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Devoted to Foundry & Non-Ferrous Metals Industry

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■ **Indian foundry industry sees bright prospects with the adoption of technological advancements**

Devendra Jain - Vice President, IIF

■ **ZINC POTS FOR GALVANIZING - TRIALS AND TRIBULATIONS - Part 2**

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D. A. Chandekar
Editor

Dear Readers,

The metals industry in India seems well on recovery track.

We all are observing that for the last few days, the number of covid cases per day are reducing across the country. Also, the severity of the cases has reduced thereby reducing the death tally and also improving the survival rate. This has substantially improved the sentiment and in most part of the country people have resumed their normal routine taking some precautions. The industry too has been working hard to restore normalcy. Off late, the cases in few locations have increased but the government and the administration is going all out to control them. Also the expectation that the vaccine would be available shortly, too has increased the public confidence and the industry sentiment.

As such, the construction sector was less affected by this pandemic and the steel demand for this sector had never been too low. The western states in the country did face labour migration problem for few months but these migrated labours slowly returned back and the work has now started in full swing. As discussed in the last month's piece, the auto sector was facing a lower sales issue from atleast one year before the start of the pandemic. Slowing down of the economy and the emergence of other options like Ola and Uber were the reasons attributed for this bad performance of auto sector. Now after more than seven months the scenario is quite different. The monsoon was good which gave a boost to the tractor demand in the country. Travelling by public transport is now perceived as somewhat risky and thus the urge to have our own vehicle has increased. This has reflected in the higher sales of two wheeler and passenger vehicle segment. The growth in the commercial vehicle segment is bit slow but one can safely say that the auto sector has bounced back. This development must have given a great relief to the foundry sector, especially to those which supply castings to the auto sector. Similarly, the mega infrastructure projects are surely in a position to trigger the metals demand. They were paused for all these months but are now gradually re-starting. Hope all this helps the metals and foundry sector to stabilise and move ahead on a sustainable and long term growth path.

The second edition of 'Industry 4.0 For Aluminium', organised by 'Metalworld' on digital platform was very well received by the industry. The tone of the event was quite positive and the panellists and speakers were bullish about the adoption of smart manufacturing practices by the aluminium sector in the country. I also think the industry is now geared up for more such interactive webinars on digital platform. It is simple, less time and money consuming and equally effective. I am slowly getting convinced that 'Digitalisation' is the only way forward. What say you ?

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Indian foundry industry sees bright prospects with the adoption of technological advancements

"The future of the Indian Foundries is very bright provided they keep abreast with the latest technical developments and adept themselves to changing scenario with minimum time gap",

Devendra Jain - Vice President, IIF

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- Joined family business M/s Porwal Udyog (India) in the year 1976.
- Established M/s Triveni Conductors Ltd. Plant at Dewas in the year 1981.
- Established M/s Porwal Diesels Pvt. Ltd. In the year 1985 as Managing Director.
- Established second unit of M/s Triveni Conductors Ltd. Plant at Pithampur in the year 1991.
- Established M/s Porwal Auto Components ltd. Pithampur in the year 1992 as Managing Director.
- Established M/s D P Aluminium Casting LLC, Rasal Khema, UAE in the year 2008 as Partner.
- Established Solar Plants of Porwal Auto Components Ltd.
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- Received National award for Entrepreneurship by Govt. of India, Ministry of Small Scale Industries for the year 1999.
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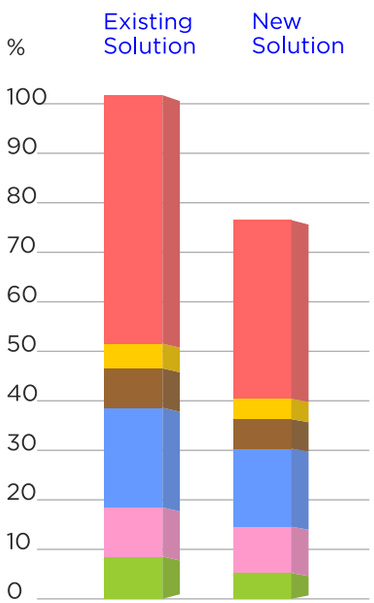

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How is the present situation in Indian foundry Industry?

