



“Aluminium Industry- The Evolving Asia – Pacific Story”

SPECIAL TECHNICAL SESSIONS

1. Special Session on Alumina & Non-Metallurgical Bauxite

Coordinated by Dr. Richard Flook, International Expert (Australia)

Background & Objectives:

This session is being coordinated by an International expert on the subject - Dr. Richard Flook of Australia. The special alumina segment covers the use of bauxite and alumina to produce products for non-metallurgical markets. These products include refractory and ceramic raw materials, aluminium chemicals, cement raw materials, abrasives, ceramic proppants and flame retardants.

According to Roskill (Non-Metallurgical Bauxite & Alumina: Global Industry, Markets & Outlook 2015) “Production of **Refractories** accounted for over 20% of non-metallurgical bauxite and 50% of specialty calcined alumina use in 2015, including material used both directly and indirectly via an intermediate product (such as brown fused alumina). World refractory production was just over 35Mt in 2015, a reduction of nearly 4% compared to the prior year. The main driver behind lower refractories output and use has been longer refractory product lifetimes combined with lower demand from end markets – namely iron and crude steel.

The use of **ceramic proppants** for hydraulic fracturing has emerged quickly in the last five years and this sector now represents the second largest market for non-metallurgical bauxite, having grown by nearly 40% per year since 2011. The sudden drop in oil prices, from US\$105/bbl in June 2014 to below US\$45/bbl in January 2015, caused a sharp fall in ceramic proppant use and led to a large build-up of Chinese stocks. Nevertheless, ceramic proppant demand is expected to recover during the forecast period as new unconventional hydrocarbon fields are developed.

Elsewhere, **speciality calcined alumina** has benefitted from the rise of technical ceramics and aluminosilicate glass. Aluminosilicate glass is expected to represent the highest growth market for calcined alumina out to 2021, because of its use as the substrate for thin film transistors (TFT) used in liquid crystal display (LCD) panels.

Aluminium chemicals continue to be the largest market for commodity aluminium trihydrate (ATH), and in particular aluminium fluoride – which has profited from a strong primary aluminium market in China. Flame retardants are forecast to be the fastest growing sector for ATH, where tighter safety regulations are spurring demand for the speciality

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mineral filler. Demand for both calcined alumina and ATH is projected to grow in excess of global GDP in the period out to 2021. Non-metallurgical bauxite demand is likely to grow at slightly under GDP as its use in some applications – such as Portland cement, slag adjusters and chemicals – could remain stable or contract slightly. The main highlights are likely to be the ceramic proppants and mineral wool sectors.”

Companies like Almatris, Alteo, Altec Chemicals, CUMI, HINDALCO and Zili Corporation Ltd, have already confirmed the presentation in this Special Alumina session of IBAAS 2016. A number of other international companies have been approached for presentations.

Some of the interesting topics of this special session are enumerated below:

- ✚ *Global Review and Update of the Non-Metallurgical Bauxite and Alumina Industries*, Alison Saxby, Roskill, UK
- ✚ *Aluminium Chemicals Market – Focus on Water Treatment Chemicals and Fire Retardants*, Samantha Wietlisbach, IHS, Switzerland
- ✚ *High Purity Alumina of Altech Chemicals*, Iggy Tan, Managing Director, Altech Chemicals Limited, Australia
- ✚ *Non Refractory Alumina Applications with Cost Effective Solutions*, Xavier Bapst, Asia Pacific Director, Alteo-Alumina, Japan
- ✚ *Development of Sintered Alumina & Its Application in Ladle Refractory Lining*, Martin.Z.Ma, Zhejiang Zili Corporation Limited, China
- ✚ *Premium Alumina Solutions for Modern Steel Making*, Shankha Chatterjee, Almatris Alumina Pvt. Ltd, India

2.Special Session on Bauxite Residue (Red Mud)

Coordinated by experts from India Mr. Vinod Sood & Mr. Sadguru Kulkarni

Background & Objectives:

This session is being coordinated by a group of experts and Indian alumina refineries and R&D centres. Experts and speakers from companies like CHALIECO, CPCB, TERI, HIL, Vedanta, CSIR - IMMT, NALCO, NML etc. have confirmed their participation.

