

METALWORLD

Devoted to Foundry & Non-Ferrous Metals Industry

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- Scrap recycling to play an important role in \$5 trillion low-carbon economy

Dhawal Shah,
Sr Vice President, MRAI

- Bühler adds Volvo Cars to its mega casting customers

- Copper prices ended lowest on a global demand concerns

- Aluminium Degassing & Selection of Appropriate Degassing Tool

- Aluminium is playing a crucial role in the Industrial Development

- Material World: Shape of Things to Come: Batteries and Lithium issue:

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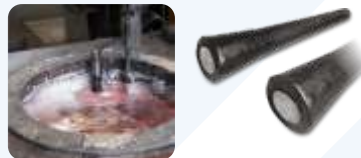
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D. A. Chandekar Editor

Dear Readers,

Till last month, both price and demand curves were heading north and the metals industry was very happily sailing ahead. Suddenly winds changed their direction. Black clouds started gathering and the whole industry sentiment changed. What really happened ? Why this unexpected dive ? Lets analyse.

It is a well-known theory that a rising price curve will not interfere in the demand curve up to a certain level but after that demand curve is not able to carry the price weight on its shoulders and still climb up. It starts falling. I do agree that the rising raw material prices have pushed the metal & metal product prices up but now I think it has crossed the limit and reached the threshold. The demand can no more carry its burden.

I can also see another reason. To improve the yearly performance and to achieve the targets, mills must have done a record despatch in the month of March. Thus there is a lot of material in the market which has naturally reduced the appetite. This is a yearly phenomenon and every year the month of April is usually dull.

The third reason being the Ukraine-Russia war which has disrupted logistic chain at many places. This has influenced the movement of raw materials as well as the finished metal in many sea routes. Today the availability of ships and containers is also an issue. This has increased the

Editorial Desk



freight charges which again has a depressing effect on the demand. The last reason is of course China. As we all know, China is the single country producing and consuming around half of the world's metal & metal products. Any shift in Chinese market is sure to have a multiplying effect on the world. Today, there is a reoccurrence of Covid pandemic in China. Many cities are under lockdown and this has also affected metal production and the consumption in China, in turn affecting the global mineral & metals industry dynamics.

What lies next ? I think the inventory in the market will get cleared in a month or two and its negative effect on the demand will get neutralised. What is more worrisome is the raw material prices and logistics. Firstly, the war between Ukraine and Russia is showing no signs of stoppage. Even if the war is being fought between two countries, many countries, lobbies are helping these war bound countries and indirectly fuelling the crisis and prolonging the war. There is a possibility that few other countries may jump into the war. If this happens, the war may continue for a longer time. Lastly, even if the war stops tomorrow, it is foolish to expect the raw material price correction to happen instantly. It will take atleast 4 to 5 months to secure and restore the production facilities. Logistic disruptions too need to be worked on and this is going to eat some more time.

Finally I feel it will take around six months for the industry to normalise after the war is stopped. Friends, be prepared for an extended challenging period !

Write your comments :

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Scrap recycling to play an important role in \$5 trillion low-carbon economy

“ If India needs to reap the benefits of a truly “green” metal production ecosystem, it would need to step up its efforts in chasing every scrap supplying resource - imports & domestic alike”

Dhawal Shah,
Sr Vice President, MRAI

How do you see the recycling industry playing an important role in the de-carbonisation?

Recently India broke a record of 122 years... not something that we are too proud of! March 2022 was officially declared as the warmest month in India. Similarly, a very reputed study group has predicted 9 coastal cities of India to be swallowed by the oceans by 2030, as they shall fall below the tide-level. This includes the bustling, financial capital of India i.e. Mumbai – where I live.

To mitigate this - a lot is expected from all manufacturing industries here to work alongside the government, and help achieve the goals set out of India becoming carbon neutral by 2070. Most companies would be going to the war room, and finding ways to immediately & radically transform themselves – either by

replacing their source of energy (if it's fossil fuel driven), and /or curtailing emissions at every stage of their production processes. Similarly, consumers also would have to bring a monumental change in their behaviour, when it comes to their discards, and the product journey thereafter.

Today every government discussion, internal or external – words like sustainability & de-carbonization resonates a lot. So what they call “low carbon” or “green” – we simply call it scrap!! And I say it with even more conviction that our industry is perhaps the biggest and most effective artillery that always has... and will continue to help, in combating the perils of global warming.

I have been associated with the metal recycling industry for the last 25 years. I consider this industry to be the rock bed of India's socio-

economic, & environmental transformation. This reason I say this is because:

- 35~40% average contribution to the total output of all non-ferrous metals
- 25000 small, medium & micro units – over 20 lakh direct/indirect employment
- It's a pan-India activity or industry - cutting across every section of society
- About 30% of workforce are skilled women, who specialize in scrap metal sorting
- At a combined average of all non-ferrous metals, we use 1/5~1/8th of energy. There is almost zero waste discharge
- The carbon footprint is about 5~10%, compared to primary production, through mined resources.

How do you analyse the recycling industry to minimise the environmental impact?

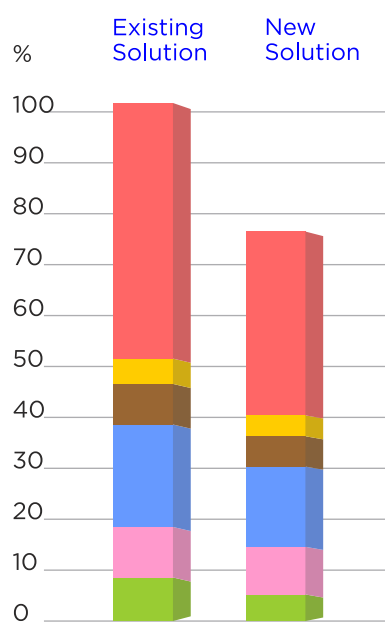
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recycling and waste management practices and now the government is in the process of framing up an overarching policy to ensure the resource efficiency and circular economy across all sectors including recycling as well.

In addition to above, the Centre has notified rules for the management to protect the environment, natural resources and human health. Such rules stress on waste segregation, material recovery, 'recovery, 'extended producer responsibility' (EPR), safe handling and end disposal. They are based on the principle of 'reduce, reuse and recycle'.

Such an announcement reflects the government's commitment to ensuring that the country's economic growth is by way of a circular economy. The Budget for 2022-23 provides a roadmap to achieve that circular economy. It recognises that development and environmental conservation need to be aligned and not be treated as exclusive of each other.

Therefore, we urge the society to move away from the 'take, make, dispose' mind-set to one of improving recycling, promoting reuse, creating a market for recycled materials and redesigning products with end of life in mind.

Overall, India needs to enhance the Circular Economy of recycling sector is an absolute necessity to minimise carbon emission and negative impact on the environment.

Tell us more about how

recycled material is useful for the Automobile industry?

About 60~% of our output is meant for auto die-casting. Indian Recycling industry supplies to world class companies like Maruti, Bajaj, TVS, Hero, or their OEMs. Today we export about 25% of our ingot production to countries like Japan, China, etc. Aluminium components made from secondary Aluminum are also being exported around the world.

About 10% of our output is meant for the steel industry, who use de-ox ingots made from scrap. We supply to steel plants like Jindal, Tatas, SAIL, etc. We also export our de-ox wire rods, shots, pyramids & ingots. Again, with zero quality issues.

Another 10% is catering to the building & construction industry, mostly in form extruded, architectural products (windows profiles). Similarly, for Lead – where 75~80% is meant for auto & industrial batteries. Customers like Exide, Amar Raja, Luminous & several others are using our material for their production of batteries. Indian refined lead is exported around the world. Its widely recognised, and accepted quality. In fact, some of the producers have even achieved LME approval, and are qualified to deliver into LME warehouses.

How do you analyse the important role of the secondary route in brass production?

Today almost the entire Brass production in the country is through secondary routes. Jamnagar alone with about 3000 micro industries – is churning out about 15000 mt of production per

month. Our Brass components are being exported around the world. used in high class engineering. & sanitary fitting application. So bad quality cannot find roads into such applications.

So, in most end applications – secondary, or recycled metals are consistently performing well, and are seeing positive growth – which does not serve the business interest of primary producers.

How do you foresee the importance of scrap metal in India's \$5 trillion low-carbon economy?

India's consumption story has just started to take off, and we intend to become a 5 trillion-dollar economy by the end of this decade. Today our per capita consumption of metals is significantly lower than the world averages. We do not have enough scrap generated, due to low base.

Therefore, we import scrap from overseas. In an attempt to have non-tariff barriers, it is said that foreign scrap is being dumped in India. The fact of the matter is that the entire value chain is largely working on pre-processed industrial scrap, about 65~70% coming from Western countries. In fact, there is a wave of economic nationalism on scrap going on right now as every country (including major exporters) are now trying to hold back its scrap export because they find this to be a fantastic resource material for their own consumption – the best way to offset or reduce their carbon footprint and go more green.

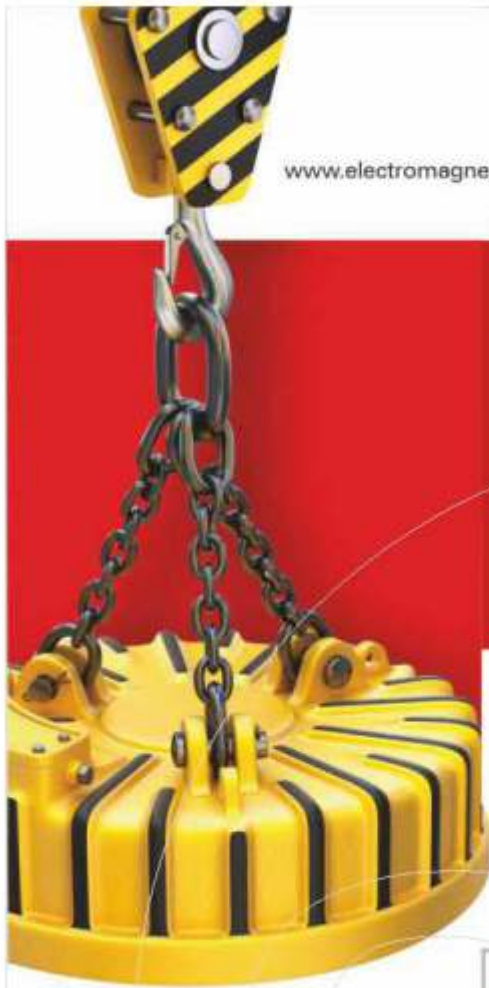
Infact, the EU's proposed Green Deal is aiming to stop scrap exports from the EU to non- OECD countries. Over the last 2 years – there has been

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Face to Face

no new capacities being added through primary routes (using mined resources), and most countries/ companies are implementing a structural shift to recycled metals.

There have been over 2 dozen big secondary plants, mostly green fields announced by international, giant metal producing companies including Aluminium companies like EGA, HYDRO, ALCOA, Rio Tinto, INALUM, etc. who would be using scrap as their infeed. Also China has reduced their primary Al production capacities by about 2.5 million tons, and is quickly ramping up their secondary Aluminium production to over 10 million tons, from the current 5~6 million tons.

So where is all the scrap going to come from? If India needs to reap benefits of a truly “green” metal production ecosystem, it would need to step up its efforts in chasing every scrap supplying resource - imports & domestic alike.

What would be your suggestion on setting up new standards for Aluminium Recycling?

Since 2017, MRAI and other associations are continuously discussing with the Bureau of Indian Standards on the need of establishing new Indian standards on metal scraps - an idea pushed by the primary producers.

At MRAI, we have always believed that focus should always be towards recyclables, and non-recyclables. Emulating some other random country's scrap grading systems - is

not serving the interest of our industry - as the purpose, and the needs are different. A strong, vibrant metal recycling industry does not warrant for high purity, furnace feed materials. It rather thrives on the ability to sort / segregate most complexed scraps, and extracting maximum value from every element - without creating any burden on the environment.

Our processes prove that our downstream products are able to deliver highly acceptable quality globally, across applications. Therefore, we must rather look at how India can become a global hub for metal recycling by enhancing its investments, & infrastructure... including any disposal mechanisms (if required), which no government wants to willingly address. We could then even further strongly penetrate global export markets for intermediate and downstream products. And this is not just too fancy a picture to visualise, as India has the skill, the mind-set, financial resources, and ability to deliver.

We communicated all the nitty gritty regarding the practical position of the Secondary Stakeholders while implementing BIS Standards in last one and half year but our suggestions were not taken into consideration while formulating this new standard which however questions the process of appointment of the Panel & convener and its recommendations. This new standard is not workable. The draft circulated by BIS is very similar to the initial

document prepared by AAI which was not supportive in any way to the Recycling sector resulting in it being rejected by the recycling industry.

We are an association of responsible recyclers who work in a regulatory manner not hampering the environment or economy of the Country. We in fact are contributing to Nation Building by adhering to practices which are environment friendly. Being a real stakeholder in Recycling and putting our best effort in drafting the balanced document, it is sad that the MRAI draft standard which has been submitted to the JNARDDC has not been taken into consideration.

Currently our industry contributes a little over 2% to the GDP, and this can easily be scaled up to 7~8% over the next 10 years. This is rather our golden chance and we must capitalize on the same.

In the end, we all should understand that India is a very frugal economy. Maximum recycling happens here as everything which has value is sorted, segregated with skilled human hands - and used for our consumption. Besides profitability for companies - the net result of this activity is a national gain as well - in terms of economics, environment, & employment. With increased capacities, the world is soon going to scramble for more scraps. Whilst we do our best in overhauling domestic supply chains, imports also are helping us in achieving our targets - as maximum value addition is happening in the country. Let's work together in making India a global hub for metal recycling. ■



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Feature

Morgan
Advanced Materials

ABSTRACT

As input costs continue to rise, casting competition becomes fiercer and profit margins shrink, casting facilities are looking for innovative ways to improve their operations. While most automotive components are being casted into Aluminum and there are many potential conversions in pipe-line, stringent quality standard and casting complexity throw competitive challenges to Aluminum caster every day.

