government of India, graced the occasion as Chief Guest and inaugurated the Mega MSME Summit
- Sh. Santosh Gangwar, Hon'ble Minister of Textiles, Government of India attended as Chief Guest on September 5, 2014 at Mega MSME Summit
- Gen. V K Singh, Hon'ble Minister of State (IC), Development of North Eastern Region attended as Chief Guest at Mega MSME Summit on September 6, 2014

Exhibitors from MMMM 2014 were extremely satisfied with the Visitor turnout at MMMM 2014. A few of their testimonials are given below.

"This show has proved to be the best platform to showcase the engineering and manufacturing capabilities of YOGIJI-DIGI"

Navneet Gill, Managing Director -YOGIJI-DIGI

"It is a pleasure participating in MMMM every year. We got a large number of delegates & visitors both from India and abroad coming to our stall and enquiring about our products and services"

Ashish Kumar, Head - Corporate Communication,TATA Steel Limited

"Good response of people in the field of steel"

Stefano Talassi, COO - Industrial Transformer Division,
Transformers & Rectifiers (India) Ltd.

About the Organisers

Joint Organiser and Sponsor

The Indian Institute of Metals is a premier body representing professional metallurgists and material scientists from Industry, R&D Institutions and Academia in India.

IIM was conceived in 1946 with the objective of promoting and advancing the study of science and technology of metals / alloys and best practices in the metallurgical profession. Headquartered at Kolkata, IIM conducts its activities through three divisions and fifty chapters spread across India.

Today IIM is the apex professional Institute in the field of Minerals, Metals and Materials sector and has nearly 11,000 members. Delhi Chapter is one of the leading chapters and has the support of National Council of The Indian Institute of Metals for organising this prestigious event.

Organiser

ITEI – International Trade and Exhibitions India Pvt Ltd is a part of the ITE Group PLC UK, which has 30 offices worldwide and organises over 230 leading trade exhibitions and conferences each year, in 21 countries, including specialized exhibitions in Mining and Metallurgy, Metals, Oil and Gas, Industrial and Manufacturing, Power and Energy, Building and Construction, among other. ITEI presently organises a number of annual trade events and co-coordinates the participation of Indian companies at ITE's various events around the world, has ambitious growth plans of expanding its existing events and launching new events that will provide business opportunities for India's growing industries.

* * *

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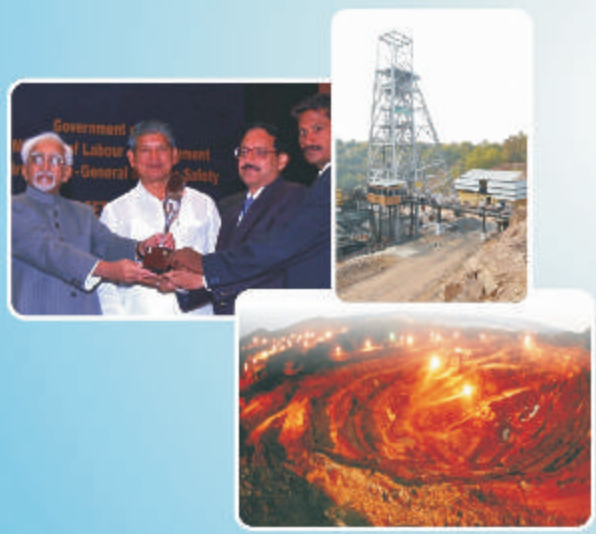