As on date the foundries involved in supplies to Automobiles, Tractors/agricultural Equipment's, two-wheelers, and exports are quite comfortable and are overloaded with orders.

While the foundries dealing with Commercial Vehicles and Engineering sector are lagging but there is an upward trend in demand from these sectors also and hopefully last quarter will exhibit a drastic improvement.

Is the present boom in auto industry sustainable?

In my opinion the present boom is sustainable but for some hiccups here and there. This boom will be riding on the growth in two major sectors of the economy:

a. Cement and Steel industry
b. Reality sector

Besides the other two, the large infra-structure of the Indian government and return of the consumer demand from the inelastic phase towards elastic phase will be additional boosters.

What effect you see on Indian foundries after reducing our trade with China?

With reduction in trade with china the Indian Foundries will have definitely better business prospects. Indian foundries were unable to match the pricing of the Chinese competitors due to certain chines policies towards there industries. But now with restrictions on Chinese imports this field has opened up for Indian foundries.

How do you see the future of the Indian Foundry Sector? What is your advise to the small foundries?

In my opinion the future of the Indian Foundries is very bright provided they keep abreast with the latest technical developments and adept themselves to changing scenario with minimum time gap.

As regards the small foundries, they need to upgrade themselves very fast on both the technical fronts as well as the management level. The decision-making process should change from subjective to more analytical data base system.

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Feature

ZINC POTS FOR GALVANIZING - TRIALS AND TRIBULATIONS - Part 2

Sudipto Sarkar, Shantanu Chakrabarti, M.B. Das, R.N. Chattopadhyay and M.D. Maheshwari
Tata Steel

contd. from last issue

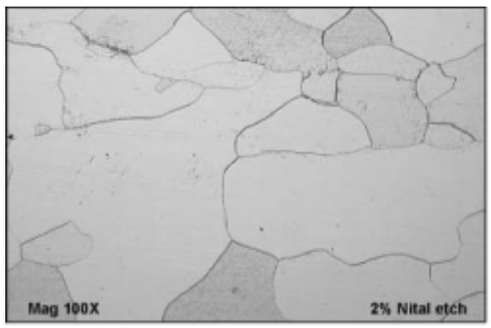
Thickness mapping of pot wall In the process of diagnosing the root cause of pot failure, it is essential to map the reduction in wall thickness at various locations to determine the severity of deterioration of the pot. Except for galvanizing pot # Fig. 9b : Microphotograph of galvanizing pot # 1 at a 4, where the pot had not thinned at any location, all location away from the failure, revealing resolved pearlite at triple points in a ferrite - pearlite matrix

The pattern of failure revealed a typical erosion of grains from the surface of the steel plate.

Galvanizing pot # 2 - Very coarse-grained ferritic matrix was observed. Erosion of the grains due to the diffusion of zinc into the iron lattice is clear in Fig. 10. The grain size was ASTM 0.

Galvanizing pot # 3 - Extremely coarse ferritic matrix was observed with grain size of ASTM 0 (Fig. 11) revealing erosion of ferrite grains.

Fig. 11 : Micrograph of galvanizing pot # 3. The matrix consisted of very coarse ferrite other pots



were scanned for reduction in thickness by ultrasonic technique. Mapping of the pot wall gives a clear indication on whether the pot can be salvaged or not. Mapping also helps in providing clues on whether the root cause of the failure is restricted to a local region in the pot or spans globally on all the surfaces of the pot.