Some of the interesting topics of this special session are enumerated below:

- ✚ *Commercial Production of Iron from Mud of East Coast Refineries*, CHALIECO, China

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- ✚ *Commercialization of Residue Neutralization with CO₂ available in Alumina Refinery Stack- is it an economic option, CSIR – IMMT, India*
- ✚ *Processing of Various Industrial Wastes for the Extraction of Alumina, A. K. Tripathy & B. K. Satpathy, CSIR – IMMT & NALCO, India*
- ✚ *Mineralogical and Chemical Studies on Uncalcined, Calcined and HCl Treated Red Mud Waste, N. Gangadhara Reddy & B. K. Satpathy, IIT Bhubaneswar & NALCO, India*
- ✚ *Red Mud Containment : Muri Case Study, Prof. Devendra Narain Singh, IIT Bombay, India*
- ✚ *Sustaining Vegetation in Residue Ponds- The Belgaum Revisited 10 years later, HIL- Belgaum, India*

3.Special Session on Energy Reduction in Aluminium Smelting

Coordinated by The Indian Institute of Metals (IIM)

Background & Objectives:

Aluminium metal due to its light weighting and high recyclability potential has a low life cycle cost. However, energy consumption for primary aluminium manufacturing is considerably high accounting for 30 to 40% of production cost. While anticipating encouraging economic conditions and policy decisions from the government, industry realizes the need for a concerted effort with a long term view to address energy challenges in aluminium smelting. While Al Smelting capacity in the subcontinent including China has gone up many fold over last decade, both vintage technologies and state of art technologies coexist in the region. Issues like energy cost pose serious concerns for coal based power and also offer differentiating factor for gas based power. Both local and global environmental regulations have stated pinching the Al smelters, whether it is the PAT-regulations mandating 5+% reduction in specific energy consumption, obligations for sourcing renewable power at increasing percentage, tightening implementation of emission norms, or voluntary national commitments post COP-21 in Paris, with impending threats of carbon tax.

On the other hand increasing per capita consumption of aluminium linked closely to GDP-linked lifestyle growth, offers enormous scope for Al products, as well as warrants emerging opportunities in recycle-based smelters, scope and demand for making country-specific products to meet both the needs of the growing middle class as well as the needs of the folks at the bottom of the pyramid. Prospects of challenging alternatives offered by steel, polymers and carbon make it necessary to master and develop proprietary technologies for going

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beyond the present best-in-class technologies, through back up of design capabilities, and a few break-through processes, to meet the needs of the day, which can be developed through appropriate partnership with academic institutes, as well as Govt and Private sector laboratories. The need of engineering support systems for the aluminium smelters, such as equipment manufacturers, material suppliers, and instrumentation & automation needs offer one more aspect unaddressed thus far.

In this regard, IBAAS and The Indian Institute of Metals, in participation with the three Indian primary aluminium manufacturers – HINDALCO, VEDANTA and NALCO, will organize a special one day theme symposium. The symposium on “Energy Reduction in Aluminium Smelting” will have invited lectures by experts from technology providers (RTI-AP, GAMI, KAN-NAK, SGL, R&D Carbon, etc), industry (HINDALCO, NALCO, and VEDANTA), academia (LMRC, IITK), research laboratories (JNARDDC, NML, ABSTC) and professional consultants / associations (Prof Kvande, Dr Vinko Potonik, etc) with the following key objectives:

- Share knowledge and deliberate on worldwide initiatives on reduction in specific energy consumption in Al-smelting & evaluate the path forward for Indian industries.
- Create a forum of experts from industry, academia & research laboratories from both India and overseas along with government bodies.
- Set-up collaboration framework including working groups between industry, academia & research institutions to address the industry challenges through exchange, training and R&D/Technology programs.