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Conference Summary

MMMM 2014 - SUMMARY

05-07 September 2014 at Pragati Maidan, New Delhi

The International Conference "Emerging Trends in Metals and Minerals Sector" was aimed to present the novel emerging technologies and research innovations for the industrial growth in the metals and minerals sector including steel and non-ferrous sector, minerals and ores processing sector, shaping and treating of metals, advanced materials, energy efficiency and environment in industries, etc. The Conference consisted of total seven technical sessions including the plenary session. The Plenary session was on the processing of iron ores, biotechnological innovations in Gold extraction and market demand and applications in steel sector. On the first day, after `*Plenary session*', two more technical sessions were held on `*Iron and Steel Technologies*' and `*Mining and Minerals Preparation Technologies*'. On the second day, four technical sessions on `*Innovations in Non-ferrous Technologies including Rare Earths*', `*Shaping of Metals*', `*Advanced Materials*' and `*Energy and Environment*' were held in succession. There were total thirty seven speakers for the technical sessions, including three speakers for the plenary session. About 200 delegates from India and overseas companies participated in the conference. A Valedictory session was held on the third day after which the Chief Guest Minister of State for steel, mines, labour and employment, Govt. of India delivered his address. The detailed Conference program is as under:

5th September 2014

Inaugural Session

The conference started with the welcome address delivered by Shri S.C. Suri, Chairman, IIM Delhi Chapter. He presented a brief introduction of the conference and welcomed all the dignitaries and delegates at the conference. Mr. K.L. Mehrotra, Vice Chairman briefed about the MMMM 2014 International Exhibition progressing

concurrently with the International Conference and highlighted that the country's metals sector has been increasingly becoming dependent on the global factors. The Guest of Honor, Dr. R.N. Patra, President IIM & CMD Indian Rare Earths Ltd. presented a lucid overview of the overall metals sector in the country and its international status. Shri Syedain *Abbasi, Joint Secretary, Ministry of Steel, Govt. of India, delivered the Inaugural Address of the Conference. He emphasized that India is presently the 4th largest steel producer in the world and has potential to upgrade its ranking in this sector. However, sustained and focused efforts in this direction are necessary. He mentioned that presently due to the global competition, imports in the metal sector have become cheaper in the country. The raw material sector requires revival and requires significant attention to become competitive in the global market. Mr. Deepak Vaidya, Honorary Secretary, IIM Delhi Chapter presented vote of thanks at the end of the inaugural session.*

Plenary Session

The International Conference consisted of total seven technical sessions including one plenary session. Dr. R. N. Patra, President IIM and CMD Indian Rare Earth Ltd. was the session Chairman for the Plenary Session and introduced the three speakers of this session. Professor B.K. Mishra, Director, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar delivered a talk on *'Problems in processing of different iron ores of India - some alternative techniques'*. He addressed the issue of large quantity of banded iron ores and other low-grade materials occurring in Indian iron ore mines, which are difficult to be beneficiated. He suggested the technological advances, such as, reduction roasting followed by magnetic separation or microwave heating for the beneficiation of these low-grade ores. Under the optimum conditions these technological advances were found to deliver quality magnetic concentrates assaying 63-65% Fe

with 65-70% recovery. Professor K.A. Natarajan, Department of Materials Engineering, Indian Institute of Science, Bangalore delivered his presentation on '*Biotechnological innovations in gold extraction: Indian imperatives*'. He highlighted the innovations of biotechnology for the extraction and mining of gold with illustration of examples. He demonstrated development of a bioreactor technology at IISc Bangalore in the collaboration of Hutti Gold Mines, Karnataka State for the biooxidation of the refractory G.R. Halli concentrate. Mr. Sushim Banerjee, Director General, Institute for Steel Development & Growth (INSDAG), Kolkatta delivered his talk on '*Steel-market demand generation and new application areas*'.

Session on Mining & Minerals Preparation Technology

The session was chaired by Mr. S. Ranade, Executive Director, JSW Steel Ltd.. There were six speakers in this session. Mr. Ujjal Chakraborty, Chief Pellet Plant, Tata Steel Ltd., Jamshedpur delivered his talk on '*Problems and issues in production of pellets in India and Tata Steel's initiative thereof*'. Mr. Chakraborty presented a brief view of the TATA's world's first integrated steel plant having 6 MTPA pellet production capacity and discussed the issues pertaining to it. He pointed out that introduction of pellets enhances mine life by using lower grade ores. He also highglighted the innovative steps taken by his company in the process of production of pellets. Mr. K K. Mehrotra, Former CMD, MECON Ltd. delivered a presentation on '*Slurry pipeline: cost effective solution for India steel industry for transportation of iron ore for long distance*'. Mr. Mehrotra presented a brief review of iron ore scenario in India apart from need and advantages of slurry transportation system. He gave global and Indian scenario of slurry pipeline for iron ores and a cost benefit analysis of slurry pipeline vis-a vis transportation by Indian Railway was presented for the transportation of iron ores. Mr. R. Prasad, MECON Ltd., presented his talk on '*Enrichment of low grade iron ores by beneficiation*'. He indicated that in order to