Aluminum degassing has very high emphasis on casting quality and mechanical properties. While Graphite Machined Rotor is considered as the most advanced degassing tool, a standard rotor design and its in-ability to maintain shape through the life cycle, due to faster erosion, has high negative impact on the degassing efficiency. With this in mind, Molten Metal Systems has developed, through its advanced processing & material technology a robust one piece degassing tool. It is designed to maximize degassing efficiency through better vortex formation, smaller bubble size and longer product life due to high erosion resistance. Considering Total cost of Ownership, it gives significant savings through multiply increased product life, excellent metal

quality, reduced degassing time and other operational benefits.

After successful trials and mass scale adoption in North America, Europe and China, this technology is now available to Asian & Middle East foundry industry.

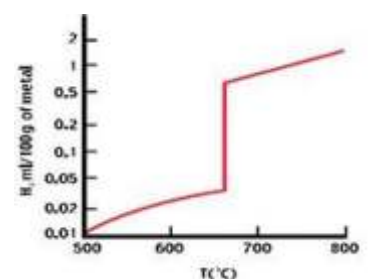
INTRODUCTION

Phenomenally liquid aluminium has high affinity towards hydrogen. This typical characteristic of aluminium results in hydrogen gas entrapment in casting during solidification. Entrapped hydrogen forms micro porosity and blow holes, resulting in casting rejections. Hence the process of minimizing gas content from aluminium alloys before casting (formally known as Degassing) has at-most importance in an Aluminium foundry. Different techniques used for removal of gas content includes (1) purging tablet of chlorine or chlorine free base, (2) Purging inert gas (Ar, N₂) through ceramic rod/pipe, and (3) purging inert gases through rotary degassing tool. However, rotary degassing is the most popular choice today for all sizes of Aluminium foundries due to higher efficiency & reliability.

Rotary degassing efficiency has very high dependency on rotor design, which is the enabler of creating

smaller bubbles & distribution of the inert gas throughout the liquid metal. Morgan Molten Metal Systems has developed Silicon Carbide enriched degassing rotor, manufactured using ISO pressing technology & advanced raw materials. While the benefits as explained above, not only advocates the purchasing decision, but also have many indirect operational benefits of increased production throughput and energy saving. In this paper we have covered basic terminology of AL degassing, testing methods, research methodology that Morgan followed for rotor profile, material and manufacturing, and the results of controlled field trials which supported the value proposition.

1.0 Molten aluminium alloys degassing requirement The source of hydrogen gas for molten aluminium alloys are typically kind of charge materials, dampness in handling tools/refractory materials, metal treatment additives etc. The level of hydrogen gas absorption molten aluminium varies in line with type of alloy, operating temperature and atmosphere.





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Feature

#Graph of typical hydrogen gas dissolving in solid and molten condition

Hydrogen absorption in molten aluminium varies 0.01 to 0.8 ml/100 Gm typically at operating temperature. Presences of hydrogen gas often leads to gas porosity, both closed and open. Gas cavities are voids in the cast material and the surface of which is clean, smooth, and non-oxidised, or shows small colored oxide spots. Reduction of dissolved hydrogen to lowest possible level before casting would be key factor for controlling casting rejection. Rotary degassing is best technique for efficient degassing operation. Inert gas's like Argon/Nitrogen purged into molten aluminium through ceramic or machined graphite shafts/rotor.

Rotary action at specified RPM generates smaller bubbles of inert gas and distributes throughout melt to remove the dissolved hydrogen to lowest possible level checked by Density and Density Index% test of degassed metal

Testing and ensuring hydrogen level after degassing

Density and Density index% or RPT sample tests are mostly adopted and proven

methods for checking level of hydrogen presence in the degassed aluminium. Density (Gm/cc) and Density Index% would be tested with samples cooled at atmospheric condition and vacuum condition (80 mbar) against benchmarked density requirement for specific alloy.

Allowance or safety density are marked for optimum quality castings result

Density (Gm/cc) = Mass (Air) / Mass (air)-Mass (Water)

Density Index% = $\frac{\text{Density (Air)} - \text{Density (Vacuum)}}{\text{Density (Air)}} \times 100$

Reduced atmospheric test (RPT) would be conducted by cooling samples at vacuum condition (80 mbar) and checking section of sample for porosity after polishing or by dye-penetration test. Samples would be compared with standard chart for level of porosity.



Samples drawn for checking at different atmospheric condition

Density and Density Index% required to produce quality castings

- A. Density of sample measuring $\leq 2.55 \text{ g/cm}^3$ and while calculated DI $\geq 5\%$ is high risk of defect generation
- B. Density of sample measuring ≥ 2.55 but $\leq 2.65 \text{ g/cm}^3$ and while calculated DI $\leq 3\%$ is safe but with some risk.
- C. Density of sample measuring $\geq 2.65 \text{ g/cm}^3$ and while calculated DI $\leq 1\%$ is the desirable melt condition and is a criterion for producing high strength/leak-tight parts

2.0 Challenges for efficient degassing and consistency

Degassing of aluminium is mainly based on principle of purging inert gas in to molten aluminium, generating finer size bubbles and distributing throughout melt. Survey from various foundries and key end-users revealed that

- Typically machined graphite shaft/rotor has low resistance to erosion / oxidation at operating temperature or condition
- Molten aluminium needs to be tapped in to transfer ladle at higher temperature due to loss of molten metal temperature with longer degassing cycle time
- Present machined graphite shaft and rotor performance would be satisfactory at the initial stage or limited cycles of



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Feature

new shaft/rotor assembly

- Degassing efficiency of assembly falls relating to erosion/deformation of rotor shape with limited numbers of degassing cycles.

- Deviation in degassing efficiency due to erosion of rotor part leads to uncertainty in results, redegassing or increasing degassing cycle time to achieve required quality (density) of degassed aluminium.

- Moderate resistance to thermal shock- Required skilled operators for right assembly and preheating at time of installation.

3.0 Morgan Silicon Carbide base ISO pressed Degassing rotor

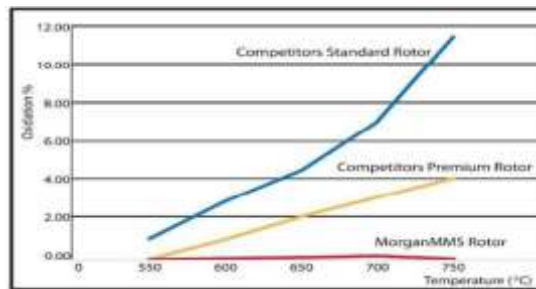
Morgan has developed single piece robust design degassing rotor. Degassing rotor is manufactured with advanced technology- ISO pressing and Morgan Silicon Carbide base material. Key features of Morgan SiC degassing rotor are

- Excellent resistance to erosion/oxidation
- Unique peddle type rotor design generates finer bubbles & distributes throughout melt.
- Higher and consistent degassing efficiency on extended life
- Ease of maintenance and handling- Robust single piece design
- Good thermal shock resistance

4.0 Laboratory testing and results Laboratory testing for oxidation properties of machined graphite degassing rotor and Morgan SiC degassing rotor assembly shows significant difference. Oxidation of Morgan SiC degassing rotor is very less compare to machined graphite degassing assembly

Graph : # Tested at MMS lab- Germany

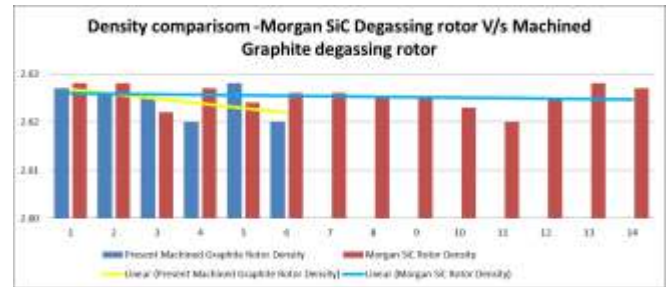
Degassing efficiency (Quality check) and consistency on extended life. As well known fact- Degassing efficiency



would be good if finer bubbles generated and distributed throughout melt. Morgan SiC degassing rotor key features are high resistance to erosion and unique rotor head design distributing finer bubbles generated thus ensuring higher efficiency of degassing consistently throughout extended life. Field test shows that Morgan SiC Degassing rotor performance is consistent throughout extended life of degassing rotor

Graph : Density Comparison
#Density obtained with Morgan SiC degassing rotor is consistent throughout extended life (almost 3 time

of graphite rotor) against required minimum 2.60 Gm/cc,



1= 10 degassing cycles.

Density reduced due to dross deposition and improper cleaning Degassing efficiency (Quality check) and consistency on extended life. As well-known fact- Degassing efficiency would be good if finer bubbles generated and distributed throughout melt. Morgan SiC degassing rotor key features are high resistance to erosion and unique rotor head design distributing finer bubbles generated thus ensuring higher efficiency of degassing consistently throughout extended life.

Field test shows that Morgan SiC Degassing rotor performance is consistent throughout extended life of degassing rotor. Total cost of ownership As competition continues to become more global, metal casters are being pushed to squeeze every last Rupee, Dollar, Yen, Euro, RMB, etc. they can, from their operations.

Very often, consumables are purchased based on their purchase price alone without input from production, quality or maintenance. Even if other departments' input is considered, the actual true indirect costs are not calculated because of a lack of



Feature

time, resources or understanding.

This understanding of the total impact of a purchasing decision is referred to in the financial world as the Total Cost of Ownership (TCO). Depending upon the type of metal casting facility and its location, the following may be of more or less importance and may or may not contribute significantly to the overall cost of producing metal castings. 'Direct' and 'Indirect' cost factors when using a crucible:

- Life of degassing rotor
- Number of change over
- Process variables
- Scrap due to performance issue
- Production cost
- Energy cost
- Skilled operators cost

CONCLUSION

The findings of this report are a result of the collaborative efforts of research & development and application engineering. The research carried out was kept to a technological context and the benefits for the customer(s) were compiled objectively. The analysis was carried out in the laboratory as well as in various metal casters in comparison to various other machined graphite degassing rotor

manufacturers' The laboratory analysis shows that Morgan SiC Degassing rotor has a higher resistance to oxidation. The oxidation tests, where the samples were exposed to an oxidising atmosphere at 750°C, resulted in Morgan SiC single piece degassing rotor having lower losses which means that it is very less deforming/eroding during operation than machined graphite degassing rotor. Degassing efficiency of assembly was consistent throughout extended life which was checked by monitoring Density and density index% or RPT samples. This better oxidation resistance and consistent higher degassing efficiency implies better performance over a longer

period of time. These measurements translate to a more efficient aluminium degassing operation during the lifetime of Morgan SiC degassing rotor. The properties that were tested are a result of the raw materials and the processing parameters. While laboratory investigation provides controlled analytical results, field trials connect theory with reality. Two medium to large metal casters performance in India specifically for Asia market, first customer and second customer case study were evaluated. Performance at these customers, showed significant improvements over machined graphite degassing rotor assembly which decreased their annual total cost of ownership (TCO). ■





Aluminium is playing a crucial role in the Industrial Development

Aluminium, which began to be commercially produced in 1886, is the second most widely used metal globally. The amount of Aluminium at our disposal makes it no surprise that the metal finds its use in so many varying aspects of our everyday life. Aluminium's universal appeal is its odourless, malleable, conductive, and corrosion-resistant qualities that make it an intrinsic metal. It is so vital to modern mobility, environmental sustainability and the economy that without it, many of the conveniences of today's world would merely not exist.

Transportation, construction, consumer goods and packaging are

sectors where the metal continues to make very practical items. Its lightweight and sturdy properties are qualities why Aluminium continues to be used vastly, even in intricate industrial uses. Aluminium today is not just the fastest growing metal but a versatile product whose positive efficiency, safety and durability are noteworthy. It helps the metal in catering to present-day requirements and complex engineering demands.

Consumption & Demand

Though low in comparison to a world average of 11 kg, India, with a per capita Aluminium consumption of 2.5 kg, is continuing to show growth. With anticipated policy



R. K. Jain
Sr. Vice President –
Corporate Affairs,
Jindal Aluminium

changes, the metal's consumption is only set to grow further. Globally, data indicates that the auto and transport sector are spearheading the consumption pattern with 23% of Aluminium consumption, construction at 22%, packaging at 13%, electrical at 12%, machinery and equipment at 8.5% each. Aluminium in consumer durables is 4.5%, with other segments amounting to 4%. The power sector is the biggest consumer of Aluminium at 48% used in India's vast electric distribution system. The transportation and automotive sectors are at 15%, building and construction at 13%, and consumer durables contribute to 7% of aluminium consumption in the country. As the world turns green, with EV manufacturing being one of the



critical measures, economic growth led by Aluminium in this space is expected to increase rapidly.

The future is bright for the use of Aluminium, with the Make in India initiative offering the most significant potential opportunity for its consumption to grow manifold. It has set the ball rolling with several Government-backed mega-projects to see Aluminium being used as a critical component. These include creating smart cities, ensuring housing for all, the rural electrification mission, dedicated freight corridors, high-speed railway lines, etc. The often-asked question is, why is Aluminium so wanted? It is because Aluminium is uniquely positioned to meet the needs and challenges of the 21st century. The downstream Aluminium industry has created capacities and capabilities to provide engineered Aluminium products that meet the most detailed requirements of industries and are also a great fit in a circular economy. These are energy efficient and suited for extreme weather conditions. This lets it offer itself to different applications in almost every industry and finds a role in creating every other product in use today.

