

# METALWORLD

Devoted to Foundry & Non-Ferrous Metals Industry

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■ **Jaideep N. Malaviya,**  
Solar energy expert  
views on Solar energy  
waste management

**Advantage of Preformed Ceramic  
Crucible In Induction Furnace For  
Melting Copper and Copper Alloys**

■ **Lightweight Aluminium  
Construction for  
Industry:  
Access Solutions from  
ALTEC**

■ **Role of Aluminium Industrial  
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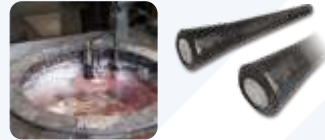
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## D. A. Chandekar Editor

Dear Readers,

It is said that if one has to predict the future, he will have to first study the past. How was the past one year for the economy and specifically for the metals sector? Can we draw some conclusions and make some guesstimates about the present fiscal by analyzing past year's performance by this important sector of the economy? Let's see!

In July 2020, the covid pandemic was creating havoc all over the world and also in India. The metals industry, which was almost shut during the last quarter, was slowly trying to wake up. As such the metals demand in construction sector was never fully bottomed and it was the first sector which gave an upward push to our industry post covid. Also a good monsoon triggered tractor demand which gave an initial boost to almost shut auto industry. In next few months this industry really bounced back to almost pre covid sales levels. Of course pre covid period was one of the worst phases of auto sector. The metals sector, was was operating at around 50 % capacity utilisation in the month of June 2020, achieved almost 75 % capacity utilization by October. This was mainly because a fundamentally strong demand in construction sector and bouncing back of auto sector. It should also be

## Editorial Desk



noted that the eastern states, which account for higher metal production, never faced labour migration problem. Infact this migration was from western to eastern region and to some extent, the metals industry actually gained from it. Thus by end of the last year, most of the logistics disruptions were corrected and the metals industry was almost back to pre covid levels.

Though the demand was more or less restored, the balance sheets of the metal companies were damaged and would require a long period to wipe out the losses incurred during the peak covid period. Also the SMEs, which form the backbone of any economy, suffered great losses which were difficult to absorb. Indian government did announce a huge 20 Lac crore package and it did help SMEs to some extent, but still few had to pull down the shutter permanently. Nevertheless, pandemic, though a disastrous entity, taught us a lesson or two. It hastened the digitalisation process in the industry. Also, 'Work From Home' (WFH) evolved as a good alternative to office culture to such an extent that huge centralised offices may become obsolete even after the pandemic is completely over.

What lies next? I think the metals industry in India stands on a very strong foundation of demand from domestic infrastructure, construction and auto sector (in that order) and will surely remain bullish for a foreseeable future. The Indian economy is expected to grow at a robust rate of 7 to 8 % annually and will certainly provide the required support and the push for this core sector in the country. ■

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## Jaideep N. Malaviya, Solar energy expert views on Solar energy waste management

Jaideep N. Malaviya is a professional in solar energy since 1996 and is the Managing Director of Malaviya Solar Energy Consultancy operating under Malaviya Solar Energy Consultancy. He is also the Founder cum Secretary of Solar Thermal Federation of India (STFI), world's only solar thermal association of manufacturers. He has over 25 years of experience in solar energy industry as a Consultant, Researcher and Trainer and presented over 100 papers in Indian and International Conferences. Recently he was recognized by the International Solar Energy Society amongst the 250 global pioneers in research and industrial development of solar energy.

Malaviya specialises in Solar Rooftop Systems Designing and Engineering developing projects by undertaking load analysis and optimising. He is also a faculty in several Engineering Colleges on the said subject.

Under his leadership the Ministry of New and Renewable Energy operated the National Solar Energy Helpline for 9 years that addressed to over 10,00,000 phone calls. Currently he is the Project Head in India for "Solar Payback" executed on behalf of German Solar Association. He is also undertaking a research study on drawing Roadmap for Solar energy waste recycling and coordinating with Ministry of Environment and Forests and Climate Change.

Malaviya has also published an Engineering Handbook on "Solar Photovoltaic Systems Engineering and Designing" accredited by Department of Education and is a visiting faculty with several Engineering Colleges. He is a professional technical writer several international publications. He has published over 100 papers at National and International Conferences in solar energy.

His current focus is to pursue Solar Waste Management and explore Circular Economy as part of 'Atmanirbhar' and create job opportunities.



### **Q1) Why should solar panels be subject to recycling?**

Government of India has set ambitious target of 450 GW of renewable largely using solar energy. At the rate of India All solar energy systems must be subject to Extended Producer Responsibility (EPR). Recycling will create more jobs and re-harvest the basic raw material to RE-POWER. Let the new 3R's be RECYCLE REUSE and REGENERATE instead of REJECT. Besides re-use of materials will greatly reduce carbon foot-print as compared to fresh mining. The recycling entity can recover its cost of recycling by trading the raw material.

### **Q2) When do solar panels become a waste?**

Crystalline solar modules (panels) last 20 years and



## Face to Face

above, however some manufacturers also claim life beyond this. Our analysis shows that with recurring high efficiency solar cell technologies end-users may opt for re-powering once the investment is recovered as it will give higher yield. This will result in far sooner waste. I anticipate about 20,000 tons waste by the

almost 95% by weight aluminium, glass, silicon, copper and metal parts that are recoverable and recyclable. The balance 5% polymer sheets are still a challenge to recycle and are potential hazard to landfill as it contains fluorspar. Solar thermal panels (collectors) are 100% recyclable and easy to do. It will be

only way it can put weight on the government to consider it earnestly.

### **Q4) How is the government considering address the issue of Solar energy Management?**

First it is important to understand that inverters and batteries are already governed under Electronics and Battery waste management laws in India but none for solar



year 2030 and eventually 2,00,00,000 tons by 2050.

### **Q3) Are solar panels considered hazardous to the environment?**

Typical crystalline silicon Solar modules (panels) have

interesting to undertake a detailed study on how much carbon footprint will be avoided if solar modules are recycled and reproduced instead of freshly mining the raw materials. This is the

modules. It is understood an initiative is already taken by the government of India to address the issue of Solar energy 'Circular Economy' by forming a committee comprising of Industry Associations,





## Face to Face

Institutes and Experts. What is required at this stage to undertake R&D on developing low cost recycling techniques so as to make it economical. India can set benchmark for the consortium countries of International Solar Alliance (ISA).

**Q5) How does the current landscape of solar recycling in India compare to other markets across the world? What has been done commercially to implement solar recycling in our country?**

There is presently no regulation or law that binds any solar module to mandatorily sent for recycling. There is need for an immediate bylaw to make sure all future solar modules made/imported in India have a cost of recycling built in as EPR. The classification of EPR has also to be clearly defined. Presently only Europe has mandatory law on solar energy recycling under Waste Electrical Electronic Equipment (WEEE). India needs to be 'Atmanirbhar' in the entire value chain.