achieve the targeted steel production of 300 MTPA by 2025-26 in the country, iron ore requirement will be of the order of 500 MT. To achieve the said target, it is essential to evolve alternate benefeciation technologies for the effective utilization of low and sub grade iron ores, which are likely to be added to the National resource base of iron ores as per the guidelines of IBM. The speaker discussed the methods of enrichment of low grade iron ores to make suitable for sinter and pellet products in a techno economic and echo friendly manner. Dr. S.K. Pan, DGM & HoG (Mineral Engg.) Research & Development Center for Iron & Steel, SAIL, Ranchi

delivered his talk on the *'Recovery of rich fine iron mineral particles through beneficiation of slimes and low grade hematite ores of SAIL captive mines'*. Dr. Pan discussed the intense beneficiation techniques for recovery of iron mineral part to more than 95% from low grade ores. The implementation of innovative slime beneficiation systems at the SAIL R&D center in its two iron ore mines, viz., Dalli and Meghahatuburu and further expansion plan for the Bolani and Barsua mines were highlights of the presentation. Mr. Sanjay Wadhwa, GM Projects, Korus Engineering Solutions Pvt. Ltd. delivered a presentation on *'Iron ore pelletization-Technology and need'*. He addressed that about 70-75% of production of iron ores in India is of fines, which need be agglomerated for further processing. For the processing of low grade iron ore fines, pelletization is the highly profitable proposition since the fines should not be disposed at throw away prices and may be converted into pellets, which adds to value. Mr. Hervinder Singh, Business Head-Mining, Jindal Steel & Power Ltd., presented a talk on *'Emerging trends in the Mining Industry'*. He gave a brief overview of his company and presented the current challenges and opportunities in the mining industry focusing on the futuristic requirements of the steel industry.

Session on Iron and Steel Technologies

The session having eight speakers was chaired by Dr. B.N. Singh, Chief Technologist, Uttam Group & Former CMD, RINL. Mr. P.C. Mahapatra, AVP JSW

Steel Ltd. delivered talk on *'Innovations in iron and steel technologies at JSW steel Ltd.'*. The speaker discussed some of the initiatives taken at JSW steel to efficiently deal with the Indian raw material conditions viz. handling of high manganese iron ore fines and its management, till steel making. The processing aspects of low grade iron ores at JSW were also discussed. The key highlights of the talk were installation and commissioning of Slime Recovery Plant, Micro-pellet plant and Briquetting plant as some of the key innovations undertaken at JSW Steel Limited. Mr. Sungkee Shin, POSCO, Pohang, Korea delivered his presentation on *'Technological advances of FINEX iron making Process'*. He presented the comparative aspects of the FINEX process viz-a-viz conventional blast furnace process. The history of scaling up of FINEX process at POSCO upto 2.0 MT/Y was presented. The speaker emphasised the fact that the FINEX process could sharpen the competitive edge by continuous challenges of the improvement of operation and facility. Mr. Luo Yang (Robbie) Ramon Science & Technology Co. Ltd., Hunan, China presented a talk on *'A new vibration ladle slag detection system'*. The various aspects of the new vibration ladle slag system in terms of development of hardware and software parts were discussed. The new system is applied to several steel continuous casters and has achieved close to 95% alarm accuracy with the new algorithms. Dr. Bala Paramanathan, Danieli Corus presented a talk on *'High capacity iron making with large, modern blast furnaces'*. In view of the growing capacity of the steel making industry, the speaker presented new expansion projects being developed by the Government of India which include traditional BF-BOF plants, since they are efficient and economic. Simultaneously, small and classical blast furnaces are replaced by the large and modern blast furnace plants, which was the highlight of the talk. Mr. Jae-Ho-Lee, POSCO and Engineering Center, Pohang, Korea delivered a presentation on *'Introduction of LBR revamping construction method'*. In this presentation, the speaker introduced the actual construction practices of POSCO E&C and its technological aspects; mainly, the features and benefits of the Large Block Ring method of Blast Furnace.