Intrinsic bond

Aluminium shares an intrinsic bond with the world we live in today. Its strength-to-weight ratio makes it particularly useful as a



structural material weighing 65% less than steel. It leads the complexities of executing perfection in transportation, construction, consumer goods and packaging industries to a possibility. It may not be the strongest on its own, but Aluminium draws incomparable strength when alloyed with other metals. We find it being used in cars, trains, and airplanes because it allows the vehicle to withstand impact. Aluminium's feather-light weight enables it to travel at increasingly higher speeds without adding much drag.

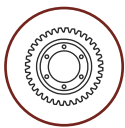
For the construction sector, its corrosion-resistance qualities let Aluminium forego the need to apply any anti-corrosion coating, which is an added cost. But what makes this a developer's delight is that building fenestrations with Aluminium are almost free of maintenance, and they have higher thermal efficiency and can be moulded into various desired shapes supporting modern design innovations. Some advanced countries are experimenting with

photovoltaic devices and micro-wind turbines that can be integrated directly into the Aluminium façade offering green buildings a new meaning.

The consumer goods sector has seen Aluminium replace other materials like steel and plastic as it allows heat to dissipate at a much faster pace. New age gadgets and appliances like flat-screen TVs, smartphones and tablets have included Aluminium over time, and its applications in various consumer products have let the devices work for hours without overheating.

Larger Good

The use of Aluminium alloys has revolutionized the world, especially through green initiatives. While we would perhaps have lived similar lives without Aluminium, the world would have been less comforting. Less comforting concerning the use of a metal, whose applications and capabilities enriched by the downstream sector have added a host of modern conveniences to our lives. The world would not have achieved industrial development as quickly without Aluminium. ■



Gargi HA Stall – A meeting Point for Indian & Overseas Foundrymen

GARGI Industries is a rapidly growing company having established since 62 years providing the complete solution for the foundries with the essential material like Fluxes, Chemicals and Metal Feeding Aids suitable for Ferrous and Non-Ferrous Foundries.

Gargi HA and Gargi Engineering Enterprises Pvt Ltd which are the Gargi Industries associated companies had jointly participated at 70th IFEX 2022 exhibition and showcased its complete 360 degree solution to the foundry industry at the stall GARGI

HA Stand (Stand No. P1, Hall 1 @ IFEX-2022). The exhibit stands showcased various Cores & Castings from several key customers. It was held during 17th to 19th April 2022 at Gandhinagar. Vinod Kapur, Gaurav Kapur, Varun Kapur and GARGI HA team were making special efforts to welcome Foundrymen worldwide to

develop deep understanding and strong business relations among the Foundrymen.

Bernhard Mueller, Regional Vice President Asia & Pacific, Klaus Oosterhof, Business Development Manager and Mr. Simon Turley Global Technology Leader of M/s. Huttenes Albertus Chemische Werke GmbH (Member of HA Group), Germany, interacted with the foundrymen and shared their experience on Resins & Coatings.

It was the best Meeting point for Foundrymen from all parts of India and Abroad. The Management of Gargi HA, Gargi Family and other team members of Gargi HA were busy welcoming the delegates





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- COMPETITIVENESS IN THE MANUFACTURING SECTOR
- ENERGY SAVING
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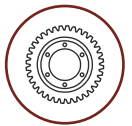
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explained in detail about the advantages/ benefits of the system.

Gargi Huttenes Albertus Pvt.Ltd.- HA Group of Companies – A leading manufacturers of Foundry Resins & Coatings in India.

Gargi Industries - Since last 62 years, Gargi Industries is engaged in manufacturing Foundry Fluxes, Chemicals and Metal Feeding Aids suitable for Ferrous and Non-Ferrous Foundries.

Gargi Engineering Enterprises Pvt.Ltd. is in operation for more than 41 years. It represents many leading manufacturers of Foundry Plant, Machinery and Materials from India and abroad. Some of these companies are:

- Omega Foundry Machinery Ltd., U.K.
- Omega Sane Foundry Machinery Ltd., Pune



and discussing about their products / technologies and exchanging thoughts and information.

The Stand measuring 306 Sq meters (17 m x18m) was very impressive. A very strong Team of GHA was present. Technical papers were presented by Mr. Klaus Oosterhof- "Additive manufacturing designed for Foundry needs" and Mr. Chandan Panda – "High performance cold box

system to optimize quality, economy and pollution."

Mark Fenyes Chairman & Andy Pickering, Sales Director of Omega Foundry Machinery Ltd., U.K. along with Mr. Nitin Sane, Managing Director of Omega Sane Foundry Machinery Ltd., Pune welcomed foundrymen and explained them about the use of various types of Continuous Mixers, Sand Reclamation and Green sand. They





India's shift to electric vehicles will lead to more copper imports



India's import dependence on copper will go up with the rapid adoption of electric mobility and shift to renewable energy. The copper imports went up from \$2.2 billion in FY21 to \$2.9 billion in FY22.

The average battery electric vehicle requires 83 kg of copper, and solar photovoltaic and onshore wind platforms require nearly 3,000 kg of copper to deliver just one MW of power. Offshore wind power generation is considerably more copper demanding, requiring more than 8,000 kg of copper per per MW.

"Copper is a key component for an electric vehicle and rising EV penetration will lead to a pickup in demand for copper from the auto segment which currently accounts for close to 10% of India's overall copper demand of around 1.1 million tonne per annum.

Thrust from renewables and the automotive sector will drive demand to over two million tonne by 2030, provided India remains on track of achieving more than 450 GW renewable power capacity and 30% EV penetration in passenger vehicles by 2030.

Demand from the auto-segment will rise to more than 25% of overall demand in that scenario," a TOI report quoted Hetal Gandhi, director, CRISIL Research, as saying.

Hindalco, Vedanta, and HCL have primary copper production capacity. Although the combined capacity is above 1,000 kilo tonne per year, production is only around 600 kilo tonne. India's local copper production took a hit due to the closure of Vedanta's Sterlite Copper.

International Aluminium Institute issues update to Red Mud sustainable use guidelines

The International Aluminium Institute published its revised guidelines for sustainably managing bauxite residue or "red mud," updating its Bauxite Residue Management Best Practice first published in 2015.

The new guidelines, dubbed "Sustainable Bauxite Residue Management Guidance" fleshes out more of the

lifecycle of red mud and how relevant parties can better handle the toxic substances in a sustainable manner.

Red mud disposal continues to be an issue facing the aluminium industry. With approximately 133 million metric tons of primary aluminium production last year, around 159.6 million metric tons of red mud was produced, most of which is held in Bauxite Residue Storage Facilities (BRSF). Efforts continue to be made to find new and sustainable ways to repurpose this red mud into safe, useful substances.

Pernelle Nunez, IAI Deputy Secretary General and Director of Sustainability, said in a press release that the document aims to describe new ways to sustainably handle the toxic substance.

"As aluminium production has increased, so has bauxite residue – estimated at almost 170 million tonnes generated in 2021. We'll need to continue to manage bauxite residue in a sustainable way through innovative treatment, remediation, rehabilitation and utilisation options. This document aims to provide an overview of the varied approaches that can be adopted to minimise the impacts of bauxite residue from the facility design phase through to operation, closure and rehabilitation."

Roberto Seno, Vice-Chair of the IAI's Bauxite and Alumina Committee and Technology Manager at Companhia Brasileira de Alumínio said that a great deal of progress on utilizing red mud for valuable purposes has



been made to date.

"The IAI and the aluminium sector continues to research how to extract the valuable materials

remaining in bauxite residue or use the residue for other production uses. Many opportunities have been identified – some of which, while technically feasible, are not yet economically viable. One of the most promising however has been residue as a raw material for cement production which presents a major opportunity for both industries and growing its bulk consumption is a focus in a number of regions."

"Residue management goals require a culture of continuous improvement," explained Eugenio Azevedo, Chair of the IAI's Bauxite and Alumina Committee and Vice President Continuous Improvement at Alcoa. "An ideal future state would be producing zero residue but where this is not yet possible, we want to manage the residue safely stored in Bauxite Residue Storage Facilities (BRSF) so that we can rehabilitate and revegetate them or prepare them for the next useful land use. Residue management is not 'one-size fits all' and technology selection and management practices need to be adapted to specific local circumstances."



Global aluminium output flat y-o-y at 5.599 mln T in April -IAI

Global primary aluminium output in April was unchanged year on year at 5.599 million tonnes, data from the International Aluminium Institute (IAI) showed on Friday. Estimated Chinese production rose to 3.29 million tonnes in April from 3.257 million tonnes a year earlier, according to IAI data.

EGA welcomes global aluminium leaders to Dubai for industry meet



United Arab Emirates: Emirates Global Aluminium, the largest industrial company in the United Arab Emirates outside of oil and gas, welcomed aluminium industry leaders from around the world to Dubai for the 50th anniversary meeting of the International Aluminium Institute.

The International Aluminium Institute brings together the global aluminium industry to promote a wider understanding of the industry's activities and to demonstrate both the industry's responsibility in producing the metal and the potential benefits to be realised through its use in sustainable applications and recycling.

The association's members include global bauxite, alumina and aluminium companies from all the major producing regions worldwide. The work of the International Aluminium Institute is overseen by a Board of Directors, with each member company represented at a senior executive level.

After the meeting, Board members visited Dubai Electricity and Water Authority's Mohammad bin Rashid Al Maktoum Solar Park to hear about the UAE Energy Strategy 2050. Aluminium production is energy intensive, and decarbonising electricity generation is critical for the industry to reach net zero by 2050. Last year, EGA became the first company in the world to produce aluminium using solar power, sourced from the solar park. EGA markets this metal under the product name CelestiAL.

Abdulnasser Bin Kalban, Chief Executive Officer of EGA, said: "EGA makes the UAE the fifth largest aluminium producing nation in the world, and we were pleased to welcome the global aluminium industry's leaders to

Dubai. Aluminium is lightweight, strong and infinitely recyclable, making it an essential material for the development of a more sustainable society. It also matters how sustainably aluminium is made, and the International Aluminium Institute is a forum to progress the responsibility agenda across the industry as a whole."

Miles Prosser, Secretary General of the International Aluminium Institute, said: "As the IAI marks its 50th anniversary this year, we are cognisant of the fact that the UAE is an important global centre of aluminium manufacturing and a hub of global trade, both important reasons to bring global aluminium industry leaders together here. EGA is a very active member of the International Aluminium Institute and is leading on key sustainability issues, helping us contribute to tackling industry-wide challenges and making progress for humanity."

Abdulla Kalban, EGA's Managing Director, served as Chairman of the International Aluminium Institute from 2014 to 2016, the first Arab to hold this global position in the aluminium industry.

Hindalco doubles Q4 net profit as India biz shines

Aditya Birla group company Hindalco Industries Ltd announced its consolidated March quarter results with net profit nearly doubled to a record Rs.3,851 crore from the previous year's Rs.1,945 crore, backed by a strong performance in its India aluminium business.

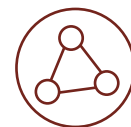
Consolidated revenue grew 37.7% during the period,



while consolidated Ebitda (earnings before interest, tax, depreciation and amortization) rose 30% to ₹7,597 crore.

The Indian aluminium business posted a robust Ebitda growth of 123% to ₹4,050 crore, with Ebitda margins of 41%. The company attributed the same to favourable macros, higher volumes, better operational efficiencies, and improved performance of downstream business offset by higher input costs.

Aluminium prices on the London Metal Exchange (LME) during the quarter had averaged about \$3,273 a tonne, up 56.2% year-on-year and 18.4% sequentially, as per analyst data. The same is likely to have lifted profitability



of Hindalco's aluminium segment, despite higher coal costs.

The company's India business recorded aluminium production of 326,000 tonnes versus 316,000 a year earlier. Aluminium metal sales at 336,000 tonnes during the quarter came in higher than the 329,000 tonnes in the previous year.

Hindalco's copper business did well, too, with the segment revenue rising 15% from a year ago to Rs.9,787 crore, primarily due to higher global prices of copper and higher volumes. Better operational efficiencies and improved by-product realizations meant that Ebitda for the segment at Rs.387 crore was up 20% year-on-year in Q4.

However, its US subsidiary Novelis reported a relatively softer performance during the quarter, marred by one-offs. It was also impacted by the semiconductor chip shortage in auto industry, cost inflation and other short-term operational issues, as well as a non-recurring regulatory provision taken in the quarter. The adjusted Ebitda of \$431 million was 15% below the previous year's \$505 million. Higher operational costs of about \$55 million on account of production and logistics challenges and \$15 million in non-recurring regulatory provisions impacted Ebitda, as per analysts.

Copper falls as investors fear global economic slowdown

Copper prices fell on 24th May 2022, pressured by fears of slowing global economic growth that also pulled down equities, though a weakening dollar helped to limit losses. Benchmark copper on the London Metal Exchange (LME) was down 1.2% at \$9,435 a tonne in official trading.

Prices hit a seven-month low of \$8,938 on May 12 but rebounded as the dollar weakened from 20-year highs, making metals cheaper for buyers with other currencies.

"Central banks are maintaining their hawkish stance to try to kill inflation, and killing inflation will also kill the economy," said WisdomTree analyst Nitesh Shah, predicting further price pressure in the coming months.

However, he agreed with many other analysts who say the long-term outlook for copper remains strong because of low investment in new mines and demand generated by the green energy transition.

Copper, which is widely used in the power and construction sectors, reached a record high of \$10,845 in March.

DAVOS: Threats to the global economy topped the list of worries at the annual Davos think-fest.

INTEREST RATES: The European Central Bank and U.S.

Federal Reserve signalled significant interest rate increases in the coming months in an effort to curb inflation.

CHINA: The Chinese government promised steps to support the economy, but COVID-19 lockdowns are hurting growth and trouble in the property sector is predicted to worsen.