**Q6) What are some of the barriers to solar panel recycling at this time? Are there any technical barriers, or more related to the process of integrating recycling into business operations?**

Firstly a database will

have to be created of all installed domestic and imported solar modules in the country. This is necessary to ensure they are not dumped and break the EPR law. The EPR definition will require manufacturers to take back the waste and recycle, which will be an expense to them as they had not built in the recycling cost earlier. A preliminary study shows that a minimum 5,000 tons of solar module waste is feasible for setting up a recycling facility. Considering our vast geographic location to begin we will need multiple collection centres after de-framing the modules at the site. A central recycling facility that reduces the logistics cost and will be economical. Nagpur city best fits as it located centrally and well connected with the country. Re-furbishing modules, if disposed early should be avoided as it may lead to fraud and malpractice.

**Q7) What are some of the advantages for solar manufacturers that integrate recycling practices into their business operations?**

Presently there is not much knowledge available on low cost recycling. Manufacturers of solar modules have very prominent role to play. The policies for recycling must be manufacturer-friendly. A devoted not-for-profit

organisation of solar module manufacturers can function as catalyst between the government, regulatory bodies and end-users to facilitate safe disposal. The body can invite entrepreneurs and researchers to offer low cost solutions funded as part of Industry-Institute partnership. The recovered materials can be then traded with the module manufacturers

**Q8) What is the current status for disposal of solar panels?**

Presently it is sold as scrap in the open market.

**Q9) What can be the revenue model that will make recycling efficient?**

The best way is to levy a carbon footprint tax on every Watt of solar module manufactured. The generated tax can be pooled into an account to be used for safe and eco-friendly recycling. This will also ensure job opportunities. ■





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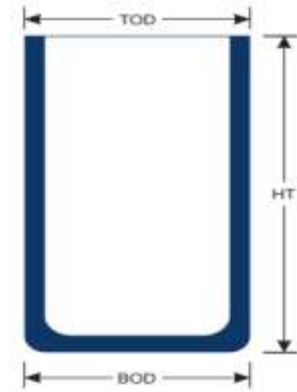
# Advantage of Preformed Ceramic Crucible In Induction Furnace For Melting Copper and Copper Alloys

Recent trend of induction furnace adaption is increasing mainly because of efficient melting and environment friendly process. Morgan Molten System providing crucibles and engineered consumables for the metals industry and continues support to the customer which monitoring their voice. During this measurement, it has been observed that copper alloy melting in coreless induction furnace with ramming lining have many challenges like long time for installation, early lining failure leads to metal penetration, capacity reduction after certain use due to oxide metal sticking, high energy consumption etc. with this induction melting foundry are unnecessarily increasing their production cost and obstructive the plant capacity. Many customers and furnace manufacturer in India are not fully aware that there is solution to overcome all these challenges. Morgan team have worked closely to customer and provided the preformed crucible for melting copper alloy in induction furnace and eliminate use of metal former and partial ramming materials to support the

preformed crucible, which resulted quick installation, energy saving and other benefits as stated above. Based on the study and various trials it has been revealed that lower frequencies are more efficient when melting large metal pieces like ingots and as the size of metal charge decreases, small scrap → turning → powder, the frequency should increase for efficient melting. Higher frequencies are more efficient at melting low resistivity metals & high resistivity crucibles improve melting efficiency. Considering these requirements, Morgan has developed advanced materials, various shape and sizes of crucible based on the application and furnace parameters like coil dimension, coil height, frequency and power shown in below fig.



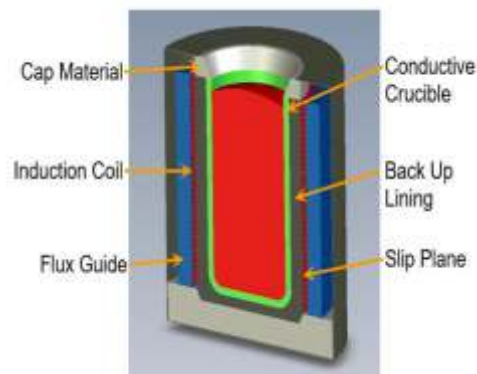
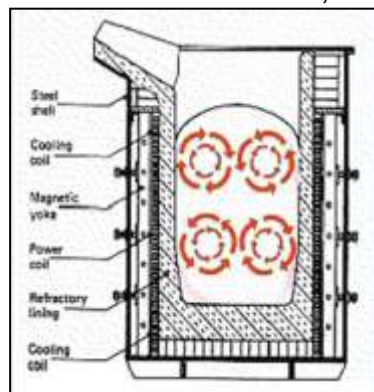
**Ramdas Chitalkar,**  
Deputy General Manager  
Technology,  
Morgan Molten  
Metal Systems, India



**Conductive crucible**

Benefits and recommendation for replacement of ramming lining induction furnace to crucible induction furnace: -

In general crucible are used in coreless induction furnace with different types of mechanism like push up, lifting swing or drop coil, stationary, and tilting. Very commonly precious metals are melted in small lifting, push up, stationary induction furnace with crucible only but where melting copper alloys in big furnace above 200 kgs use ramming lining in tilting furnaces.



**Coreless Induction Furnace Parameters**





## Technology

When crucible is used for coreless induction furnace either with or without ramming material, but tilting induction furnace need support of ramming material to protect coil from temperature and avoiding crucible falling from the furnace at the time of tilting. Selection of ramming line material for crucible is depends on molten metal temperature.

When crucible used in induction furnace ensures that no fusion additives add in the ramming material to ensure that there is any expansion impact on crucible during the thermal changes.

Main advantage noticed when replacing ramming line to crucible is shortest installation time depends on the size of crucible for example 300 Kg induction furnace total change over time can reduce from 20 hrs to 4 hrs for replacing crucible, preheating to charge ready.

After backing crucible top need to be closed with cap cement to protect additive free ramming material and crucible during the tilting.

When crucible is used in induction furnace, there is no need to use metal former or wash out former. This additional cost and waiting time completely reduce with crucible induction furnace.

After various trials Morgan is came up with different sizes of preformed crucibles with

different electric resistivity based on the application and furnace parameters to enhance the overall performance of performed crucible in induction melting furnace.

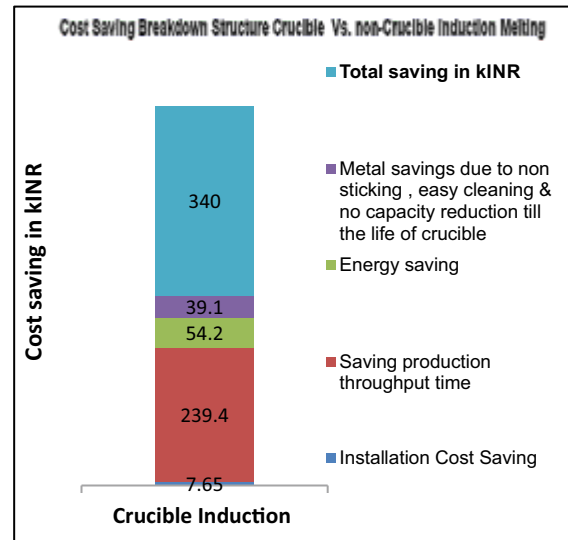
Crucible is benefited because the preformed shape delivers homogeneous dense structure and low porosity with low thermal coefficient of expansion compared to ramming materials.