Mr. Takanori lwakiri, Nippon Steel & Sumikin Engg. Co. Ltd., Fukuoka, Japan delivered a talk on the *'Blast furnace equipment of Nippon steel and Sumikin Engineering'*. He discussed about the various equipment and technologies his company has improved and developed continuously for the blast furnaces. The systems he discussed included top charging

system, solely BFG operation system for hot stove and multi-vessel electrostatic precipitator (MVEP). Mr. Fuminori Otake, Nippon Steel & Sumikin Engg. Co. Ltd., Fukuoka, Japan presented a talk on '*Establishment of the long-life technology of the BOF*'. He discussed about the steel-making plants which his company has been making and has various effective features, viz. long life BOF, Kanbara Reactor (KR) for desulfurization and Ruhrstahl Hausen (RH) equipment for achieving low-level carbon content. Specific emphasis was given on the newly introduced long-life BOF system. Mr. Taro Sato, Mitsubishi-Hitachi Metals Machinery Inc., Hiroshima, Japan delivered a talk on '*Introduction of technologies applied to no. 2 hot strip mill at JSW, Vijayanagar works*'. In his presentation, he discussed about the No. 2 hot strip mill at JSW Vijayanagar works being one of the most modern hot strip mills in the India for which MH has supplied the most advanced technologies including the Pair Cross system with the Mill Stabilizing Device.

6th September 2014

Session on Innovations in Non-Ferrous technologies including rare earths

Mr. R.N. Parbat, Past President, Indian Institute of Metals chaired this session on the second day of the Conference and introduced the four speakers. Dr. B. D. Pandey, Chief scientist and Head-Metal Extraction and Forming Division, National Metallurgical Laboratory (NML), Jamshedpur delivered his presentation on the '*Scenario of rare earths in India and extraction of rare earths from secondary resources*'. Dr. Pandey presented the current scenario of the primary resources of rare earths in India and elsewhere vis-à-vis their application and demand. Further, he highlighted the recent R&D work carried out at CSIR-NML on the hydrometallurgical extraction of rare earth metals, such as, yttrium and europium alongwith other metals, La, Ce and Tb from the phosphor powder of fluorescent lamps. Professor Goutam Sutradhar, Department of Mechanical Engineering, Jadavpur University, Kolkatta delivered a presentation on '*Metal matrix composites for the transportation systems to conserve energy*'. He addressed the challenges for the Automakers and manufacturing engineers in making light-weight vehicles and fuel efficient with low emission without sacrificing the reliability and efficiency. He presented the opportunities to manufacture low cost cylinder liners, pistons, bearing surfaces, cam shaft tappets, lifers, rockers, etc in Indian foundaries, which he has developed in

collaboration with Wisconsin-Milwaukee University in the USA. Mr. Yuri Khakhanov, Skolkovo Innovation Center delivered a talk on '*Supporting developments of MMMM sector related innovative technologies*'. He introduced that Skolkovo is a strategic development institution established by the Russian Government that provides financial support to both Russian and international innovative projects. He discussed the cluster support system at his institution and also presented examples of projects in the MMMM sector. Mr. Anup Mehra, Director-Commercial MOIL presented a talk on '*Overall view of manganese ore in Indian steel sector-present and future*'. He anticipated that due to the targeted production capacity of 300 million tons of crude steel after 10-15 years, the gap between demand and supply of manganese ore will increase that will require higher imports. Since, the average grade of manganese ores produced in the country is low, high grade manganese ores will be required to be imported. He impressed upon the fact that there is a need for acquiring high/medium grade manganese ore properties abroad, to supplement the manganese ore requirement.