JAPAN/EUROPE: Japan's manufacturing activity expanded at the slowest pace in three months in May while euro zone and UK business growth slowed.

TOYOTA: Japanese carmaker Toyota scaled back global production plans in June because of a continuing semiconductor shortage.

POSITIONING: For the first time in two years most speculators expect copper prices to fall.

BEARISH: "Recent consumption run rates imply copper and aluminium shifted into surplus globally in April," analysts at Citi said. "It will likely take some time for the balances to tighten ... we are most bearish on nickel, then copper, and least bearish on aluminium and zinc."

SUSTAINABILITY: The LME said 17 more metal producers were disclosing sustainability data on its digital register LMEpassport, taking the total to 26.

LME aluminium was down 1.7% at \$2,907 a tonne, zinc fell 0.9% to \$3,754, nickel slid 5.4% to \$26,245, lead shed 0.9% to \$2,172 and tin was down 2.1% at \$33,900.

Copper, aluminum recycling opportunities emerge as metals demand grows: BIR

Market opportunities are emerging for copper and aluminum product recycling, due to growing demand for copper and aluminum metal overall, according to speakers at the International Recycling Bureau (BIR) conference in Barcelona this week.

Of the 14 million mt of secondary copper generated annually on a global basis, only 9 million mt/year are currently recycled, InkaGuixa, of Spanish copper processor La Farga, told delegates during the non-ferrous metals panel at the event.

"The 5 million mt [that are not recovered] need to be better incorporated into the value chain," Guixa said. This needs to be done via a higher level of secondary copper recovery and process and product innovation, she said.

Recycling levels are expected to be boosted by regulations curbing carbon emissions as overall demand for base metals grows.

"Copper demand will increase," Guixa said, noting that energy transition is currently the biggest driver of copper demand.

Renewable energy is nine times more copper intensive



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than thermal power, while electric vehicles are three times more copper intensive than internal combustion engine cars, according to Guixa. Electrification and digitalization should by 2030 require 31% more copper than today, she noted, citing data from trader Trafigura and Italy-based energy company Enel.

Eventually more copper at the end of its life-cycle will be available and will need to be reintroduced into the value chain, she indicated.

"Secondary copper has a huge business opportunity to meet copper demand," Guixa said.

London Metal Exchange Grade A cash copper closed at \$9,459.50/mt May 24, down \$40/mt on day.

Aluminum 'closing the loop'

In the aluminum recycling area, there are both challenges and opportunities, Tom Eng, senior vice-president of European recycler Tomra Sorting GmbH, told delegates.

European Union demand for aluminum is set to grow by an estimated 40% between 2018 and 2050, driven by transport, construction and packaging and that will be challenging for aluminum producers, Eng said. There is also an accompanying plethora of environmental legislation, he noted.

However, the growth in demand will be predominantly covered by recycled aluminum as there is limited primary production capacity and because the circular economy is pushing legislations for CO2 reduction and incentivizing recycled content, he said.

New technologies are emerging for sorting aluminum scrap, for instance x-ray transmission (XRT), which sorts metals based on atomic density, and laser-induced breakdown spectroscopy, which detects elemental composition, sorts scrap into different alloys and alloy groups, and increases scrap quality by further reducing alloying elements.

Companies already introducing so-called "green aluminum" alloys into the market include Hydro, with its Circal 100R product, Creal (Circular Recycled Aluminium), Recall and Silval, he said.

"Aluminium is already quite a green industry," he said.

"We're closing the loop in aluminium."

Regionalization could also be key in reducing energy and transport costs in the sector, he noted.

Dhawal Shah, of US-based Metco Ventures, noted that energy costs can now represent up to 75% of recycling companies' total operating costs in some regions.

The LME high-grade aluminum cash price closed at \$2,880.50/mt May 24, down \$81.75/mt on day.

UK may impose duties of up to 29% on Chinese aluminium extrusions



Britain may impose anti-dumping duties of up to 29% on aluminium extrusions from China to protect domestic producers, a trade agency said on Friday.

Aluminium extrusions - widely used in the transport, construction and electronics industries - are being dumped in Britain at lower prices than they are sold in China, the Trade Remedies Authority said in a interim report.

"The TRA determined that there is already damage to the UK industry, having found clear evidence of price undercutting, indicating that UK businesses are struggling to compete with the dumped imports," a statement said.

Provisional measures will be imposed as the TRA completes its investigation, requiring Chinese companies exporting to Britain to provide a bank guarantee beginning on May 28, it added.

Duties ranging from 7.3% to 29.1% were recommended, depending on the company and the level of dumping margin, the interim report said.

Three companies were named - Press Metal International Group, Shandong Nanshan (600219.SS) and Haomei Group - plus there were categories for other co-operating and non-cooperating exporters.

Greener Aluminium Online Summit calls for action

The Greener Aluminium Online Summit, a one-day online event, took place on 24th May, marking its second year of action. The event aims to bring together aluminium manufacturers and environmental solutions providers to discuss how the industry must continue to adapt, minimising the impacts associated with production of the metal today, while also developing technological pathways for the future.

There were more than 200 delegates registered, from across the globe. Attendees included representatives



from Alba, Panda Aluminium, European Aluminium, Shanghai Huafo Aluminium, as well as many more.

Opening the event was Nadine Bloxsome, Editor and Content Director of Aluminium International Today. Setting the scene for the event, she stated, “[the event will] showcase ongoing projects, new technology, investments, and challenges we face together as a sector”, emphasising the need for a united front.

Keynote speaker, Joachim Von Scheele, Global Director of Commercialisation, Linde Technology presented on 'Flameless Oxyfuel and Hydrogen for Greener Aluminium Production'.

Mr Von Scheele discussed the dilemmas that arise when converting to 100% renewable Hydrogen/Oxyfuel. He proposed that companies slowly integrate renewable fuel by implementing a step-by-step strategy, which slowly phases out the use of non-renewable fuel.

He presented an example of the first 100% renewable energy fuelled steel plant – OVAKO, where 25 tonnes of ball bearing steel was heated by 100% flameless Oxyfuel with Hydrogen Fuel.

This is now being phased to full scale, at the steel company. Linde is now conducting its first large scale test with aluminium following a number of successful small-scale tests.

Presenting next was Dr Fiona Solomon, CEO of the Aluminium Stewardship Initiative. Dr Solomon discussed the future of the ASI in the next five years. “Climate actions and risks are front and centre for the industry”; the ASI aims to address all aspects to ensure an accurate assessment of environmental sustainability is made against a company. As well as environmental sustainability, the initiative assesses other sustainability factors to “maximise each other's [companies] successes”. She announced the ASI's new Indigenous Peoples Advisory Forum (IPAF), which uses qualitative data to assess and ensure social sustainability. MsSolomons also discussed the new standards that the ASI announced following their five-year review, she disclosed that the ASI will be reviewing their standards more frequently to keep up-to-date with the changes in

the industry.

Next, Vice President of Alcoa, Rosa M. GarcíaPiñeiro presented on 'The Technology Roadmap to Achieve the Aluminium Industry's Net Zero Ambitions'. She stated, “[Alcoa is] on a journey to reinvent the aluminium industry for a sustainable future”. MsGarcíaPiñeiro outlined Alcoa's investments where the company strives towards better sustainability. She disclosed that Alcoa have been investing in an R&D project – Refractory of the Future, decarbonisation of aluminium smelting and refining with ELYSIS, and developed recycled scrap aluminium through its project ASTRAEA.



Following the theme of sustainable projects and products, Hans Erik Vatne, Chief Technology Officer at Hydro added: “sustainability is becoming imperative to running a business”. He discussed Hydro's new green aluminium product: CIRCAL, which contains 75% scrap material (for more information on this topic, take a look at the March/April issue of Aluminium International Today). MrVatne also listed Hydro's research projects: Carbon Capture and Storage- 55 technologies have been implemented and Hydro work with selected companies, Inert anodes experiments - these were investigated as a huge internal project; however, the concept was discarded as it was too high risk and high in cost, support for the development of ELYSIS alongside their peers and more.

Closing the first section of the event, Paramita Das, Global Marketing and Development for Rio Tinto, spoke on 'Responsible Aluminium: Enabling Modern Life'. Stating, “Green materials need to be more than carbon free”, she discussed the importance of transparency in the industry. Ms Das went on to discuss the 10 point criteria of the START Responsible program that Rio Tinto are involved in, R&D projects like ELYSIS™ and the companies plans to invest \$7.5 billion by 2030. “Green aluminium is responsible aluminium... Sustainability is a team sport”.

Following a networking break, Quantillion CEO, HilbrandKuiken delivered his presentation on the 'Role of



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AI on the Road to Sustainable Aluminium Production'. He discussed the benefits of using "fast and powerful decision-making algorithms" in the industry and delved into the question; "how do we transform from doing one thing, to doing another that we are not used to?" He continued, "None of the goals [or changes] can be reached alone". MrKuiken proposed the use of technology to assist with the industry; a Cluster Optimisation model provided evidence that AI is 20 times faster than an "individual decision". Allowing AI to make the decisions in the Cluster Optimisation model resulted in a 6% decrease in emissions. This proved how AI technology can be used to not only improve efficiency, but also reduce CO₂ emissions.

"Knowing that the climate is *ours* and not *yours*; we need to be aware that we need to deal with issues together and rely on each other." HilbrandKuiken, CEO, Quantillion.

Speaking next was Gunther Schober, Sales Manager, PSI Metals. Reiterating the importance of Technology and AI in the industry, he stated: "Software will not change the process, but it can optimise energy use and thus help reduce CO₂ emissions." He provided another example of where intelligent software can be implemented to reduce costs; using technology to predict when peaks of energy will arise and estimate demand to reduce sharp fluctuations, and therefore improve efficiency, sustainability, and cost of energy usage.

"700 million tonnes of emissions are from electricity," said Pernelle Nunez, Deputy Secretary General – Sustainability, International Aluminium Institute.

Energy, an issue at the forefront of sustainability challenges. Ms Nunez outlined three possible scenarios regarding predictions of future aluminium production moving into 2050. She stated, "unless energy CO₂ emissions are zero, or close to zero" we will not reach the goals we have set for 2050. Ms Nunez ended her presentation by highlighting: "Aluminium is the material of the Future", so despite the challenges, the industry is succeeding.

Alumobility, a non-profit organisation, presented on its

white paper 'Closing the Loop on Automotive Aluminium Scrap to Minimise Carbon Emissions'. Speakers Alison Conroy, Director, Sustainability, Novelis and Mickaël Faliu, Sustainability Engineer, Constellium, discussed the importance of sustainable aluminium in the automotive industry. Looking at the circularity of the material, and its potential to be a closed loop within the automotive industry, the pair elaborated on the concept of recycling aluminium in automobiles; taking out the metal for the vehicles, recycling it, put into a new vehicle and repeat. To close the loop further, they suggested that automobiles start to design vehicles to be recycled. To conclude, "the end of life is also the rebirth."

Paul Adkins, Managing Director of AZ Global Consulting delivered a provocative presentation challenging the usual narrative of the aluminium industry. "There is a lot of work to do... there is a lot of hype regarding the inert anode, but its introduction will not take us to where we need to be," he continued "why would anyone spend money [on the anodes] ... the impact is not sufficient enough to implement the change".

Sterlite Copper launches coffee table book highlighting role of copper in the modern world

Highlighting the importance of copper and its contribution to the modern world, Sterlite Copper launched a coffee table book, showcasing its origin and its definitive role in shaping the modern world, at the SICCI CXO Conclave, held in Chennai.

Unveiled by Mayur Karmakar, MD, International Copper Association, India, with Ms. A. Sumathi, Chief Operating Officer, Sterlite Copper, the 70-page book comes with an interesting title "Hi I'M COPPER".

The book traverses the entire journey of copper from its discovery in 9,000 B.C. in an Egyptian river to the current times, focusing on its integral role in creating the modern world as we know it today. The book also traces the lifecycle of the metal and covers the entire gamut of its industrial and sectoral usage ranging from Power, Defence, Automobiles, Healthcare, FMCD among others. Speaking at the launch of the Coffee Table Book, Ms. A. Sumathi, Chief Operating Officer, Sterlite Copper said: "We are delighted to unveil the copper coffee table book 'Hi, I'm Copper'. The book aims to essay the journey of Copper and Sterlite's smelting story. Over the last 25 years, Sterlite Copper has leveraged on technology to upgrade its processes and we had always benchmarked our practices to the global standards in terms of energy efficiency, copper recovery, effluent treatment while being sensitive to our corporate ethos of ESG standards."





The book highlights how Sterlite Copper, which began with a 100 KTPA Smelter in the year 1996, went on to become the largest supplier of Copper in India, meeting nearly 36 per cent of the country's copper demand by 2018. The operations of the plant are also benchmarked against global best-practices, with certifications in Quality, Environment, Occupational Health & Safety, Energy.

The plant has also invested heavily in environmental safeguards such as Gas Scrubbers, Effluent Treatment Plants and Reverse Osmosis Plants in order to ensure a safe and sustainable operation in Thoothukudi. The plant has been certified for its Zero Liquid Discharge, Water Consumption Management, Waste Reduction and Repurposing Waste towards Sustainable Applications. The book also clearly brings out the economic benefits of the Thoothukudi plant in Tamil Nadu (NS:TNNP). It had emerged as a pillar of support for the community and a provider of livelihood to thousands of people. The plant engaged about 1,000 trucks/tankers on daily basis with consistent load, thereby providing livelihood to around 9,000 truck drivers and cleaners per month. It had over 650 supply and service partners and helped them generate a business of close to \$134 million every year. The total number of dependent domestic companies for supply of raw material from Sterlite Copper was 381 and contributed approximately \$295 million to the exchequer.