This resulted low erosion, quick melting, low dross sticking, less chances of metal penetration, consistent performance and clean material with lowest energy consumption. It has been observed that the ramming lined furnace reduced the capacity of charge by 40-45 kg after 200 heats, but in crucible it is reversed.

Below case study is for billet manufacturing plant demonstrated the benefits of crucible in induction furnace

### **Foundry Parameters:**

- Crucible Size = CYI 400\*640,
- Furnace type - Induction Tilting
- Frequency =1000Hz,
- Power =100kw,
- Charge=Brass turning+ Scrap+ Pb & Zn
- Application- Extrusion plant
- Billet weight -95 kg
- Out Put per Charge - 380kg
- Life obtained - 390 Charges



At the first impression, cost of crucible appears high; nevertheless, on consideration of overall benefits as per cost of ownership model, it is evident that cost of crucible is negligible as compared to ramming lining that clearly shown in the above case study.

Conclusion:

It is revealed from recent developments of introduction of crucible in induction melting furnace that ramming lining for melting is a traditional and incompetent technique and which can be effectively replaced by crucible.

Morgan Molten Metal Systems have demonstrated through several case studies and trials conducted at copper alloy foundries that application of crucible in induction furnace is very efficient, environmentally friendly and technically superior practice over ramming lining.

Morgan Molten Metal Systems is continuously working to make the induction melting practice easier with crucible technology and helping copper melting customers to get the benefits of crucible melting furnace. ■



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## Technology



# Lightweight Aluminium Construction for Industry: Access Solutions from ALTEC

ALTEC manufactures a wide variety of largely aluminium scaffold-based access solutions, such as aircraft docking systems, by relying on welding technology from Fronius. With the CMT welding process and the Rippledrive pulse characteristic, ALTEC's industrial production lines are fully equipped for future challenges.

It is not only in lightweight automotive construction or aerospace technology that aluminium is a byword for dynamism and pushing the boundaries of accepted engineering limits. It also facilitates everyday life wherever large structures have to be moved by human hands, such as the diverse range of access solutions offered by ALTEC Aluminium-Technik GmbH &

Co. KGaA.

The medium-sized enterprise from Mayen in the western German state of Rhineland-Palatinate has an extremely broad product portfolio: from rolling scaffolds, facade scaffolds and flat roof fall-protection systems to complete docking systems for the aviation industry and numerous special solutions. These include mobile maintenance stairs, working platforms, transitions or platform stairs for industrial applications.

Certified welding company with the latest technology

Up to 95 percent of the metal processed and welded on ALTEC's production lines is aluminium. Steel applications account for just five percent. Yet as a specialist welding company

with EN 1090-1 and 1090-3 certification, ALTEC and its 50 employees can master even the most complex orders thanks to 35 years of experience in welding aluminium components.

In order to be able to meet its customers' demands, ALTEC has always relied on pioneering process and manufacturing technology, despite its relatively modest size. "This includes state-of-the-art CAD workstations as well as fully automated robotic welding cells and the associated high-tech welding process technology," explains Siegfried Berenz, a certified master metalworker and international welding specialist (IWS). Having spent the past 15 years being primarily active in the fields of aluminium welding and processing, he took over as plant manager of ALTEC in





## Technology

2019.

Fronius welding technology moves in at ALTEC

As part of an ongoing automation process, a specific aluminium framework part (AlSi1, two millimetres) that has since become required in large quantities was to be transferred from manual production to robotic welding. One of the main goals here was to achieve a high welding speed in order to gain a competitive advantage. At the same time, the structure was to be joined with the greatest possible process reliability.

As a specialist in thin sheet and aluminium applications, Fronius therefore had the opportunity to beat the competition in 2018 as ALTEC found the best possible solution for its needs with the Fronius CMT (Cold Metal Transfer) process. When deployed in combination with the high-tech TPS 320i welding system platform, CMT delivers particularly high welding speeds, especially in the thin sheet range. As a result, Fronius succeeded in establishing itself in ALTEC's production operations.

After 25 years of automated production, however, other areas of ALTEC's robotic welding technology were also becoming long in the tooth. Plant manager Berenz therefore made it his mission to ensure the company's production environment was equipped to guarantee long-term competitiveness. Following the positive experiences gained with the CMT process, the welding expert once again turned to the

German sales and service team at Fronius Kaiserslautern.

Further manufacturing challenges for ALTEC

In the case of the scaffolding system concerned, the outdated welding technology from a third-party supplier was now causing up to 70 percent rework due to a steady increase in weld seam defects. Time, material and labour costs were therefore no longer in proportion, and the advantages of robotic welding were being completely cancelled out. In addition, the weld seam appearance no longer came close to satisfying ALTEC's strict demands. However, the production volume of the component was not high enough to justify investing in a modern robot system.

ALTEC's requirements were therefore clear – a new system would first have to be compatible with the old robot technology. In addition, the greatest possible process reliability had to be ensured, which would reduce downtimes to almost zero. If possible the system should also be capable of welding in a single action in order to reduce processing times; it was this target that represented the greatest challenge. Due to the round style and the semi-circular fabrication of the rung, the unmanipulated welding operation would have to produce a vertical-up, flat and vertical-down seam in a single action. One process for all positional welds was thus a basic requirement.

At the same time, there was a gap of two millimetres in the flat-seam section due to

the pre-processing. Particularly high gap-bridging ability therefore also had to be ensured in the future process technology. In order to be able to clearly distinguish itself from the competition in the production of scaffold and framework structures, the future welding process also had to deliver the best possible weld seam appearance. And on this basis ALTEC started its search for alternative modernization options.

Conversion to PMC Rippledride

Extensive welding tests conducted at the Fronius Germany competence centre for application engineering in Neuhoof-Dorfborn near Fulda ultimately led to a successful conclusion. The PMC Rippledride welding process variant, a special characteristic used for pulse welding, represented the most suitable solution for ALTEC's welding challenges.

Rippledride works in a way that is as ingenious as it is simple. Between a number of pulses defined by the welder, defined pause times are set in which the arc is completely switched off. This gives the weld pool time to cool down, making welding possible in all positions. The necessary gap-bridging ability of two millimetres is also guaranteed without any problems. In terms of appearance, the Rippledride function also leaves a rippling pattern that is in no way inferior to the elegance of TIG welding.