Session on Shaping of Metals

The session having five speakers was chaired by Dr. Sanak Mishra, the Past President Indian Institute of Metals. Mr. D.D. Kapur, Joint Managing Director, Korus Engineering Solutions Pvt. Ltd., delivered a presentation on '*Philosophy of setting-up various rolling mills engineered by Korus in past nine years*'. He gave a brief introduction of various projects handled by his company. He discussed about the various types of rolling mills engineering supplied by his company. He also presented the emerging trends of TMT rebar mills, wire rod mills, coil routes, heavy bar mills and structural mills, etc. Mr. Shin Ozeni, Mitsubishi Hitachi Metals Machinery Inc., Hiroshima, Japan delivered a presentation on '*Newly developed universal crown control mill HYPER UC-MILL for rolling of high hardness and thinner steel*'. He discussed that HYPER UCM-Mill enables rolling of higher strength materials than is possible with conventional mills and materials of the same strength can be rolled to thinner thicknesses. He also discussed the methods to decrease the investment in TCM mills for the benefits to the steel makers. Mr. Hiroki Maegawa, Nippon Steel & Sumikin Engineering Co. Ltd., Fukuoka, Japan presented a talk on '*Advanced internal quality control technologies for top quality of special bar quality*'. He discussed that Nippon steel has been working on the innovative technological

development for CC machines of blooms and billets to meet the strong demand for those quality required by Nippon steel and Sumitomo Metal Corporation and other main Japanese special steel manufacturers. He also highlighted that his company assures the quality of special steel by steady operation in constant casting temperature with the state-of-the-art technologies. Mr. Pankaj Puri, DGM, Rail & Structural Mill, Bhilai Steel Plant delivered a talk on *'New rail technologies and prospects for Indian railways logistics'*. He addressed that SAIL with its rail manufacturing facilities at Bhilai has been a partner in progress and development of Railway infrastructure since past five decades. He discussed the upcoming URM facilities to be installed at Bhilai being the most sophisticated technologies from across the world and would be an asset for the SAIL to remain a world class long rail producer. Mr. Matthias KNABL, Vice President, INTECO Special Melting Technologies, GmbH, Austria delivered a talk on *'Production of heavy forging ingots upto 250 tons via the ESR process'*. The presentation was focused on the operational experiences of large sized ESR plants especially with the challenge of a well-controlled starting and hot topping process as well as the electrode change procedure. The results of attainable quality of ESR ingots produced in a 250-tons static mold as well as a 145 tons short collar mold ESR plant were also presented.

Session on Advanced Materials and Materials Handling

Mr. B.R. Thukral, Former ED, Hindustan Zinc Ltd. and Past President IIM Delhi Chapter chaired this session and introduced the five speakers. Dr. S. Narahari Prasad, DGM, MIDHANI presented a talk on *'Advanced materials for the Strategic Sector'*. He addressed the major challenges for the processing of critical materials at MIDHANI and its contributions to the strategic sectors of the country viz. Defense, Space and Atomic energy sectors. An overview of the alloy and product development programs was presented and futuristic materials, such as, Graphene, refractory metal alloys, powder metallurgy superalloys, etc were also discussed. Mr. Avtar Singh, Head, Product Application Group, Flat Product Technology Group, Tata Steel Ltd., Jamshedpur presented a talk on *'Challenges in development of Automotive steel'*. He gave a brief overview of his company and activities. He presented the challenging opportunities towards the development of automotive steel aiming to meet the requirements of the present scenario. Mr. Deepak Viadya, Outokumpu delivered his presentation on