Additionally, it provided more than 17 per cent of Thoothukudi port's total revenue. Even the by-products of the copper smelting like sulphuric acid, phosphoric acid, gypsum and copper slag act as critical input for a number of important industries. While sulphuric acid is the primary raw material for chemical and fertilizer, gypsum is a key ingredient for cement production. Sumathi adds: "Copper is the third most used metal in industrial and civil applications across the world and its constantly increasing demand increases the need for production, thereby having a direct impact on employment opportunities & downstream industries. We at Sterlite have created direct employment for 4,000 people and impacted more than 20,000 people engaged in various supplier and customer units. Through the book, we want everyone to become aware about the journey & importance of copper and Sterlite, which together contributed immensely to the overall economy, not just at a national level, but also at a State and District level."

Prof. Ashutosh Sharma, Institute Chair Professor, Department of Chemical Engineering, Indian Institute of Technology, Kanpur & Former Secretary, Department of

Science & Technology, government of India, who wrote the foreword for the coffee table book, says "I believe Copper is one of the key drivers of Industry 4.0 and beyond. An invisible enabler, copper's role in the future of our world will be all pervasive from our homes to outer space explorations.

"I'm delighted that the importance of copper is being covered in a comprehensive way in the book being launched today. I wish to congratulate the team Sterlite for conceiving and executing this much needed document of value to its many stakeholders from the traditional industries to Industry 4.0 and Digital/cyber technologies."

Also speaking at the occasion, MayurKarmakar, MD, International Copper Association India, said: "Copper is the third-most-essential metal in the world, contributing to the environmental and socio-economic development across the globe. The demand for the crucial metal, which is a key input for multiple sectors, is expected to further raise sustainable growth in the post-pandemic scenario."

Another significant aspect of the book is that it brings into focus, the role of the company in building an aspirational and empowered society with all the stakeholders working in tandem for the common good all. For instance, under the Muthucharam initiative, the company plans to build a smart school and a well-equipped hospital for the community. Plans are also afoot to plant 1 million trees to make Thoothukudi, one of the greenest cities in India. Other initiatives include providing clean drinking water to every family in Thoothukudi. More than 2,300 families have already benefited from this project, Tamira Surabhi till date.

Zinc air batteries to reduce dependence on lithium batteries : IZA

Arun Misra, the first Indian to be elected as chairman of International Zinc Association, believes viable Zinc-air batteries have helped reduce dependence on lithium batteries.

Zinc air batteries have the potential to provide a cost-effective and sustainable solution to storage of renewable energy, newly appointed Indian head of International Zinc Association has said.

Arun Misra, the first Indian to be elected as chairman of International Zinc Association, believes viable Zinc-air batteries have helped reduce dependence on lithium batteries, as only a few countries have control over this metal.

Observing that almost all companies across the globe are looking to renewable energy solutions for their



sustainability goals, Misra on Thursday said one of the biggest difficulties with renewable energies has been the storage solution and that too fixed storage solution.

"We firmly believe that zinc air batteries would firmly find a place and will make it much easier to adapt for people for the storage solution," said Misra, asserting that this promotion is going to be one of the key priority areas for International Zinc Association (IZA).

Early this year, Mishra, who is also the chief executive officer of Hindustan Zinc Ltd, was selected as the new Chair by the IZA Executive Committee. The IZA is a non-profit organisation representing the global zinc industry. Its mission is to support and advance zinc products and markets through research, development, technology transfer and communication of the unique attributes that make zinc sustainable and essential for life. According to Misra, there is a huge demand for storage solutions now. Noting that only a few countries have control over lithium supplies, Mishra said any country for its own strategic interest must diversify its resources for the same purpose.

Although they may start with lithium, we strongly feel that zinc batteries will come into play in a big way, he said.

Nalco posts 272 per cent growth in net profit

National Aluminium Company (Nalco) Limited, a Navratna CPSE has surpassed several milestones in its journey of business excellence during the 2021-22 financial year. Showing robust performance across all its business units, the company has posted its best-ever annual production and sales registering the highest ever revenue from operations and highest-ever net profit of Rs 14,181 crore and Rs 2,952 crore respectively.

The net profit of the company for the financial year 2021-22 has jumped by 227 per cent (pc) over the preceding

financial year. Company sources said market dynamics has resulted in a multi-fold increase in turnover and consequent profit in the fiscal.

The aluminium major has achieved bauxite production of 75.11 lakh tonne from its captive bauxite mines and produced aluminium of 4.6 lakh tonne during the 2021-22 fiscal for the first time since inception, surpassing all previous records.

The company had achieved the maximum production of 73.65 lakh tonne bauxite in 2020-21 while the export was 1.92 lakh tonne of aluminium metal surpassing the decade-old record of 1.46 lakh tonne in 2009-10.

The company has reported 9.5 pc rise in consolidated profit at Rs 1025.46 crore for the quarter ended March 2022. The profit was Rs 935.74 crore during the same period last fiscal. The consolidated income has jumped to Rs 4492.1 crore from Rs 2874.47 crore a year ago.

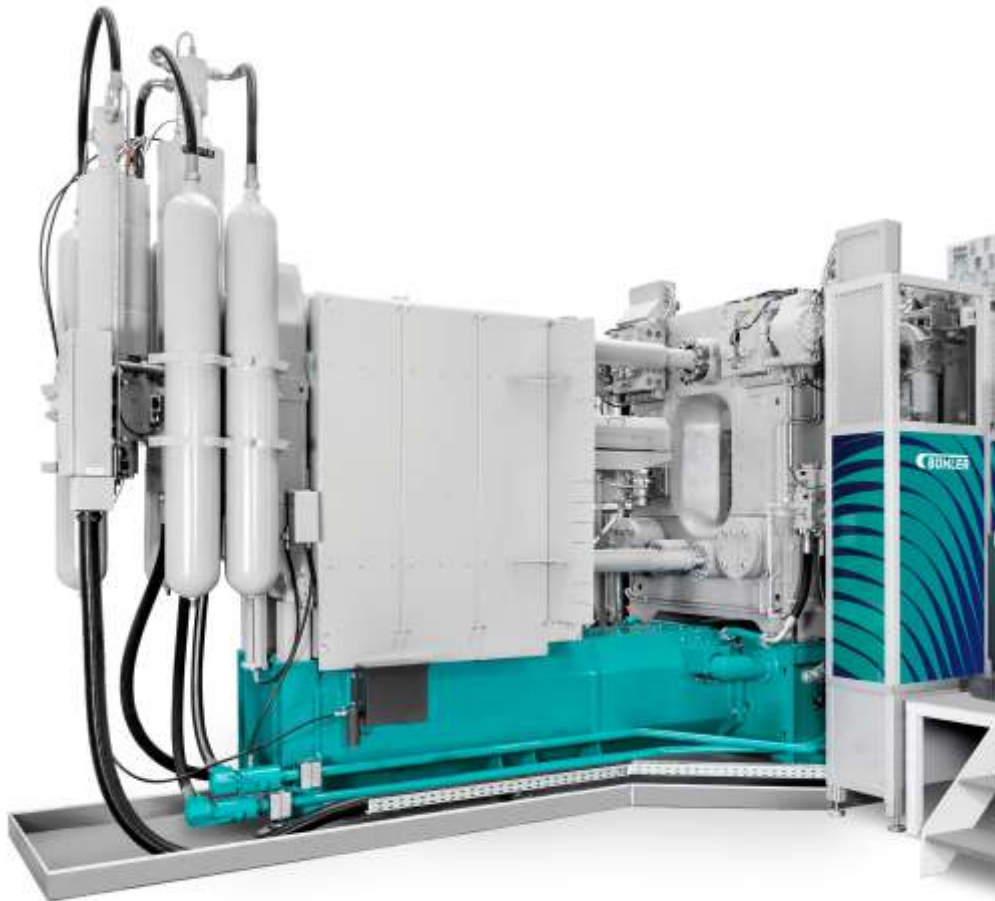
Chairman cum Managing Director of Nalco, Sridhar Patra said the results were driven by strong operational performance coupled with effective raw material procurement and sales strategy. He attributed the success to the teamwork and dedication of the employees.

GMC's efforts recognised



Greater Mumbai Chapter Alongwith Ahmedabad Chapter and Western Region of The Institute of Indian Foundrymen recently organised IFC & IFEX 2022 at Gandhinagar, Ahmedabad during 17 - 19 April 2022. The event was a grand success with more than 250 exhibitors and 1000 delegates.

The efforts put in by Greater Mumbai Chapter to make 70th IFC and IFEX successful were remarkable in the most difficult time of the history. Ms Ruma Rao, Chairperson of Greater Mumbai Chapter along with Mr Suresh Chavan - Hon. Secretary of IFC 2022, received a memento by the hands of IIF President Shri Devendra Jain as one of the host chapter for IFC 2022.



Böhler adds Volvo Cars to its mega casting customers

Böhler adds Volvo Cars to its mega casting customers. Image : attached PDF Page 2. Image can be imported here. The Swedish premium car brand Volvo Cars has purchased two Carat 840 die-casting cells for its factory in Torslanda, Sweden. Keep your production running smoothly with Carat.

The Carat 840, along with Carat 920, Böhler's largest die-casting solutions, were launched in 2021. These solutions have become very attractive for customers in the automotive industry. In October 2021, Böhler launched the Carat 840 and the Carat 920 with locking

forces of up to 92,000 kilonewtons (kN). With these solutions, Böhler's customers can produce structural castings for automotive body in white assemblies, known as mega castings. This expansion builds on the success of the Carat 560 and 610, which have up to 6,000 tons locking force and have been on the market since 2020.

Nearly a century of experience in die casting, Böhler has been active in die casting for over 90 years and supported customers with thousands of applications. Mega casting is a further development of the structural process (complex,

thin-walled parts produced using die casting) which Böhler has driven since the early 2000's. Böhler's Carat series is the most successful solution on the market and brings mega casting production to the next level.

Cornel Mandler, Managing Director of Böhler Die Casting, says: "Mega casting is of utmost importance for the entire die-casting industry. Mega casting gives the trend towards structural casting another push by extending the range of applications to complete body sections with the use of the new large Carat solutions with up to 92,000 kN locking force."

With the introduction of the



Technology

Carat 840 and 920 and its vast die-casting experience, Bühler has further developed its solutions to be able to provide complete cell solutions for ever larger projects. Two Carat 840 die-casting cells will be delivered to Volvo Cars for its factory in Torslanda.

Customer focused innovations

"Volvo Cars is among the first carmakers to adopt the mega casting process. The fact that Volvo Cars has chosen Bühler for two complete Carat 840 cells shows that we have the right products and services for this intensively discussed innovation in the automotive industry," says Cornel Mendler.

"Especially for such large projects, thinking about the entire die-casting cells from the melting furnace to the

handling of the final part is essential. Bühler has the competence to deliver these complete die-casting solutions," Mendler adds. Groundbreaking mega casting

Mega casting is considered groundbreaking by many car manufacturers who are moving in this direction or thinking about adopting this trend. Mega castings reduce complexity in production by enabling between 70 to 100 parts to be replaced by a single die-cast part. These single-piece castings will generally be produced close to the automotive assembly line, which allows for better integration and reduced transport. Aluminum castings have the potential to be almost CO₂ neutral, when using low CO₂ aluminum alloys and biogas for the melting furnaces. The

aluminum that goes into overflows can be remelted directly and reused in the die-casting cell, thereby avoiding transport and recycling.

Thinking a step further, the usage of lighter aluminum parts can reduce the energy consumption of the cars over their entire lifecycle.

Bühler offers the right expertise when it comes to mega casting. "Bühler is the number one solution provider for die casting, offering complete die-casting cells with a full range of services in all relevant regions. As of today, half of all structural casting for automotive body in white production is produced on Bühler machines. With more than 800 machines in operation, the Bühler Carat series is the most popular die-casting solution to produce structural parts," says Cornel Mendler. ■

Indian Aluminium Summit & Expo

16 - 23 July 2022

(On Digital Platform)

Organiser
METALWORLD

Highlights

- **Emerging Technology Trends in Aluminium Sector**
- **Processing & Applications**
- **Markets & Trading**
- **Recycling**



Material World: Shape of Things to Come:

Batteries and Lithium issue:

In continuation of the articles covering different areas advancing in the field of metals, materials and minerals, and the directions which are shaping the world of material science, we have so far spoken about the overview and covered Recycling & Material informatics. Over the coming months we plan to review other important areas of the Material World, such as Nanomaterials, 3D Printing, Material Nationalism, and others. This month we speak about the sensitive issue of batteries, lithium batteries, and how the subject is driving the global politics.

History of batteries

Two major milestones after Benjamin Franklin discovered electricity back in 1752 were Alessandro Volta's invention of electric cell in 1800 and Michael Faraday's invention of power generator in 1839. Both inventions have been instrumental in providing humanity with a new source of power that could be put to action. The world has never been the same since these years! While early advents in manufacturing industry were built on power generators, cells have been on low key; but never went out of practice. With the progress in hand-held electronic gadgets like lighting torches, clocks without spring keys, transistor radios, calculators, and the key-start motors for

automobiles such as four wheelers and two wheelers, the use of dry cells based on carbon rod cathodes and zinc anodes, the classical lead-acid batteries and the button cells with nickel-cadmium flat batteries continued. In recent years, with the pressures of global warming, and concomitant rise in renewable energy, which is time-variable, the need for devices to store electrical energy started increasing by leaps and bounds. Thus, starting with the clumsy Volta's cell based on copper and zinc strips dipped in blue colored copper sulphate solution mounted in a glass jar, today's sophisticated storage batteries evolved.