The Pulse Multi Control (PMC) functions also allow the number, shape and size of the individual welding spots to be set by precisely defining the pulse currents. The TIG-like seam pattern can thus also be varied in its final execution. ■



## News Update

### Experts Say Copper Shaping Up to be the New Oil as Demand Soars

Although gold, silver and lithium are metals that get most of the press, copper is viewed by experts as one of the most important battery metals. Goldman Sachs stated copper is the most critical material in the world's path toward zero emissions. Goldman Sachs has also declared copper "the new oil" expecting copper to set an all-time high in 2022. It's been reported that Goldman Sachs has argued that the critical role copper will play in achieving the Paris climate goals cannot be understated. Without serious advancements in carbon capture and storage technology in the coming years, the entire path to net zero emissions will have to come from abatement - electrification and renewable energy. The article continued: "As the most cost-effective conductive material, copper sits at the heart of capturing, storing and transporting these new sources of energy. In fact, discussions of peak oil demand overlook the fact that without a surge in the use of copper and other key metals, the substitution of renewables for oil will not happen, the report said. Moving the global economy toward net zero emissions remain a core driver of the structural bull market in commodities demand, in which green metals - copper in particular - are critical."

Goldman Sachs added: "Copper has the necessary physical properties to transform and transmit these sources of energy to their useful final state, such as moving a vehicle or heating a home, the report said... Leveraging our equity analysts' carbonomics analysis across EVs, wind, solar, and battery technology, we quantify this demand in a bottom-up model, estimating that by 2030, copper demand from the transition will grow nearly 600 per cent to 5.4Mt in our base case and 900 per cent to 8.7Mt in the case of hyper adoption of green technologies", Goldman Sachs said. It concluded: "We estimate that by-mid decade this growth in green demand alone will match, and then quickly surpass, the incremental demand China generated during the 2000s. Ripple effects into non-green channels mean the 2020s are expected to be the strongest phase of volume growth in global copper demand in history", it added.

### Chinese floods snarl supply chains for lead and aluminium

Deadly floods in the central Chinese province of Henan will have an inevitable impact on the supply of non-ferrous metals, with lead and aluminium the most severely hit, according to analysts.

The flooding, which has been described by local authorities as a "one in one thousand year event", has

killed at least 73 people and affected more than 13 million residents, or 13 per cent of the province's total population. The disaster has also tangled supply chains for key materials and products.

The flood-stricken province accounts for about 36 per cent of China's total production capacity for primary lead and about 15 per cent for recycled lead. It also produces about 5 per cent of the country's electrolytic aluminium, a metal processed to make aluminium products.

Central China begins clean-up after record floods but other cities brace for typhoon

Even before the floods, lead and aluminium plants in Henan were not running at full capacity because local governments had restricted electricity due to insufficient coal supply across the country.

Bauxite, the primary ore used to make aluminium, was also in short supply and the floods is likely to cause an uptick in imports, according to Zhang Yu, an analyst from online pricing and intelligence service MySteel.

Most aluminium processing plants in the province are expected to resume production this week, as the silt that inundated work sites has almost been cleared, Zhang said.

### China extends zinc reserves sales, copper and aluminium auctions complete

China will extend the bidding hours for zinc reserves sales that were affected by an earlier system breakdown, a customer service representative of the online auction platform said.

The world's top metals consumer released a total of 170,000 tonnes of non-ferrous metals from state reserves to fabricators on Thursday, the second reserves sales within a month.

However, the online bidding platform for 30,000 tonnes of copper and 50,000 tonnes of zinc, operated by China Minmetals Corp, had a temporary breakdown after auctions started at 9 a.m. Beijing time (0100 GMT), a customer service representative of the platform told Reuters.

The reason for the breakdown was unclear.

The copper auctions affected by the system crash were reopened at 3 p.m. (0700 GMT) and were completed "pretty fast", said the representative.

Around 20 lots of zinc reserves, or about 3,000 tonnes of the metal, will be re-auctioned from 6:30 p.m. till 9 p.m. (1030-1300 GMT) on Thursday.

A contact from a Jiangxi-based zinc manufacturer that participated in the auction said they had won a bid with transaction prices at less than 22,000 yuan (\$3,407) per tonne.

"Time was so tight," said the contact, who refused to be



## News Update

named, adding that results were "not ideal" as prices were a bit high.

The most-traded zinc contract on the Shanghai Futures Exchange SZNcv1 closed up 0.2% at 22,360 yuan per tonne.

Public bidding for 90,000 tonnes of aluminium reserves on the platform run by state-backed Norinco had been completed in the morning session, according to another customer service representative.

China's National Food and Strategic Reserves Administration said it would continue to release metals from its reserves in near term based on market demand, supply and price trends.

### Union at BHP's Escondida copper mine urges members to strike



The union at BHP Group Ltd's (BHP.AX) Escondida copper mine in Chile, the world's largest, on Wednesday urged its members to vote to strike, saying

the company was attempting to impose its will and its contract offer was "insufficient".

The powerful, 2,300-member union is set to vote on BHP's contract offer between Thursday and Saturday this week. "The Union has summoned all its members to vote en masse to reject this last offer, in order to declare a legal strike, the only tool that we have left in this scenario," the statement read.

A prolonged strike by the mine's top worker's union would constrict already tight global supplies of copper and likely send already high prices higher.

Negotiations over the last two months between the company and the union have been conducted in secrecy, against a backdrop of record high metal prices amid expectations of a gradual global recovery from the COVID-19 pandemic.

"The Company has no excuse for not responding favorably to our reasonable requests," the union said, noting the efforts of its workers during the pandemic. "The responsibility to avoid a serious conflict is entirely in the hands of ... BHP."

The union said in its statement the talks had failed to make progress on its main demands, including an improved system of professional development and performance-based compensation.

BHP said in a statement sent to Reuters that the offer

"improves current conditions and incorporates new benefits in matters highly valued by workers. This was built on the basis of conversations held with the union". If workers vote to reject the offer, further government-mediated talks of five to 10 days' duration would ensue ahead of a potential walk-out.

At Escondida, memories remain fresh of the historic 44-day stoppage in 2017 that jolted global copper markets and slowed Chile's economic growth.

### Rio Tinto's aluminium, refined copper production up, mined copper down

Rio Tinto's aluminium production rose by 3% to 1.62 million tonnes from 1.57 million tonnes, touching at its highest since 2018. The company's ISAL smelter in Iceland and the Quebec Becancour smelter operated at full capacity while the Saguenay smelters in Quebec operated at a stable level...

### U.S. Copper Buyers Face World's Highest Prices as Demand Booms

U.S. copper buyers are paying the world's highest prices for the metal as soaring demand and logistical bottlenecks send New York futures surging ahead of contracts in London and Shanghai.

Copper futures for September delivery on the Comex have been trading at a premium to those for December since Friday in a condition called backwardation that suggests tight near-term supplies and rising demand. It's the only main exchange where the metal is trading in backwardation right now, and inventories at warehouses tracked by the bourse have been declining since early April. As a result, a New York trader was paying over \$250 a metric ton more for Comex copper than the metal traded on the London Metal Exchange on Tuesday, the widest since 2011. The New York price is also higher than in China, excluding a value-added tax on Shanghai purchases.

The premium underscores investor assessments of diverging outlooks for the regions. Commodities from copper to steel have posted big gains this year, partly on bets that massive U.S. government spending to rebuild infrastructure will boost demand. Pandemic-triggered supply-chain woes have also helped lift prices. Meanwhile, Europe has been slower to recover from the pandemic, while concerns over China's efforts to rein in inflation have clouded prospects for commodity gains there.