'I*nnovation in stainless steel: responding to global megatrends*'. He focused on the recent developments at his company on the materials and technologies in the area of stainless steel responding with the global trends. He discussed recent innovations with the duplex, ferritic and austenitic steel family for the components developments for the processing industries, refineries, power generation, bridges and temples, etc. Dr. A.K. Kapoor, DRDO, Hyderabad delivered a presentation on '*Materials science for missiles*'. He briefly discussed the materials being used for the missiles and various products developed by the DRDO in this area. Mr. Jagannathan Rajagopalan, Managing Director Pesmel South Africa presented a talk on '*Case study on JSW CRM #2 logistics: Merits of automated YMS & ASRS*'. He presented their state-of the-art Cold Rolling Mill 2 (CRM 2) JSW Bellary that has adopted a total automatic yard management system and ASRS wherein coil products are handled as much as possible with extreme care without damage to the sides or layers insuring the receipt of the coils to the customer as were produced with extreme care and advanced technology.

Session on Energy and Environment

Dr. Ajay Mathur, Director General, Bureau of Energy Efficiency chaired this session and introduced six speakers. Dr. Amit Chakraborty, GM, JSW steel Ltd., delivered his talk on '*Waste management at JSW Steel Ltd.*'. He highlighted JSW steel's innovative approach towards identifying measures to maximize utilization of generated wastes and achieve the zero status. He addressed the JSW's adoption of waste management technologies; such as, micro-pellet plant, mill scale briquetting plant, slime recovery plant and utilization of granulated blast furnace slag and LD slag as aggregates for roads towards the maximum utilization of the generated wastes. Mr. Prabhas Kumar, Research & Development Center for Iron and Steel SAIL, Ranchi delivered a presentation on '*Eefforts towards reduction in energy consumption and GHG emission in SAIL plants*'. He highlighted that RDCIS has been playing a lead role in identifying energy conservation schemes for the reduction in energy consumption in SAIL plants and has contributed significantly towards energy conservation and green house gas reduction by implementation of innovative ideas including in-house developed energy efficient combustion systems and optimization of thermal engines. Mr. Manu Bhargava, Exxon Mobil Lubricants Pvt. Ltd. presented a talk on '*Energy efficiency in Mining operations*'. He

presented a global energy outlook for 2040 and sustainable technologies having the investment opportunities. He discussed the extensive applications and Mobil industrial lubricants in mining sector. He also discussed the top mining challenges and correlated with energy efficiency in the mining operations. Mr. Steve Steranka, Radcomm Systems Corp delivered a presentation on '*Radioactivity in the metals industry*'. He discussed the radioactive hazards and accidents occurred due to the unsafe practices in the metal industry. The effects of such accidents were presented with reference to the actual incidents happened. The technological advances in the metals sector to prevent such incidents were also elaborated. Mr. K. Shanmuganathan, Project Assistance (Tech) UNDP-Aus AID-MoS Steel Upscaling project delivered a talk on '*Energy efficiency in steel Re-rolling Mills in India*'. He discussed that the energy efficiency intervention made in steel rerolling mills (SRRMs) showcased reduction of energy consumption by 30%. He also presented an update of energy efficient interventions made, the results achieved and the follow up actions taken up to upscale energy efficiency in small scale steel industrial units in India. Mr. Anand Kumar Jha, MECON Ltd. delivered a talk on '*Alternate energy options for bulk production of DRI under Indian context - A green technology initiative*'. He emphasized that the use of alternate fuel options, viz. Corex export gas, Coke oven gas, Syn gas from coal gasification, underground coal gasification, shale gas for DRI production, etc provide a good opportunity to meet the growing energy demand in the country. He discussed that as a futuristic scenario, Shale gas, UCG and CBM can provide options for use in gas based DRI, once significant breakthrough is achieved in its bulk discovery through appropriate technology interventions and the policies of the Government of India.