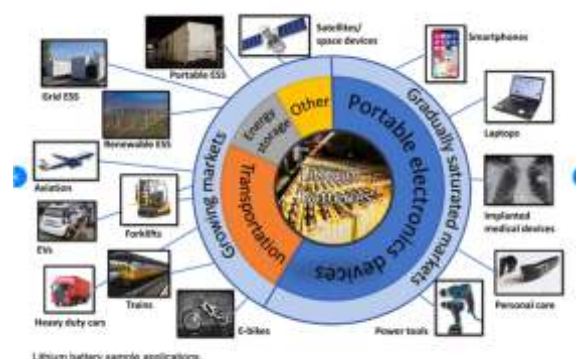
Lithium is an alkali metal of the sodium group (Group 1A) of the periodic table and comes after hydrogen and Helium! It is highly reactive

atomic number	3	[6.938, 6.997]	atomic weight
symbol	Li		acid-base properties of higher-valence oxides
electron configuration	[He]2s ¹		crystal structure
name	lithium		physical state at 20 °C (68 °F)

and occurs as oxide, carbonate etc. Many applications of lithium are important in today's world, especially electronics.

That makes lithium one of the fastest growing materials of the day with a growth rate of. 11-15% and price of USD 15 to 25 per kg.

The basic principle of



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Business Head -
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Industries Ltd.
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Scientist - Hindustan
Unilever Research
Centre

storage batteries is simple. Take the school textbook example of electrolysis of water: $\text{H}_2\text{O} + \text{Electric current}$ $2\text{H}^{+1} + \text{O}^{-2}$. Logically, if the reaction is reversed, i.e. we react hydrogen with oxygen, we should get water + electricity! All cells are thus various implementations of a positive ion reacting with a negative ion, to form a compound accompanied by generation of free-flowing electrons. Once the electrolyte which is the source of the ions, or the anode, which captures the electron and allows it to flow in the outside circuit get exhausted, the battery is defunct; and you need to change the cells. This led to the need for cells which you could use again and again, i.e. rechargeable batteries.

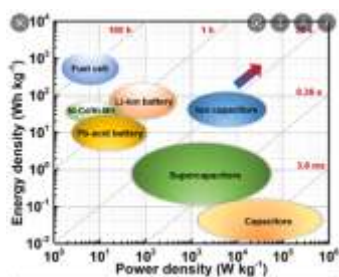
It was in 1861, that the French electro-chemist Gaston Plante proposed the concept of batteries which could be charged with external current, build up the 'potential' or voltage of the battery; use it to provide current to a device until the voltage drops to a low value; and then recharge the battery; repeat the process of



Technology

charging and using until the components get exhausted. The first practical example of a rechargeable battery was the classical lead-acid battery, which was the work horse of automobiles. The trick in rechargeable batteries was the reaction that could be reversed to regenerate the anodes / cathodes, unlike in the primary batteries, where the electrode and the electrolyte got used up and reverse reaction was not possible. Lead-acid batteries were good but faced a few problems. These batteries were heavy; had to handle concentrated sulfuric acid, which was corrosive and dangerous; and lead was not an environment friendly or human friendly metal. Many health problems associated with lead put pressures on the suppliers. The search for other options continued; and that lead to three options- nickel-cadmium batteries; Nickel-metal-hydride batteries and lithium ion batteries. The race today is won by lithium-ion batteries, which form over ninety percent of the rechargeable battery market.

How are the batteries compared? There are two

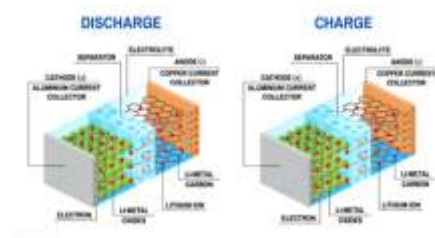


technical parameters: First is the Energy density (Wh/kg) and the second is power density (W/kg).

Energy density is an indicator of the energy storage capacity- how much total electrical energy can be stored in a battery weighing one kg: higher the better. Power density is an indicator of the ability to provide this energy in a short time, that the battery can provide, which is important for the device that it is going to run. For example, a car starter will not start at a voltage below 11.8 V; you need to recharge, build up the voltage and then it can run! Various batteries, single use and rechargeable, have different characteristics. One can observe in the figure that there are devices like capacitors, which have high power density, but low storage capacity, which empty out very fast and you need to recharge them often. There are devices like fuel cells which have a good energy density, but low power density; unless you are out together many such cells, you can't gather up the required power density! To meet the optimal power density and storage capacity, ability to meet the required voltage and current for an extended time is required. Of the various rechargeable cells available today, lithium ion battery provides both and is the most popular option today.

How does the rechargeable lithium-ion battery work?

A standard lithium ion rechargeable battery consists of a graphite anode plate, a membrane separator, aluminium plate as cathode,



lithium metal reacted with carbon (LiC₈) with a small amount of cobalt as electrolyte between the anode & the membrane separator, and lithium metal oxides as the electrolyte between the membrane and the cathode. While other versions of the anode, cathode and electrolyte materials have been tested and used, C/LiC₈/Li₂O/Al is the most commonly used. Carbonates, fluorophosphates, perchlorates of lithium have also been tested as the electrolytes, based on ionization properties and electrical conductivity. Search for better solid state electrolytes is a matter of constant search in the evolution of lithium ion batteries.

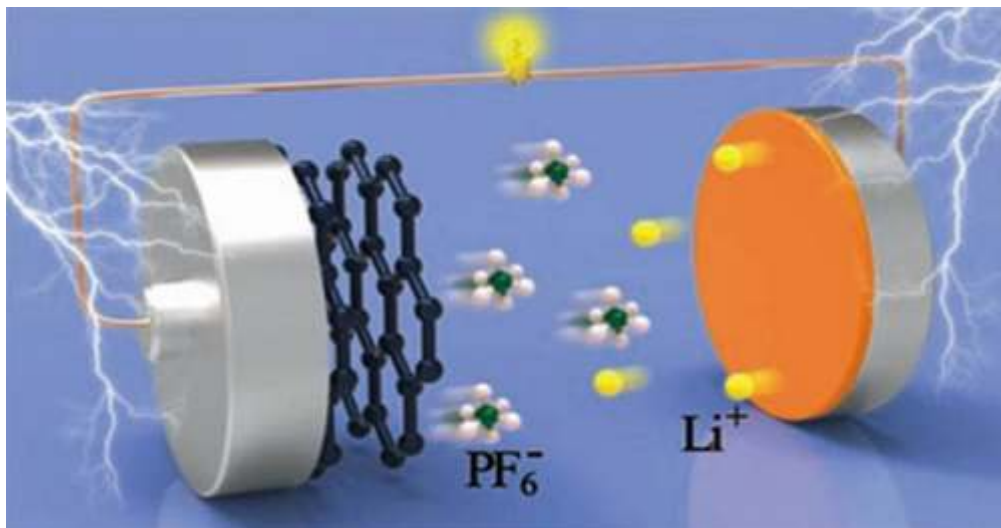
The electrochemical reactions taking place in the process are: $\text{CoO}_2 + \text{Li}^+ + \text{e}^- \rightarrow \text{LiCoO}_2$, $\text{LiC}_6 \rightarrow \text{C}_6 + \text{Li}^+ + \text{e}^-$, overall reaction being: $\text{LiC}_6 + \text{CoO}_2 \rightarrow \text{C}_6 + \text{LiCoO}_2$. The cell's energy is equal to the voltage times the charge. Each gram of lithium 13,901 coulombs. At 3 V, this gives 41.7 kJ per gram of lithium, or 11.6 kWh per kilogram of lithium. This is a bit more than the heat of combustion of gasoline but does not consider the other materials that go into a lithium battery and that make lithium batteries many times heavier per unit of energy. Reverse reactions take place during charging and



discharging of the cell; with a small amount of loss of materials. That makes it possible for the lithium ion battery to be used over a hundred cycles of optimal

awarded the Nobel Prize for Chemistry in 2019!

The rise of lithium ion batteries has now led to a record figure of over one and a half million tons per year in



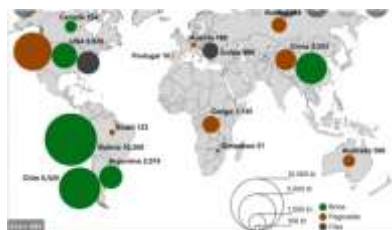
Rarely it is observed that a single new material affects so many people across the world; and drives political wars. Lithium is one such material we will see, affecting the world, creating shortages, driving growth in unconnected areas, promoting inventions and discoveries, creating challenges, claiming Noble prizes, pushing for recycle and sustainability and driving search for newer candidates. This is not only the 'shape of things to come in material science; but it is the present already!

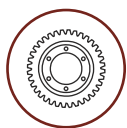
charging.

NASA needed rechargeable batteries as a key need for their long-distance space flights, where material efficiency was critical. They made the first version of Copper fluoride/lithium cells over fifty years back in 1965; but commercials were never important enough for NASA!

It was the British scientist M. Stanley Whittingham at University of Birmingham and state university of New York who made the first commercially viable lithium ion battery in 1974, patented in 1978..The intercalation chemistry behind lithium ion batteries is considered as one of the most important, fundamental and yet practical inventions in material science in the last century and earned billions of dollars for the inventor and its first assignee Exxon. He also was rightfully jointly

2022. The sources of lithium are however limited, due to





Copper prices ended lowest on a global demand concerns

Copper

Copper prices touched the lowest in over two months after U.S. economic growth unexpectedly went into the red, fuelling fears about weaker global growth knocking metals demand. Demand side hit was very visible on most metals as China continues to lock down several major cities such as Shanghai and potentially Beijing as well to control the latest spread in Covid 19. The Chinese government has announced new massive spending in infrastructure to spur growth amid a new Covid 19 wave, but this will have a long drawn impact. The ongoing protest in Las Bambas mine in Peru seems to be ending as Peruvian police have

been aggressively evicting an indigenous community that set up a camp inside a huge open pit at the Las Bambas copper mine, forcing operations to be halted. The mine produces 2% of global copper and restart of operation would improve supply side.

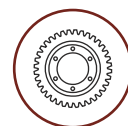
Copper is also exposed to how quickly China ends the current lockdowns, and there are already signs of weakness in imports of the key industrial metal. Copper inventories in LME warehouses have more than doubled since February to 156,050 tonnes. However, stocks are still historically at low levels. Copper inventories in ShFE Exchange fell 32% from last month. For the first quarter



Navneet Damani
Sr. Vice President,
Commodity & Currency
Research, Motilal Oswal

only imports of unwrought copper saw an increase over the same period in 2021, underscoring what has been a soft start to the year for commodity demand in China. PBoC reduce the reserve requirement ratio (RRR) of financial institutions by 0.25% in order to support the development of the real economy and promote the stability of comprehensive financing costs, as headwinds increase amid COVID-19 outbreaks.

Chinese PMI fell to 47.4 points in April, down from 49.5 in March and the weakest outcome since February 2020. It was the second straight month for the index below the 50 mark separating growth from contraction, and the soft outcome came amid a series



of corona virus lockdowns in major cities, including Shanghai. The ongoing lockdowns will make it more challenging for China to meet its 5.5% economic growth target for 2022, especially since the current quarter appears likely to be weak, which could keep copper rallies in check.

Aluminium

Aluminium prices were under stress for the last couple of month, falling ~15% in April, biggest monthly percentage drop in more than a decade, as COVID-19 lockdowns in China and prospects of aggressive U.S. rate hikes fuelled worries over a global economic slowdown. Dollar held firm at a 20-year high and was poised to score its best monthly gain in a decade, making dollar denominated metals more expensive for buyers using other currencies.

U.S. Federal Reserve officials have aligned around plans to accelerate the pace of interest rate hikes this year, but remain split over what could be the make-or-break decision of where to stop to avoid dragging the economy into recession.

China's aluminium production rose by 1.8% YoY to 3.3 million tonnes in March. In the first three months of the year, China produced 9.63 million tonnes, a drop by 0.4 % from the same period last year.

SMM statistics suggest, social inventory of aluminium across China stood at 987,000 mt, down 11% YoY or 128,000 mt.

Inventory of aluminium hovered at a low level and continued to decline down 17% in last month. Shadow aluminum stocks peaked at 1.74 million tonnes in February 2021. By the end of February this year they had shrunk to just 218,000 tonnes. The scale of the decline argues against this being a case of owners opting to move metal away from the exchange's warehouses to avoid statistical scrutiny. Rather, it suggests radically changed market dynamics.

Aluminum is commanding a premium over LME cash of around \$600 per tonne in the European duty-paid market and almost \$900 in the United States Midwest. Secondly, the draw on LME stocks has tightened up the forward curve, meaning fewer spread opportunities for lucrative stocks financing deals. The value of stockpiled aluminum, in other words, is now greater in the physical supply chain than in the financial arena and metal has been leaving exchange warehouses accordingly. Overall much of the pain is already built into the price and follow up selling could attract buyers.

Zinc

Zinc has been one of the most stable metals in the complex with a marginal negative closing. Currencies also pressured the metals markets as the U.S. dollar index surged to its highest level in two decades, meaning that dollar-denominated metals would be expensive for buyers

using other currencies. A weakening Yuan is bearish for base metals and there's expectation that the Yuan can weaken a bit more, so that will continue to pressure base metals. The Yuan dropped to almost 17-month lows against the U.S. dollar.

For zinc, after a strong post-pandemic recovery of 5.7% in 2021, global demand for refined metal is forecast to rise by a more modest 1.6% to 14.26 million tonnes in 2022. After rising by 4.1% in 2021, world zinc mine production is forecast to rise by 3.9% to 13.28 million tonnes in 2022. Global refined zinc metal output will rise by 0.9% to 13.97 million tonnes in 2022, after rising 0.4% in 2021.