"At the root of it all is the friction in global trade, but it's also a reflection of the fact that demand is strong. It genuinely looks like a tight market," said Oliver Nugent, an analyst at Citigroup Inc. "If you look outside of the LME, and you look at the U.S. and even at China, you can see that they're moving in the right direction."





## News Update

### **Second Release of Government Copper, Aluminium, Zinc Reserves Officially Launched**

According to the resolution of State Council Executive Meeting to secure commodities supply and to stabilise prices, the National Food and Strategic Reserves Administration (NFSRA) officially released on July 29 the second batch of national reserves of copper (30,000 mt), aluminium (90,000 mt) and zinc (50,000 mt) with a total amount of 170,000 mt, in order to alleviate the cost pressures from raw materials on enterprises and to regulate market through national reserves. The bidding enterprises actively participated with nice results.

### **China's copper scrap import has almost doubled, so why does secondary output lag?**

Chinese importers have been buying double the copper scrap from overseas under the category of 'recyclable copper material', yet its growth in secondary copper production is relatively modest.

The country's import volume of copper scrap (HS code: 7404) almost doubled in the first half of 2021 to 821,376 tonnes. It is up 90.8% year on year from a base number affected by outbreak of Covid-19 in 2020.

That is only slightly below the import quantity of 854,578 tonnes in the first half of 2019, China's customs data shows.

China's refined copper production using copper scrap only grew by 10.7% for the first four months of 2021, to 712,000 tonnes, according to the International Copper Study Group (ICSG).

The majority of copper scrap imported to China was not sent to refinery and smelters at all.

### **Allow Sterlite Copper's oxygen plant to function'**

A section of women from eight villages situated around the Sterlite plant staged demonstrations on Wednesday urging the State government to give permission to the copper smelter unit for operating its oxygen plant until the COVID-19 threat subsides.

The protests were organised in parts of Meelavittaan, Saamynaththam, Rajavinkovil, Madathur, South Sankaraperi, North Sankaraperi, Ayyanadaippu and South Veerapandiapuram.

The protesting women said the oxygen generated by Sterlite Copper was supplied to various districts to help COVID-19 patients. As the permission granted

for the operation of the oxygen plant would end on July 31, they appealed that it should be extended. The women later dispersed as directed by the police since they had not obtained permission for the demonstration.

### **Vedanta Q1 results: Company reports 314% jump in PAT, Ebitda up 150% YoY**

Anil Agarwal-led Vedanta Ltd reported a jump of 314 per cent in its attributable profit after tax at Rs 4,280 crore during the June quarter of FY 22 as against a profit of Rs 1,033 crore in the same quarter last year mainly on account of the low-base year effect, coupled with a rise in the company's higher revenues and better commodity prices.

"We continued the momentum across our segments, we delivered record operational performance driven by structural integration of technology adoption in all our business...we continued our focus on cost-cutting," Sunil Duggal, group chief executive officer told ET.

### **Hindustan Zinc Limited Q1FY22 Results: PAT jumps 46% YoY on higher volumes**

Hindustan Zinc Limited Q1FY22 - Vedanta Group company's revenue from operations stood at Rs 6378 cr, up 64% YoY led by higher metal and silver volumes and higher zinc, silver and lead prices. "In light of the rising input commodity prices, management is closely monitoring the situation and taking all necessary actions to combat it," the company said in its GUIDANCE for FY22

The company said that it produced "record-high first quarter refined metal and silver". The mined metal production is 221kt; refined metal production stood at 236kt and the saleable silver production stood at 161 tn.

### **Hawkins &Brimble goes for aluminium upgrade**

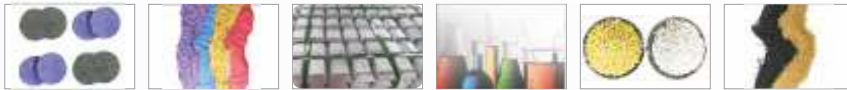
Men's grooming brand Hawkins &Brimble is moving three of its most popular lines to aluminium packaging, produced by Vetroplas in conjunction with its Spanish partner Envases.



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### Vedanta Aluminium invites waste-to-wealth partnerships with cement industry for low-carbon products



Vedanta Aluminium Business, India's largest producer of the aluminium and value-added products, invites partnerships from cement producers for using its by-products for manufacturing low-carbon cement.

The company expressed its interest for long-term collaboration with cement industry players on opportunities of using fly ash (a by-product in thermal power generation) and bauxite residue (a by-product of producing alumina from bauxite) in cement manufacturing, in a national workshop conducted with global industry experts.

The cement industry, which is exploring viable solutions to produce cement more sustainably, is the perfect circular economy partner for Vedanta Aluminium. Fly ash and bauxite residue, the two most voluminous by-products generated by the aluminium industry, can be used in cement and concrete manufacturing, providing cement manufacturers significant benefits in terms of quality output, cost and sustainability.

Recently they had Organized a national workshop on the opportunities and benefits of using fly ash and bauxite residue for cement manufacturing.

Fly ash can partially replace cement in concrete (or be used to produce blended cement), significantly improving durability and workability of cement. With a 30 – 33% blending ratio, fly ash can help save 270 kg of carbon emissions for every tonne of cement produced. Bauxite residue can be added to the raw mix in clinker manufacturing to replace virgin bauxite, improving its hydraulic properties and strength. Owing to high concentration of iron oxide and alumina, bauxite residue is a better substitute for laterite, used in clinker manufacturing. Moreover, the residual caustic in bauxite residue helps in controlling the emission of sulphur when used directly, making it a better fit for the purpose. Both fly ash and bauxite residue being industrial wastes themselves, come with significant cost and energy advantages as well.

Vedanta Aluminium's technical workshop was attended by over a hundred executives from the cement industry and featured globally renowned experts in this domain – Shreesh Khadiolkar, ex-Director of Quality and Product Development at one of India's leading cement producers, and Mr. Robin De Beer, a concrete technologist from South Africa with 40+ years of experience in gainful utilization of

fly ash in concrete.

Rahul Sharma, CEO – Vedanta Aluminium Business said, "We firmly believe that industries must develop waste-to-wealth value-chains to truly become sustainable. At Vedanta, we have made encouraging progress in this direction and intend to pursue it further. Long-term strategic collaborations, such as between Vedanta and India's key cement producers, will not only eliminate significant volumes of industrial waste from the system, but also provide the trifecta of quality, sustainability and cost benefits for the cement industry. We hope the Indian cement producers come forth to work with us on this innovative solution, which is a true win-win scenario for the industry and environment."

Sharing his insights and industry experience with the audience, Robin De Beer said, "Good quality fly ash can help reduce water demand, lower heat of hydration and significantly enhance workability of concrete, resulting in long-term strength and durability. This technical workshop is a great initiative by Vedanta to create awareness on how fly ash can support the sustainability agenda of the cement and concrete industry, while significantly improving the product performance."