7th September 2014

The Valedictory session held in the morning session of the third day. Mr K. L. Mehrotra, Vice Chairman, IIM Delhi Chapter welcomed the delegates and dignitaries at the dais. He gratefully welcomed the participants and valuable guidance provided by the Hon'ble Minister

of State of Steel, Mines, Labour & Employment. Shri Mehrotra presented a brief overview of the Conference and the exhibition. Mr. G.I.S. Chauhan, Honorary Joint Secretary, IIM Delhi Chapter presented a *Detailed Summary of the Conference proceedings* including different sessions held at the conference. The Chief Guest of the session Mr. Vishnu Deo Sai, Minister of State for Steel, Mines, Labour & Employment addressed the audience and appreciated industrious efforts of the organizers of the MMMM 2014 exhibition and the international conference to make it a successful and memorable event. The Exhibition Summary was given by Mr. B.D. Jethra, Former Advisor Planning Commission of India and Member-Advisory Committee, IIM Delhi Chapter. It was followed with the distribution of awards for the exhibitors by Honorable Minister of Mines, Steel and Labour & Employment and Ms. Kim Willis, CEO, ITEI. The Session and the International Conference concluded with formal Vote of thanks proposed by Mr. Deepak Vaidya, Honorary Secretary, IIM Delhi Chapter.

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Conference Recommodations

MMMM 2014 RECOMMENTATIONS

The International Conference was attended by luminaries and stalwarts in the area of Minerals, Metals, Metallurgy and allied sector. The following issues have come into sharp focus.

1 Mineral and Metals constitute the most valuable national resource and form the basic raw material for development of infrastructure, capital goods and basic industries. Minerals and Metals contribute around 4.5% of the national GDP. Their exploration need be guided by nation's long term national goals and perspective.

2 Increased emphasis is required on exploration activity for coal, iron ore and other non-ferrous mineral reserves. Geological Survey of India has to play a significant role in Survey and enhancing exploitation of mineral resources.

3 So far the exploration of iron ore resources in India is being done to a depth of 60-70 meters against the common international practice of ~100 meters. In order to improve the resource base the exploration activity needs to be permitted to the public and private sectors by the Government.

4 There is a need for preparation of database of metals and minerals as resource inventory. This information presently available is scanty and obsolete.

5 There is a need for development of innovative / path-breaking technologies for utilization of Indian iron ore fines, slimes and non-coking coals.

6 Beneficiation / upgradation of low grade iron ore, coal and agglomerates need to be pursued with greater vigour so that low grade iron ore and coals etc. can be effectively utilized.

7 There is a need for development of commercially viable technologies for utilization of steel plants and mine-waste including LD / EAF slag.

8 There is a need for development of indigenous technology for new processes and improved products vis ultra-high strength steels, high strength high formable steels, CRGO steels and coated products.

9 There is a need for development of innovative technologies for effective recovery of waste heat in different iron and steel making processes.

10 We have a plan to create 300 MT capacity of crude steel by 2025. A detailed strategy has to be drawn in advance to ensure the raw material availability and energy needs for production of such ambitious production target.

11 The current scenario of the primary resources of rare earths in India needs a detailed review. Innovative technologies need to be developed for extraction of rare earth metals from the mineral reserves.

12 Defence and space sector needs special steels for strategic applications. Bulk of these special steel required by the space sector are being imported. Specific requirements of such steels need be worked out for production of such grades for regular requirements.

13 Steel is among the 32 sectors under National Skill Development Council that has been created recently. A long term plan needs to be made for meeting the skill gap in the sector.

14 Project Management continues to remain a weak link in project implementation. The modern techniques and various innovative technologies are being followed in developed countries to complete the project within the time and cost schedules.

15 Minerals and plant equipment for construction and installation of steel plants are not available indigenously leading to permanent dependence on foreign suppliers. There have not been adequate endeavours on our part to indigenize equipment manufacturing. It needs entrepreneurial commitment and zeal effectively supported by the Government.