Zinc inventories in LME warehouses have fallen to their lowest since June 2020 falling 33% in last month to 95,350 tonnes, with more zinc expected to leave the LME system as indicated by high levels of cancelled warrants. The premium for LME cash over the 3M contract stands at about \$45 a tonne, compared with a discount of about \$15 a month ago , suggesting worries over low inventories.

Smelter curtailments in Europe have deepened the regional deficit and sent physical premiums soaring. With LME shadow stocks now almost fully depleted, the only source of accessible replacement metal is the zinc sitting on LME warrant. With very less tonnage in the LME system, the market is now super-sensitive to further cancellations and could keep the prices upbeat. ■



Passenger vehicles dispatches down 3.8%; two-wheelers up 15% in April: SIAM

The total Passenger vehicle dispatches to the dealers by manufacturers fell 3.84% in April to 251,581 units amid ongoing supply-related challenges, the Society of Indian Automobile Manufacturers (SIAM) said on Wednesday.

As per the data released by SIAM, domestic wholesales of passenger vehicles were down 3.84% from 261,633 units in April 2021. Within the passenger vehicle segment, car sales were down 20% to 112,857 units from 141,194 units in the year ago period, while sales of vans was almost flat at 11,511 units. Wholesales of utility vehicles, however, was up nearly 17% to 127,213 units from 108,871 units in April 2021.

The data showed that two-wheeler sales were up 15% to 1,148,696 units in April 2022, as against 995,115 units in the year ago period. While sales of scooters jumped 24% to 374,556 units from 301,279 units in April 2021, wholesales of motorcycles grew 10% to 735,360 units as against 667,859 units in the year-ago month.

Wholesales of three grew to 20,938 units, up from 13,856 units in April 2021.

While Commenting on April-2022 performance, Mr Rajesh Menon, Director General, SIAM said, "Sales of Passenger Vehicles is still below the April 2017 figures, while Two Wheelers are even below the April 2012 figures. Three-Wheelers are yet to reach normal levels, as sales are still less than 50% of April 2016 figures.

Manufacturers are working hard to manage the supplier ecosystem with agility and flexibility, as supply side challenges continues for the industry. Further, manufacturers are also monitoring the likely impact on demand, due to the recent hike in repo-rates, as it would increase the lending rates to the customers."

Overall, automobile wholesales across categories stood at 1,421,241 units last month, up nearly 12% from 1,270,604 in April 2021.





SIAM						
Summary Report: Production, Domestic Sales & Exports data for the month of April 2022						
						Report I
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
	2021	2022	2021	2022	2021	2022
Passenger Vehicles (PVs)*						
Passenger Cars	166,546	149,320	141,194	112,857	24,744	29,451
Utility Vehicles (UVs)	127,452	146,718	108,871	127,213	17,207	16,921
Vans	11,954	11,468	11,568	11,511	66	176
Total Passenger Vehicles (PVs)	305,952	307,506	261,633	251,581	42,017	46,548
Three Wheelers						
Passenger Carrier	56,463	42,025	9,279	13,337	45,742	35,375
Goods Carrier	7,295	7,834	4,577	7,601	695	405
Total Three Wheelers	63,758	49,859	13,856	20,938	46,437	35,780
Two Wheelers						
Scooter/ Scooterette	367,837	395,492	301,279	374,556	40,024	36,160
Motorcycle/Step-Throughs	1,099,192	1,085,543	667,859	735,360	389,511	369,273
Mopeds	38,624	35,960	25,977	38,780	1,776	6
Total Two Wheelers	1,505,653	1,516,995	995,115	1,148,696	431,311	405,439
Quadricycle	509	101	-	26	516	66
Grand Total of All Categories	1,875,872	1,874,461	1,270,604	1,421,241	520,281	487,833
* BMW, Mercedes, Tata Motors and Volvo Auto data is not available						
Society of Indian Automobile Manufacturers (11/5/2022)						

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
Passenger Vehicles (PVs)						
A : Passenger Cars - Upto 5 Seats						
Mini :Seats upto-5, Length Normally <3600 mm, Body Style-Hatchback, Engine Displacement Normally upto 1.0 Litre						
Regular						
Maruti Suzuki India Ltd (Alto,Spesso)	29,056	22,655	25,041	17,137	3,052	3,708
Renault India Pvt Ltd (Kwid)	3,718	2,197	3,236	2,066	608	250
Total Mini	32,774	24,852	28,277	19,203	3,660	3,958
Compact :Seats upto-5, Length Normally between 3600 - 4000 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.4 Litre						
Regular						
Ford India Private Ltd (Figo,Figo Aspire,Ford Freestyle)	1,463	NA	809	NA	519	NA
Honda Cars India Ltd (Amaze,Jazz)	5,022	4,743	4,750	4,939	-	90
Hyundai Motor India Ltd (Aura,Elite i20,Grand i10,Santro,Xcent)	26,839	27,680	22,572	19,658	5,163	6,548
Maruti Suzuki India Ltd (OEM Model#,Baleno,Celerio,DZIRE,IGNIS,Wagon R,Swift)	83,432	76,978	72,318	59,184	9,833	9,912
Nissan Motor India Pvt Ltd (Datsun GO,Datsun Redi-GO)	541	-	376	-	189	-
Toyota Kirloskar Motor Pvt Ltd (Glanza)	-	-	2,182	2,646	-	-
Volkswagen India Pvt Ltd (Polo)	1,486	795	1,197	728	331	677
Total Compact	118,783	110,196	104,204	87,155	16,035	17,227
Super Compact :Seats upto-5, Length Normally between 4000 - 4250 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.6 Litre						
Regular						
Mahindra & Mahindra Ltd (Verito)	-	-	-	1	-	-
Total Super Compact	-	-	-	1	-	-
#Only production volume of OEM Model is reported by Maruti Suzuki India Limited. NA=Not Available						

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
Mid-Size: Seats upto-5, Length Normally between 4250 - 4500 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.6 Litre						
Regular						
Honda Cars India Ltd (City)	3,606	3,779	3,128	2,300	747	1,941
Hyundai Motor India Ltd (Verna)	3,661	2,370	2,552	781	972	1,513
Maruti Suzuki India Ltd (Ciaz)	2,194	1,756	1,567	579	371	1,585
Nissan Motor India Pvt Ltd (Sunny)	1,564	1,220	-	-	1,653	1,220
SkodaAuto India Pvt Ltd (Rapid)	607	-	848	-	-	-
Toyota Kirloskar Motor Pvt Ltd (Yaris)	237	-	285	-	-	-
Volkswagen India Pvt Ltd (Vento)	2,950	2,361	170	57	1,306	2,007
Total Mid-Size	14,819	11,486	8,550	3,717	5,049	8,266
Executive :Seats upto-5, Length Normally between 4500 - 4700 mm, Body Style-Sedan/Estate/Notchback, Engine Displacement Normally upto 2 Litre						
Regular						
Hyundai Motor India Ltd (Elantra)	70	-	53	-	-	-
SkodaAuto India Pvt Ltd (Octavia,Slavia)	100	2,596	5	2,578	-	-
Total Executive	170	2,596	58	2,578	-	-
Premium :Seats upto-5, Length Normally between 4700 - 5000 mm, Body Style-Sedan/Estates, Engine Displacement Normally upto 3 Litre						
Regular						
SkodaAuto India Pvt Ltd (Superb)	-	70	105	74	-	-
Specialty						
Toyota Kirloskar Motor Pvt Ltd (Camry)	-	120	-	129	-	-
Total Premium	-	190	105	203	-	-
Total Passenger Cars	166,546	149,320	141,194	112,857	24,744	29,451



Statistics

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
B: Utility Vehicles (UVs)						
B : Utility Vehicles/ Sports Utility Vehicles; 4x2 or 4x4 offroad capability ; Generally ladder on frame ; 2 box ; 5 Seats or more but upto 10 Seats.						
UVC : Length < 4000 mm & Price <20 Lakhs						
Ford India Private Ltd (Ford Ecosport)	9,710	NA	3,820	NA	3,558	NA
Honda Cars India Ltd (WR-V)	1,410	600	1,194	635	215	3
Hyundai Motor India Ltd (Venue)	11,472	9,710	11,245	8,392	921	942
Kia Motors India Pvt Ltd (Sonet)	8,303	7,650	7,724	5,404	1,098	2,105
Mahindra & Mahindra Ltd (Bolero, Kuv100, Thar, Xuv300)	13,266	15,346	13,707	14,747	338	490
Maruti Suzuki India Ltd ((Gypsy, OEM Model #, VITARA BREZZA))	16,300	20,426	11,220	11,764	3,366	2,610
Nissan Motor India Pvt Ltd (GO +, Magnite)	3,203	1,614	2,935	1,996	118	9
Renault India Pvt Ltd (Kiger, Triber)	7,676	6,371	5,226	5,528	635	667
Toyota Kirloskar Motor Pvt Ltd (Urban Cruiser)	-	-	2,115	3,524	-	-
Total UVC	71,340	61,717	59,186	51,990	10,249	6,826
UV1 : Length 4000 to 4400 mm & Price <20 Lakhs						
Force Motors Ltd (Gurkha)	-	99	-	88	-	-
Hyundai Motor India Ltd (Creta)	14,938	16,196	12,463	12,651	3,145	2,763
Kia Motors India Pvt Ltd (Seltos)	10,201	13,003	8,086	7,506	2,611	5,376
Maruti Suzuki India Ltd (Ertiga, S-Cross)	11,436	15,578	10,891	17,811	455	275
MG Motor India Pvt Ltd (Astor)	-	918	-	249	-	-
Nissan Motor India Pvt Ltd (Kicks)	83	200	58	144	10	-
Renault India Pvt Ltd (Duster)	450	-	180	-	-	-
SkodaAuto India Pvt Ltd (Kushaq)	-	1,643	-	2,413	-	-
Volkswagen India Pvt Ltd (Taigun, T-Roc)	-	1,407	166	2,631	-	118
Total UV1	37,108	49,044	31,844	43,493	6,221	8,532
UV2 : Length between 4400 - 4700 mm & Price <20 Lakhs						
Hyundai Motor India Ltd (Alcazar)	-	3,005	-	2,422	-	434
Kia Motors India Pvt Ltd (Carens)	-	6,597	-	5,754	-	596
Mahindra & Mahindra Ltd (Marazzo, Scorpio, Xuv500, Xuv700)	4,396	8,818	4,455	7,374	198	153
Maruti Suzuki India Ltd (XL6)	3,323	4,395	3,373	4,366	4	-
MG Motor India Pvt Ltd (Hector)	2,596	1,995	2,107	1,448	-	-
Total UV2	10,315	24,810	9,935	21,364	202	1,183
#Only production volume of OEM Model is reported by Maruti Suzuki India Limited.						
		NA=Not Available				

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
UV3 : Length >4700 mm & Price <20 Lakhs						
Isuzu Motors India Pvt Ltd (Hi-Lander, V-Cross)	46	211	45	20	-	-
Toyota Kirloskar Motor Pvt Ltd (Innova Crysta)	3,443	6,538	3,600	6,351	-	-
Total UV3	3,489	6,749	3,645	6,371	-	-
UV4 : Price between Rs. 20 to 30 Lakh						
FCA India Automobiles Pvt Ltd (Jeep Compass)	1,413	1,341	846	886	530	366
Hyundai Motor India Ltd (Kona, Tucson)	120	39	117	97	-	-
Isuzu Motors India Pvt Ltd (MU-X)	1	-	3	-	2	-
Kia Motors India Pvt Ltd (Carnival)	366	400	301	355	-	-
Mahindra & Mahindra Ltd (Alturas G4)	42	50	24	47	-	-
MG Motor India Pvt Ltd (ZS EV)	230	229	153	228	-	-
PCA Motors Pvt. Ltd (C5 Aircross)	287	35	230	51	-	-
Total UV4	2,459	2,094	1,674	1,664	532	366
UV5 : Price >Rs. 30 Lakh						
Ford India Private Ltd (Endeavour)	845	NA	840	NA	-	NA
Isuzu Motors India Pvt Ltd (MU-X)	-	12	-	3	-	-
MG Motor India Pvt Ltd (Gloster)	534	66	305	83	-	-
SkodaAuto India Pvt Ltd (Kodiahq)	-	78	3	87	-	-
Toyota Kirloskar Motor Pvt Ltd (Fortuner, Vellfire)	1,362	2,077	1,439	2,127	3	14
Volkswagen India Pvt Ltd (Tiguan)	-	71	-	31	-	-
Total UV5	2,741	2,304	2,587	2,331	3	14
Total Utility Vehicles (UVs)	127,452	146,718	108,871	127,213	17,207	16,921
Vans						
C : Vans ; Generally 1 or 1.5 box; seats upto 5 to 10						
V1 : Hard tops mainly used for personal transport, Price upto Rs. 10 Lakh						
Mahindra & Mahindra Ltd (Maxximo, Supro)	95	296	84	339	16	50
Maruti Suzuki India Ltd (Eeco)	11,844	11,166	11,469	11,154	50	126
Total V1	11,939	11,462	11,553	11,493	66	176
V2 : Soft tops mainly used as Maxi Cabs, Price upto Rs. 10 Lakh						
Mahindra & Mahindra Ltd (Supro)	15	6	15	18	-	-
Total V2	15	6	15	18	-	-
Total Vans	11,954	11,468	11,568	11,511	66	176
Total Passenger Vehicles (PVs)	305,952	307,506	261,633	251,581	42,017	46,548
NA= Not Available						



SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
Three Wheelers						
A: Passenger Carrier						
A1: No. of seats Including driver not exceeding 4 & Max.Mass not exceeding 1 tonne						
Atul Auto Ltd (Atul Elite, Atul Gemini, Atul Rik, Atul Rik + 3P, Atul Rik 3P 200)	248	468	170	286	38	215
Bajaj Auto Ltd (Maxima, RE)	36,852	22,296	6,056	6,414	30,966	19,957
Continental Engines Pvt Ltd (Baxy Express Passenger)	69	139	31	160	-	-
Mahindra & Mahindra Ltd (Alfa, Treo)	1,698	1,260	1,181	1,714	48	4
Piaggio Vehicles Pvt Ltd (Ape Auto, Ape City)	4,194	4,233	1,210	3,065	2,130	1,308
TVS Motor Company Ltd (TVS King 4S)	12,856	13,061	412	1,300	12,378	13,777
Total A1	55,917	41,457	9,060	12,939	45,560	35,261
A2: No. of seats Including driver exceeding 4 but not exceeding 7 & Max.Mass not exceeding 1.5 tonnes						
Atul Auto Ltd (Atul Gem)	327	428	219	398	-	30
Force Motors Ltd (Minidor)	219	140	-	-	182	84
Total A2	546	568	219	398	182	114
Total Passenger Carriers	56,463	42,025	9,279	13,337	45,742	35,375
B: Goods Carrier						
B1: Max mass not exceeding 1 tonnes						
Atul Auto Ltd (Atul Elite, Atul Gem, Atul Gemini, Atul Samart Aqua, Atul Shakti)	559	663	440	664	48	-
Bajaj Auto Ltd (Maxima)	2,750	2,697	1,845	2,504	460	96
Continental Engines Pvt Ltd (Baxy Cargo)	105	262	97	266	-	-
Mahindra & Mahindra Ltd (Alfa, Treo)	1,584	1,283	862	1,295	15	14
Piaggio Vehicles Pvt Ltd (Ape Xtra)	2,297	2,773	1,333	2,824	172	134
TVS Motor Company Ltd (TVS King Kargo)	-	156	-	48	-	161
Total Goods Carrier	7,295	7,834	4,577	7,601	695	405
Total Three Wheelers	63,758	49,859	13,856	20,938	46,437	35,780

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
Two Wheelers						
A: Scooter/ Scooterette : Wheel size is less than or equal to 12"						
A1: Engine capacity less than or equal to 75 CC						
Piaggio Vehicles Pvt Ltd (SR 50 MT, SXR 50)	174	917	-	-	144	896
Total A1	174	917	-	-	144	896
A2: Engine capacity >75 CC but less than or equal to 90 CC						
TVS Motor Company Ltd (Pep +)	9,410	7,286	8,143	6,329	-	-
Total A2	9,410	7,286	8,143	6,329	-	-
A3: Engine capacity >90 CC but less than or equal to 125 CC						
Hero MotoCorp Ltd (Hero Destni 125, Maestro, Pleasure)	43,248	28,135	32,099	25,438	857	557
Honda Motorcycle & Scooter India Pvt Ltd (Activa, Aviator, Dio, Grazia, Navi)	156,666	199,660	131,547	180,781	18,328	20,956
India Yamaha Motor Pvt Ltd (Alpha, Fascino, Ray)	19,286	11,216	13,124	9,674	4,916	3,206
Piaggio Vehicles Pvt Ltd (Aprilia SR 125, Vespa)	5,429	4,567	3,265	4,436	1,149	25
Suzuki Motorcycle India Pvt Ltd (Access, Avenis, Burgman, Lets)	57,342	52,095	61,439	53,098	6,908	6,508
TVS Motor Company Ltd (Jupiter, Ntorq, Wego, Zest)	73,425	87,141	49,996	91,347	6,767	3,113
Total A3	355,396	382,814	291,470	364,774	38,925	34,365
A4: Engine capacity >125 CC but less than or equal to 150 CC						
Piaggio Vehicles Pvt Ltd (Aprilia SR150, Vespa)	1,125	938	185	195	867	808
Total A4	1,125	938	185	195	867	808
A5: Engine capacity >150 CC but less than or equal to 200 CC						
Piaggio Vehicles Pvt Ltd (Aprilia SR160)	823	733	664	592	88	91
Total A5	823	733	664	592	88	91
AE- More than 250 W Electric						
Bajaj Auto Ltd (Chetak)	508	1,401	510	1,246	-	-
TVS Motor Company Ltd (TVS iQube Electric)	401	1,403	307	1,420	-	-
Total AE	909	2,804	817	2,666	-	-
Total Scooter/ Scooterette	367,837	395,492	301,279	374,556	40,024	36,160



Statistics

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
Motorcycle/Step-Throughs						
B : Motorcycles/Step-Through: Big wheel size – more than 12”						
B2: Engine Capacity >75 CC but less than equal to 110 CC						
Bajaj Auto Ltd (Boxer,CT,Discover,Platina)	157,764	136,252	51,086	44,814	104,604	89,992
Hero MotoCorp Ltd (HF Deluxe,Passion,Splendor)	294,319	305,889	250,609	312,942	12,324	9,496
Honda Motorcycle & Scooter India Pvt Ltd (Dream,Livo)	17,591	17,134	9,209	14,504	9,276	6,020
India Yamaha Motor Pvt Ltd (Crux,Saluto RX)	2,264	2,708	-	-	3,016	3,324
TVS Motor Company Ltd (Radeon,Sport,Star City)	60,163	62,455	16,805	31,520	33,314	35,063
Total B2	532,101	524,438	327,709	403,780	162,534	143,895
B3: Engine Capacity >110 CC but less than equal to 125 CC						
Bajaj Auto Ltd (Boxer,CT,Discover,Husqvarna,KTM,Platina,Pulsar)	80,304	74,950	37,063	42,777	40,996	37,937
Hero MotoCorp Ltd (Glamour,Splendor)	68,725	59,375	55,568	52,924	4,598	3,222
Honda Motorcycle & Scooter India Pvt Ltd (CB Shine)	89,270	113,387	79,416	105,413	5,323	4,765
India Yamaha Motor Pvt Ltd (Saluto,YD125)	4,950	3,070	-	-	1,830	2,650
Suzuki Motorcycle India Pvt Ltd (Hayate)	480	240	-	-	-	456
TVS Motor Company Ltd (Raider,Star City 125,Victor)	33,144	48,107	-	3,392	34,032	47,860
Total B3	276,873	299,129	172,047	204,506	86,779	96,890
B4: Engine Capacity >125 CC but less than equal to 150 CC						
Bajaj Auto Ltd (Boxer,CT 150,Pulsar)	55,938	36,987	21,100	2,177	35,854	26,206
Hero MotoCorp Ltd (Acheiver,Hunk,Xtreme)	12,399	3,763	-	-	8,776	4,495
Honda Motorcycle & Scooter India Pvt Ltd (CB Trigger,CB Unicorn 150)	240	200	-	-	160	240
India Kawasaki Motors Pvt Ltd (KLX 140)	-	-	1	-	-	-
India Yamaha Motor Pvt Ltd (FZ,SZ)	21,400	29,248	12,298	16,508	9,484	15,516
Total B4	89,977	70,198	33,399	18,685	54,274	46,457
B5: Engine Capacity >150 CC but less than equal to 200 CC						
Bajaj Auto Ltd (Avenger,Husqvarna,KTM,Pulsar)	27,893	24,622	9,016	1,340	25,700	19,418
Hero MotoCorp Ltd (Xpulse 200,Xtreme.)	4,415	8,807	4,338	7,160	3,116	2,361
Honda Motorcycle & Scooter India Pvt Ltd (CB 200X,CB Hornet 160R,CB Unicorn 160,Dragon 2.0,Unicorn 160R,X Blade)	100,260	100,260	16,941	14,778	8,838	8,093
India Yamaha Motor Pvt Ltd (MT 15,R15)	14,733	19,496	11,714	17,176	988	1,449
Suzuki Motorcycle India Pvt Ltd (Gixxer,Intruder)	7,598	7,776	2,286	1,008	6,206	8,470
TVS Motor Company Ltd (Apache)	43,589	17,072	29,458	7,342	18,767	11,771
Total B5	121,494	99,094	73,753	48,804	63,615	51,562

SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
B6: Engine Capacity >200 CC but less than equal to 250 CC						
Bajaj Auto Ltd (Avenger,Dominar,Husqvarna,KTM,Pulsar)	14,061	4,145	6,333	298	5,085	4,246
Honda Motorcycle & Scooter India Pvt Ltd (CBR 250R)	120	-	-	-	180	-
India Kawasaki Motors Pvt Ltd (KX 250)	-	-	-	3	-	-
India Yamaha Motor Pvt Ltd (FZ25)	1,928	2,546	182	610	1,324	1,118
Suzuki Motorcycle India Pvt Ltd (Gixxer 250)	551	2,956	133	208	856	2,226
Total B6	16,660	9,647	6,648	1,119	7,445	7,590
B7: Engine Capacity >250 CC but less than equal to 350 CC						
Honda Motorcycle & Scooter India Pvt Ltd (CB300R,H'Ness)	3,699	4,629	2,977	3,204	840	2,221
India Kawasaki Motors Pvt Ltd (Ninja300)	59	89	-	85	-	-
Mahindra Two Wheelers Ltd (Mojo)	-	-	-	14	-	-
Royal-Enfield (Unit of Eicher Motors) (Bullet 350,Bullet Electra Twinspark,Classic 350,Meteor 350)	50,207	56,967	44,681	48,623	1,880	2,942
TVS Motor Company Ltd (BMW,RR 310)	2,207	2,637	700	403	151	1,676
Total B7	46,086	64,322	48,358	52,329	2,871	6,839
B8: Engine Capacity >350 CC but less than equal to 500 CC						
Bajaj Auto Ltd (Dominar,Husqvarna,KTM)	8,743	7,834	1,462	581	9,364	10,679
Honda Motorcycle & Scooter India Pvt Ltd (CB 500)	8	-	4	1	-	-
Royal-Enfield (Unit of Eicher Motors) (Classic 500,Himalayan)	3,747	8,959	2,815	3,070	1,583	2,607
Total B8	12,498	16,793	4,281	3,652	10,947	13,286



SIAM						
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of April 2022						
						Report IV
						(Number of Vehicles)
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April		April		April	
Manufacturer	2021	2022	2021	2022	2021	2022
B9: Engine Capacity >500 CC but less than equal to 800 CC						
Honda Motorcycle & Scooter India Pvt Ltd (CBR 650F)	38	20	27	33	-	-
India Kawasaki Motors Pvt Ltd (Ninja650,Versys 650,Vulcan S,W800,Z650,Z650RS)	21	18	39	84	-	-
Royal-Enfield (Unit of Eicher Motors) (650 Twin)	3,278	1,794	1,293	2,159	1,046	2,754
Suzuki Motorcycle India Pvt Ltd (DL650XA)	27	-	21	10	-	-
Triumph Motorcycles India Pvt Ltd (Street Triple,Tiger 660,Tiger 800 XRx Trident)	62	53	62	53	-	-
Total B9	3,426	1,885	1,442	2,339	1,046	2,754
B10: Engine Capacity >800 CC but less than equal to 1000 CC						
Hero MotoCorp Ltd (883 Iron)	-	-	-	5	-	-
India Kawasaki Motors Pvt Ltd (Ninja ZX-10R,Z900)	32	10	127	42	-	-
Triumph Motorcycles India Pvt Ltd (Boneville T100,Street Scrambler,Street Twin,Tiger 900)	-	7	34	19	-	-
Total B10	32	17	161	66	-	-
B11: Engine Capacity >1000 CC but less than equal to 1600 CC						
Hero MotoCorp Ltd (Pan America)	-	-	-	2	-	-
Honda Motorcycle & Scooter India Pvt Ltd (Africa Twin)	2	20	1	20	-	-
India Kawasaki Motors Pvt Ltd (Ninja1000,Versys 1000)	39	-	11	20	-	-
Suzuki Motorcycle India Pvt Ltd (Hayabusa)	4	-	-	3	-	-
Triumph Motorcycles India Pvt Ltd (Boneville Bobber,Boneville T120,Scrambler 1200,Speed Triple,Speed-Twin,Tiger 1200)	-	-	6	12	-	-
Total B11	45	20	18	57	-	-
B12: Engine Capacity >1600 CC						
Hero MotoCorp Ltd (Fat Bob,Fat Boy 107,Fat Boy 114,Heritage Classic,Low Rider,Low Rider S,Street Bob,Street Glide)	-	-	18	19	-	-
Triumph Motorcycles India Pvt Ltd (Rocket III)	-	-	25	4	-	-
Total B12	-	-	43	23	-	-
Total Motorcycle/Step-Throughs	1,099,192	1,085,543	667,859	735,360	389,511	369,273
C:Moped: More than 75 CC to 100 CC and with fixed transmission Ratio, Big wheel size – more than 12"						
C1:Engine capacity less than or equal 100 CC						
TVS Motor Company Ltd (TVS XL)	38,624	35,960	25,977	38,780	1,776	6
Total Mopeds	38,624	35,960	25,977	38,780	1,776	6
Total Two Wheelers	1,505,653	1,516,995	995,115	1,148,696	431,311	405,439
Quadricycle						
Bajaj Auto Ltd (Qute)	509	101	-	26	516	66
Grand Total of All Categories	1,875,872	1,874,461	1,270,604	1,421,241	520,281	487,833
Society of Indian Automobile Manufacturers (11/5/2022)						



10th International Bauxite, Alumina & Aluminium Conference & Exhibition IBAAS-JNARDDC 2022



NEW DATES

September 14-17, 2022

Courtyard Marriott, Raipur, INDIA



- Participation by more than 50 companies
- Over 200 delegates expected to attend
- Over 40 abstracts received
- Non-Ferrous metal recycling sessions by JNARDDC
- Aluminium Sustainability sessions by ASI

Special Sessions

Sustainability by Aluminium Stewardship Initiative ASI (September 16)

One day brainstorming on Non-Ferrous Metal Recycling in India to be organized by JNARDDC (September 17)

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For participation and further details, please contact the IBAAS Office, India

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