Some of the interesting topics of technical papers on Energy Reduction in Aluminium Smelting are enumerated below:

✚ *Breakthrough Technologies for improving potline Energy Consumption, Production Efficiency & Flexibility*, Dr. Naresh Patel & Dr. Mark Dorreen, LMRC, New Zealand

✚ *Development of a Low Energy Aluminium Smelting Solution for High Productivity Pots*, Mr. Benoit Feve & Allais Bernard, Rio Tinto Alcan, Canada

✚ *Cathode & Modelling Solutions: Implementation of Low Energy Consumption Electrolysis Cell Design of Balco*, Ghazanfor Abbas/Oscar vero Gracia, SGL Carbon, Germany

✚ *Futuristic, Innovative, Energy-efficient Technologies in Aluminium Smelting*, JNARDDC, India

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4. Special Session on Aluminium Conductors

*Coordinated by Dr. Vilas Tathavadkar, Aditya Birla Science & Technology Company Pvt. Ltd
(ABSTCPL)*

Background & Objectives:

Conductor is one of the major applications of aluminium. Power transmission technology is going through major change in developing economies. In India, major infrastructure development & Make in India initiatives by Government of India are expected to significantly increase the demand for aluminium conductors. According to Technavio's market research analyst (http://www.Researchandmarkets.com/research/tn515t/global_aluminum) "Electrical grade aluminium wire rod is the most popular segment and accounted for 58% of the market share during 2014. This segment is expected to reach a market volume of around 2 million metric tons by the end of 2019. Electrical grade aluminium wire rod is majorly used for the production of conductors and cables that are used for transmission and distribution applications. The increased usage of particular conductors is also expected to drive the market growth during the forecast period. Special conductors such as Al-59, ACAR, and AACSR deliver superior performance in terms of strength to weight ratio without compromising on current carrying capacity. These conductors are anticipated to address the transmission issues within the power grid sector."

Considering these important developments, IBAAS is dedicating a separate session on Aluminium conductors, which shall cover all aspects of conductor alloys, manufacturing, application, etc. This session will have lecturers delivered by eminent speakers from academia and industry both from India and overseas.

- ✚ *Energy Efficient Conductors, R.Anantha, Hind Aluminium Associated Group, Silvassa, India*
- ✚ *Development of Super Thermal Resistant Al-Zr Alloy for Overhead Transmission Lines, R N Chouhan, JNARDDC, Nagpur*



5. Special Session on Aluminium in the Transportation Sector

Coordinated by Mr. Shanker Gopalkrishnan, Madras Consultancy Group (MCG)

Background & Objectives:

In the coming decade, the transportation sector will take the centre stage for the aluminium downstream sector. Of the total global usage of some 72 million tonnes of primary and secondary aluminium in 2015, the transportation sector accounted for 27%.

The usage of aluminium in the transport sector has witnessed steady growth over the last few decades and is now poised to expand further in the coming decade. The automotive industry is taking a major effort in increasing the usage of aluminium in order to reduce the kerb weight of vehicles and improve the fuel efficiency. In USA, an automobile uses, on an average, around 170 kg of aluminium while the number is closer to 140 kg in Europe. Growing environmental concerns and need for light weighting of various transport vehicles without compromising the structural and functional integrity of these systems will drive the global demand for aluminium in transportation sector through the next decade. Apart from automobiles, the demand for aluminium in the form of flat rolled sheet, extrusions, casting and forgings will also be driven by other transport applications such as high-speed rail coaches, bus & trailer bodies, aircrafts and marine applications.

IBAAS 2016 will have a special session on Aluminium in Transportation and this session will explore the growth prospects and the developments across the globe. Apart from assessing the markets and opportunities, the session will have a focus on the emerging applications, alloy & product developments and the implications for the downstream sector, viz. flat rolled products, castings, extrusions & forgings. The topics proposed to be covered are :

- Aluminium in Automotive applications
- Aluminium in Commercial Transportation (bus, truck trailer, tankers)
- Aluminium in Rail Transport
- Aluminium in Aerospace
- Aluminium downstream – flat rolled products, castings, extrusions & forgings

Several national and international speakers have been invited and there is a good response to this session. Some of the companies that have confirmed their participation in this session, as speakers, include Hindalco, Super Auto Forge and Century NF Castings.