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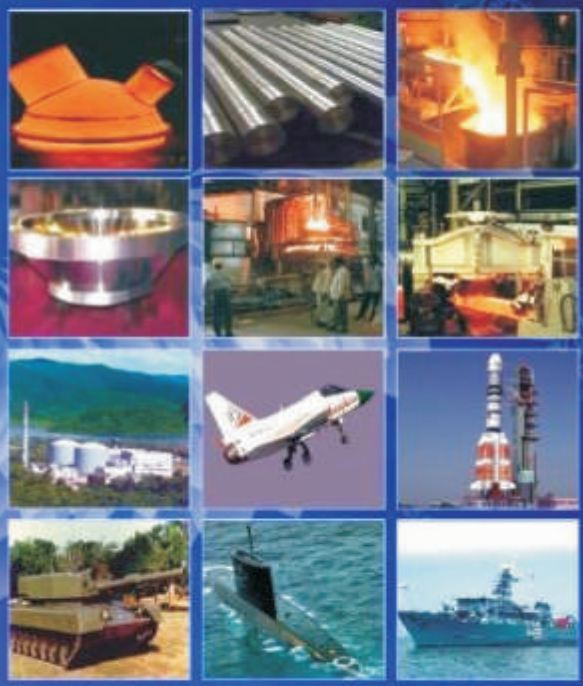

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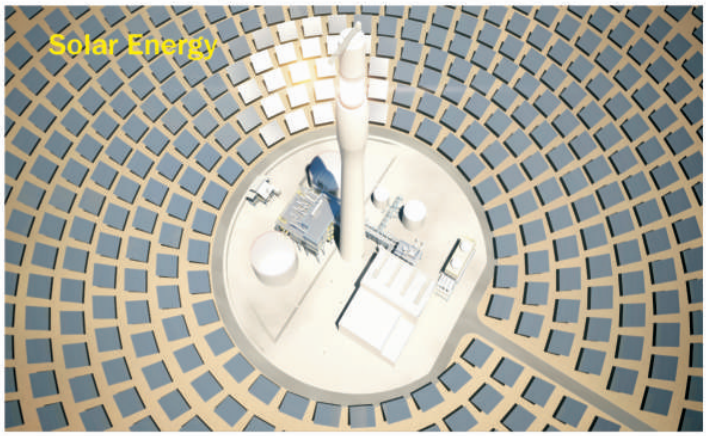

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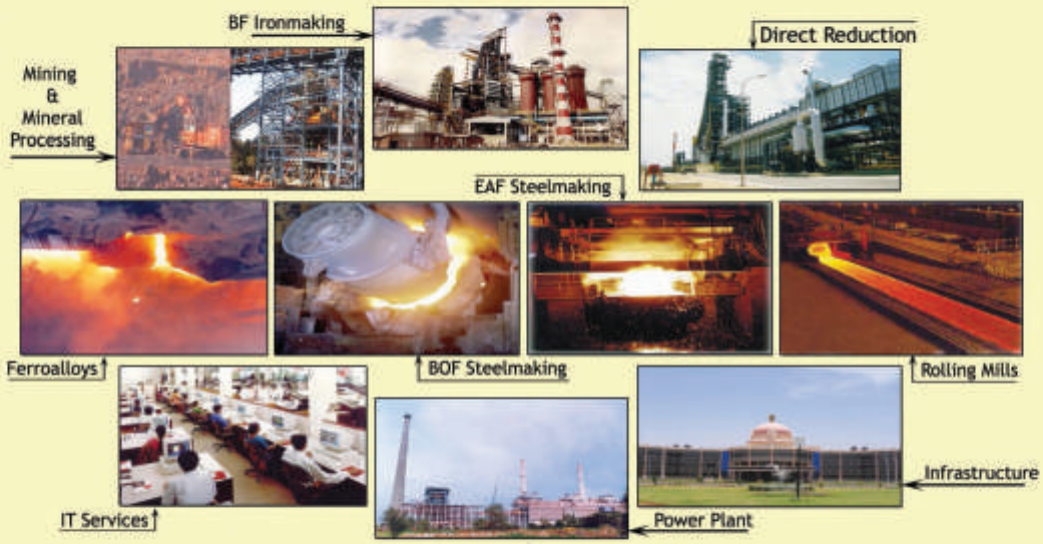

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