Mr. Shreesh Khadiolkar added, "Bauxite residue has multiple advantages in cement manufacturing, such as lower silica relative to laterite/bauxite, higher alkali content and fine particles, which reduces grinding cost. It also improves hydraulic properties of cement. Indian cement industry should leverage this innovative opportunity to reap benefits of quality and sustainability."

In line with its quest for fostering circular economy, in FY21, Vedanta Aluminium supplied over 3 lakh metric tonnes of fly ash to various cement plants in India. Since Feb'21, the company has also supplied over 30,000 metric tonnes of bauxite residue to cement manufacturers. The Business is additionally supplying fly ash free of cost to hundreds of local brick making MSMEs in its catchment.

In FY21, Vedanta Aluminium supplied nearly 4 lakh metric tonnes of ash to brick manufacturers. Ash bricks are not only lighter and stronger than traditional clay bricks, but play a crucial role in preserving nutrient-rich topsoil from being used as the raw material.

This amounts to estimated savings of 1.9 metric tonnes of topsoil for every tonne of ash brick manufactured. Besides, ash brick manufacturing is an eco-efficient process, contrary to the energy-intensive process of producing clay bricks in brick kilns that result in substantial greenhouse gas emissions. In fact, for every tonne of ash bricks manufactured, an estimated 5900 kg of carbon dioxide equivalent emissions is avoided.



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Feature

## Role of Aluminium Industrial value chain in Italy



**Mario Conserva is the President of METEF, the international Aluminium Exhibition started in Italy on 1997, CEO of A&L, the international magazine devoted to the light metal created in 1988, and General Secretary of the Federation of Aluminium Consumers in Europe FACE since 1998.**

**He is engaged in the aluminium sector since 60 years. He is President of METEF, the international Aluminium Exhibition**

**started in Italy on 1997, CEO of A&L, the international magazine devoted to the light metal created in 1988, and General Secretary of the Federation of Aluminium Consumers in Europe FACE since 1998. In the past he has been in the Board of the European Aluminium Association and Chairman of Centroal, the Italian Aluminium Group of the Italian Non Ferrous Metals Association Assomet.**



**Mario Conserva**

The aluminium industry, characterized by a wide a range of highly differentiated semi-finished products and foundry castings, parts and components for final applications, is today more and more essential to the economies of advanced and growing countries.

It has undergone fundamental structural changes in the last years in terms of geographical relocation of production and consumption, degree of concentration and integration, development of new end-use





markets, increasing financialisation, and international trades.

As a further consequence, a renewed interest in the role of trade policies to drive economic development and to influence the competitiveness of the manufacturing aluminium sector as a whole has been at the core of the international debate.

Since 2008 the European Commission has shown a growing attention to this value chain, triggering interest in an appropriate industrial policy for the sector; the light metal supply chain has also been projected in the last year even more and more at the center of the political debate relating to recovery after the dramatic effects of Covid 19. In particular due to the technical characteristics of the light metal and its alloys, an excellent choice for a great number of applications, but also for the strong natural aptitude to recovery and recycling and good requirements of eco-sustainability, representing a champion of circular economy tool.

In EU, policy attention has been mainly paid in the past to the upstream segment of the industry, whereas the fundamental role played by downstream segments, (using unwrought aluminium to produce a wide range of

products that in turn are growingly employed in many industries, automotive and transportation, building, and construction, packaging, electrical engineering, infrastructures), has been sometimes neglected.

In this paper I will give a current perspective picture of the aluminium industry in Italy, within the reference framework of the European value chain, suggesting some indications and recommendations to promote and strengthen the competitiveness of our industry in the EU, with a special focus on the issues of access to raw materials.

The aluminium industry in the European Union and the decline of primary production. The localization of primary aluminium production has profoundly changed worldwide in the last 20 years, with the exponential growth of the weight of China (today representing about 60% of the total production worldwide), with the strong retreat of North America and the European Union and with the growing importance of the Gulf countries.

The geographic relocation of production responds to the need to seek lower costs in terms of energy, transformation of raw materials and transport. The European aluminium industry is characterized by few

alumina production plants and by a now limited and continuously decreasing number of smelters. In the downstream sector of unwrought metal production there are thousands of small companies mostly not vertically integrated, representing over 90% of the chain's workforce and generate over 70% of its turnover.

The EU primary aluminium production has dropped heavily in recent years (- 30% since 2008), the EU supply chain largely depends on imports from abroad (Figure 1), a very significant cost item for downstream transformers and users which accounts for around 50% of the total production costs

According to recent surveys, 16 smelters are active in the EU, their number decreased by 38% in the period 2002-2016, so the EU has lost almost a third of its primary aluminum production, and the trend does not seem to change.

In Italy, the UK, the Netherlands, Poland and Hungary the production of primary metal has drastically reduced or even stopped, few EU countries today have smelters producing primary aluminium in any form (pure metal ingots and value-added products, such as rolling slabs, extrusion billets, foundry alloys ingots, wire rod). Today, with the further closures that have occurred in the meantime, the situation has become even





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## Feature

more critical.

The aluminium industrial system in Italy

The aluminium system in Italy was born a few years after the first steps of the new metal with the

when the Swiss group AlAG built the Porto Marghera smelter, near Venice, subsequently integrated by rolling and extrusion facilities. This was the basis for the great development of

by over 500 production and first transformations companies, with over 16 thousand employees, an annual turnover excluding the related industries, therefore referring only to the production



development in 1896 of the patents of Charles Hall and Paul Heroult for the production of metal by electrolysis. The first aluminium smelter was built in Italy in 1907, and had a production in that year of 322 tons of metal. The major developments in primary metal production took place after the First World War

the aluminium industrial system in Italy which, in various phases, has grown up to the present day, placing itself among the top in Europe, second only to Germany.

According to recent (2020) estimates by Centroal, the aluminium group in the Italian association of non-ferrous metals Assomet, the chain is characterized today

of unwrought metal and the first transformations, of more than 9 billion euros per year; the system has not had primary production for some years, it has important refining and remelting plants, according to a survey by the A&L magazine of 2019 for a total of over 40 plants, 43 extrusion plants for a total of more than 90 presses installed, 13 rolling



## Feature

plants, 400 castings foundries. The entire supply chain has an overall consumption of aluminium and alloys shown in the Figure 2, the per capita use of metal is more than 30 kg/year. The historical trends of the last few years of the sectors rolling, extrusion and foundry casting alloys are shown in the figures 3, 4 and 5. As to the rolling sector, the market situation in Italy from 2010 to today (production, imports, exports and consumption, Figure 3), shows that 2019 closed with a total production of about 610,000 t, with imports and exports around 280-300 thousand and the overall use about 550 thousand t. For the extrusion sector, the historical series of the market in Italy from 2010 to today (production, imports, exports and consumption), is in Figure 4, showing how the production is today at 565 thousand t. The movements in exports and imports of extrusions are relatively modest, with the final result of an internal demand in growth trends stabilized to 420-430 thousand tonne.

The situation of foundry ingots is shown in the Figure 5, the total production in Italy was 570 thousand t in 2020, a decrease compared to the trend of previous years, a maximum of 743 thousand t

in 2017 and almost 700 thousand t in 2019. The weight that aluminium has the transport sector is also found in the performance of the casting techniques, the pressure die casting represents more than 78% of the total, while the shell casting is worth 19%, the remaining part is poured into sand cast. According to A & L estimates, only 30% of the foundry castings were produced from primary alloys. Beyond the figures, the aluminium system in Italy appears to have a very devolved and articulated structure that ensures the sector is ranked at the top of the European and global framework in terms of production and uses. The strong roots of the aluminium industrial system in Italy have led to the development over the last few decades of a significant induced activity linked to the second transformations, and consequent growth of a solid technological and plant know-how at the top of the world in some specific sectors such as extrusion, foundry and diecasting. To complete the picture of the industrial system of aluminium in Italy, it should be emphasized that following the raw metal production and the first transformations there is an extremely articulated downstream consisting of: machinery and plant

fabricators (foundry, diecasting, extrusion, drawing, surface treatments); third processing, such as painting, anodic oxidation, welding, various mechanical processing of semi-finished products and aluminium castings; manufacturing of aluminium based value added products products, (Figure 6) such as, just to mention the main ones: doors and windows, facades, roofs, mosquito nets and shower enclosures, cast aluminum wheels, aluminum containers for drinks and food and coupled for various packaging, automotive and transportation parts and components, a distribution system consisting of hundreds of traders throughout the country, responsible for the distribution of metal in all forms.

Moreover, it is important to remember that the Italian aluminum system is supported by: a devoted magazine such as Alluminio & Leghe born in 1988, a precious tool that represents the complete value chain; Metef, created in 1997 as the first fair in the world dedicated to aluminium and its alloys, with great advance on the times and with excellent foresight of the great developments in the use of aluminium we are witnessing in recent years. ■





## IMPORTANT ANNOUNCEMENT

Owing to the severe pandemic situation in Mumbai, the board has unanimously decided to change the dates and venue of 70th IFC & IFEX for your safety

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<b>FOUNDRY INDUSTRY AFTER 20 YEARS</b>	<b>WFO HOUR</b>	<b>GLOBAL SPEAKERS THROUGH ZOOM</b>	<b>B2B MEET</b>	<b>FUTURE IS LIGHT METALS</b>



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# SIAM Annual Statistic

## Auto Industry Sales Performance of June 2021 & April-June 2021

### Monthly Performance: June 2021

**Production:** The total production of Passenger Vehicles\*, Three Wheelers, Two Wheelers and Quadricycle in the month of June 2021 was 1,693,639 units.

#### **Domestic Sales:**

- Passenger Vehicles\* sales was 231,633 units in June 2021.
- Three-wheeler sales was 9,397 units in June 2021.
- Two-wheeler sales was 1,055,777 units in June 2021.

### Quarterly Performance: April - June 2021

**Production:** Total production of Passenger Vehicles\*\*, Commercial Vehicles#, Three Wheelers, Two Wheelers and Quadricycle in April-June 2021 was 4,583,510 units.

#### **Domestic Sales : April – June 2021:**

- Passenger Vehicles\*\* sales was 646,272 units.
- Commercial Vehicles# sales was 105,800 units.
- Three-wheeler sales was 24,376 units.
- Two-wheeler sales was 2,403,591 units.

Commenting on the June 2021 and Q1 FY22 data, **Mr Kenichi Ayukawa, President, SIAM** said, *“In Quarter-1 this year, Indian Automobile Industry came forward to support the Government in its fight against Covid second wave. Many OEMs shut down their manufacturing plants to make oxygen available for medical purposes. They also contributed towards augmenting oxygen supply to hospitals, supporting health care facilities and helping local communities. Due to various lockdowns, many dealers could not operate, leading to subdued sales.*

*Lately, with ease in restrictions, OEMs have carefully resumed operations in a phased manner. We are thankful to the Government for improving the rate of vaccination in the country, rolling out a fiscal stimulus package for the worst hit sectors and including wholesale and retail trades under MSMEs.*



## Statistics

*Indian Automobile Industry is facing headwinds like steep increase in commodity prices, semi-conductor shortage, and fear of a third Covid wave. In such uncertain environment, the Industry is working hard to maximize production and sales while ensuring safety of our people and customers.”*

Commenting on the April – June 2021 data, **Mr Rajesh Menon, Director General, SIAM** said, “In Quarter-1 last year (FY 20-21), Indian Automobile Industry had very less sales because of the nation-wide lockdown induced by the first wave of the pandemic. This year too, in Quarter-1 (FY 21-22) sales were subdued due to the impact of Covid second wave.

*Sales of all segments were lower in past several years, barring Q1 of FY 20-21. Passenger vehicle segment registered sales of 6.46 lakh vehicles in this quarter, which is lowest in past 7 years, barring Q1 of FY 20-21. Sales of 1.06 lakh units for the Commercial Vehicle segment and 24.04 lakh units for the Two-Wheeler segment, were lowest in past 12 years, barring Q1 of FY 20-21. Three-wheeler segment was the worst-hit with sales of just about 24,000 units, which has been lowest in more than two decades, barring Q1 of FY 20-21.”*

### **Domestic Sales: Monthly**

Category	Domestic Sales (Number of Vehicles)		
	June-19	June-20	June-21
<b>Passenger Vehicles (PVs)*</b>			
Passenger Cars	132,077	55,497	121,378
Utility Vehicles (UVs)	67,116	46,201	100,760
Vans	10,329	3,919	9,495
<b>Total Passenger Vehicles (PVs)</b>	<b>209,522</b>	<b>105,617</b>	<b>231,633</b>
<b>Three Wheelers</b>			
Passenger Carrier	41,442	5,513	5,809
Goods Carrier	10,443	4,787	3,588
<b>Total Three Wheelers</b>	<b>51,885</b>	<b>10,300</b>	<b>9,397</b>
<b>Two Wheelers</b>			
Scooter/ Scooterette	512,626	269,812	241,689
Motorcycle/Step-Throughs	1,084,596	704,365	777,100
Mopeds	52,253	40,620	35,897
Electric Two Wheelers	-	30	1,091
<b>Total Two Wheelers</b>	<b>1,649,475</b>	<b>1,014,827</b>	<b>1,055,777</b>
Quadricycle	87	-	-
<b>Grand Total of All Categories</b>	<b>1,910,969</b>	<b>1,130,744</b>	<b>1,296,807</b>

\* BMW, Mercedes, Tata Motors & Volvo Auto data is not available.





**Domestic Sales: Q1**

Category	Domestic Sales (Number of Vehicles)		
	April-June		
	2019-2020	2020-2021	2021-2022
<b>Segment/Subsegment</b>			
<b>Passenger Vehicles (PVs) **</b>			
Passenger Cars	447,518	80,051	337,191
Utility Vehicles (UVs)	224,223	68,025	286,092
Vans	40,943	5,658	22,989
<b>Total Passenger Vehicles (PVs)</b>	<b>712,684</b>	<b>153,734</b>	<b>646,272</b>
<b>Commercial Vehicles (CVs)#</b>			
<b>M&amp;HCVs</b>			
Passenger Carrier	10,321	221	1,086
Goods Carrier	64,012	4,182	28,072
<b>Total M&amp;HCVs</b>	<b>74,333</b>	<b>4,403</b>	<b>29,158</b>
<b>LCVs</b>			
Passenger Carrier	15,919	860	4,297
Goods Carrier	118,058	26,373	72,345
<b>Total LCVs</b>	<b>133,977</b>	<b>27,233</b>	<b>76,642</b>
<b>Total Commercial Vehicles (CVs)</b>	<b>208,310</b>	<b>31,636</b>	<b>105,800</b>
<b>Three Wheelers</b>			
Passenger Carrier	119,352	6,919	15,769
Goods Carrier	30,445	5,841	8,607
<b>Total Three Wheelers</b>	<b>149,797</b>	<b>12,760</b>	<b>24,376</b>
<b>Two Wheelers</b>			
Scooter / Scooterettee	1,514,202	339,008	592,445
Motorcycle / Step-Throughs	3,330,868	901,743	1,740,198
Mopeds	167,997	53,708	69,009
Electric Two Wheelers	-	50	1,939
<b>Total Two Wheelers</b>	<b>5,013,067</b>	<b>1,294,509</b>	<b>2,403,591</b>
<b>Quadricycle</b>	620	-27	-
<b>Grand Total of All Categories</b>	<b>6,084,478</b>	<b>1,492,612</b>	<b>3,180,039</b>

\*\* BMW, Mercedes and Volvo Auto data is not available

# Daimler & Scania data is not available



## Statistics

<b>SIAM</b>						
<b>Segment wise Comparative Production, Domestic Sales &amp; Exports data for the month of June 2021</b>						
(Number of Vehicles)						
Category Segment/Subsegment	Production		Domestic Sales		Exports	
	June		June		June	
	2020	2021	2020	2021	2020	2021
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	57,808	1,67,932	55,497	1,21,378	17,878	34,848
Utility Vehicles(UVs)	46,696	1,17,913	46,201	1,00,760	6,659	17,690
Vans	3,164	10,145	3,919	9,495	24	397
<b>Total Passenger Vehicles (PVs)</b>	<b>1,07,668</b>	<b>2,95,990</b>	<b>1,05,617</b>	<b>2,31,633</b>	<b>24,561</b>	<b>52,935</b>
<b>Three Wheelers</b>						
Passenger Carrier	28,057	49,088	5,513	5,809	25,742	45,278
Goods Carrier	4,758	2,734	4,787	3,588	63	1,406
<b>Total Three Wheelers</b>	<b>32,815</b>	<b>51,822</b>	<b>10,300</b>	<b>9,397</b>	<b>25,805</b>	<b>46,684</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	1,37,305	2,47,250	2,69,812	2,41,689	9,810	23,995
Motorcycle/Step-Throughs	7,75,710	10,77,419	7,04,365	7,77,100	1,85,368	3,22,314
Mopeds	40,611	19,653	40,620	35,897	389	726
Electric Two Wheelers	80	759	30	1,091	-	-
<b>Total Two Wheelers</b>	<b>9,53,706</b>	<b>13,45,081</b>	<b>10,14,827</b>	<b>10,55,777</b>	<b>1,95,567</b>	<b>3,47,035</b>
Quadricycle	365	746	-	-	257	665
<b>Grand Total of All Categories</b>	<b>10,94,554</b>	<b>16,93,639</b>	<b>11,30,744</b>	<b>12,96,807</b>	<b>2,46,190</b>	<b>4,47,319</b>
* BMW, Mercedes, Tata Motors and Volvo Auto data is not available						
Society of Indian Automobile Manufacturers ( 14/07/2021)						

<b>SIAM</b>						
<b>Summary Report: Cumulative Production, Domestic Sales &amp; Exports data for the period of April-June 2021</b>						
Report I						
(Number of Vehicles)						
Category Segment/Subsegment	Production		Domestic Sales		Exports	
	April-June		April-June		April-June	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	76,406	4,35,618	80,051	3,37,191	31,873	79,376
Utility Vehicles(UVs)	65,215	3,40,853	68,025	2,86,092	11,707	47,151
Vans	3,430	24,188	5,658	22,989	39	588
<b>Total Passenger Vehicles (PVs)</b>	<b>1,45,051</b>	<b>8,00,659</b>	<b>1,53,734</b>	<b>6,46,272</b>	<b>43,619</b>	<b>1,27,115</b>
<b>Commercial Vehicles (CVs)**</b>						
<b>M&amp;HCVs</b>						
Passenger Carrier	567	2,263	221	1,086	268	920
Goods Carrier	6,102	39,395	4,182	28,072	966	5,082
<b>Total M&amp;HCVs</b>	<b>6,669</b>	<b>41,658</b>	<b>4,403</b>	<b>29,158</b>	<b>1,234</b>	<b>6,002</b>
<b>LCVs</b>						
Passenger Carrier	1,093	4,912	860	4,297	217	210
Goods Carrier	21,177	90,356	26,373	72,345	2,419	9,794
<b>Total LCVs</b>	<b>22,270</b>	<b>95,268</b>	<b>27,233</b>	<b>76,642</b>	<b>2,636</b>	<b>10,004</b>
<b>Total Commercial Vehicles (CVs)</b>	<b>28,939</b>	<b>1,36,926</b>	<b>31,636</b>	<b>1,05,800</b>	<b>3,870</b>	<b>16,006</b>
<b>Three Wheelers</b>						
Passenger Carrier	56,137	1,49,616	6,919	15,769	50,427	1,34,392
Goods Carrier	6,195	12,367	5,841	8,607	204	3,190
<b>Total Three Wheelers</b>	<b>62,332</b>	<b>1,61,983</b>	<b>12,760</b>	<b>24,376</b>	<b>50,631</b>	<b>1,37,582</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	1,58,231	6,93,260	3,39,008	5,92,445	14,696	90,145
Motorcycle/Step-Throughs	10,47,037	27,23,345	9,01,743	17,40,198	3,22,528	10,41,989
Mopeds	44,684	63,486	53,708	69,009	759	4,968
Electric Two Wheelers	80	2,203	50	1,939	-	-
<b>Total Two Wheelers</b>	<b>12,50,032</b>	<b>34,82,294</b>	<b>12,94,509</b>	<b>24,03,591</b>	<b>3,37,983</b>	<b>11,37,102</b>
Quadricycle	431	1,648	(27)	-	397	1,625
<b>Grand Total of All Categories</b>	<b>14,86,785</b>	<b>45,83,510</b>	<b>14,92,612</b>	<b>31,80,039</b>	<b>4,36,500</b>	<b>14,19,430</b>
* BMW, Mercedes and Volvo Auto data is not available						
** Daimler & Scania data is not available						
Society of Indian Automobile Manufacturers ( 14/07/2021)						

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