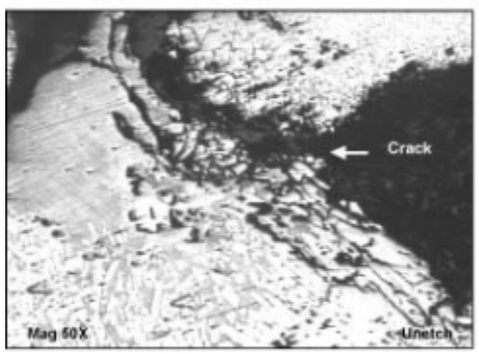
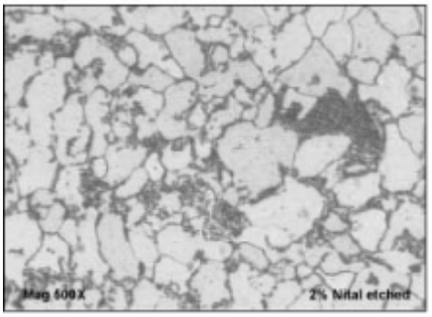


Fig. 12 : Micrograph of the eroded surface and the crack in galvanizing pot # 4 showing attack of zinc on the alloy rich grain boundaries Fig. 13 : Micrograph of galvanizing



pot # 4 revealing a ferrite - pearlite matrix Galvanizing pot # 1 - The thickness mapping of this pot can be seen in Table 3. It can be seen that the south sidewall has the most severe thinning. The other walls have also thinned but not to the extent of the south sidewall. The worst affected area on this wall was at a height of about 400 mm from the surface.

Table 3 : Variation in wall thickness at the time of pot failure in galvanizing pot # 1. Original thickness of the wall plate is 50mm. Only the south side wall and the east side wall were measured for thickness since the other walls were not damaged

Walls	South side wall (Damaged wall)	East side wall
Depth from the zinc meniscus in mm	(Thickness in mm)	(Thickness in mm)
0	48	49
100	49	48
200	47	35
300	30	28
400	10	22
500	15	31
600	35	32
700	18	35
800	47	32
900	25	35

Galvanizing pot # 2 - The erosion on this wall was restricted to a very local area as marked in Fig. 3. The rest of the pot was intact retaining the original thickness of the plate. The puncture was close to the firing leg where there was every possibility of the burner flame impinging on the pot plate. Galvanizing pot # 3 - The thickness mapping of this pot can be seen in Table 4. Only one wall was heavily affected leading to puncture of the pot.

Table 4 : Variation in wall thickness at the time of pot failure in galvanizing pot # 3. Original thickness of the wall plate is 50mm

Walls Depth from the zinc meniscus in mm	West side wall (Damaged wall) {Thickness in mm	South side wall {Thickness in mm}	East side wall {Thickness in mm}	North side wall {Thickness in mm}
200	31	29	18	30
400	16	31	18	24
600	21	33	22	29
800	28	35	29	32
1000	36	35	32	34
1200	40	37	35	34
1400	42	41	40	39

Galvanizing Pot # 4 - This pot was not mapped since there was no thinning on any of the surfaces except a hairline crack.

DISCUSSION

A static non-movable container like the zinc pot can fail in only limited ways. It could either fail by the shear load of the zinc it stores, or by over heating or by atmospheric corrosion or as a result of the reaction of the zinc with iron. The pots are designed with a sufficient safety factor and the quantity of zinc it contains can rarely over load the container.

The melting point of zinc is 419°C. Even under adverse conditions the temperature cannot rise to the levels that can lead to pot failure purely because of heat. The thickness of the steel shell is around 40 to 50mm. It is therefore apparent that the reaction of zinc with steel is, in most occasions, the primary reason for zinc pot failures.

Reaction of zinc with steel being the predominant mode of failure, it is important to appreciate the mechanism of this reaction and the factors that influence and accelerate the reaction process. Zinc reacts with steel resulting in corrosion or erosion. Erosion / Corrosion of Iron in Molten Zinc Influence of temperature - When iron directly comes in contact with molten zinc, atoms immediately begin to diffuse inwards into the iron lattice and iron atoms move outwards. Due to differences in melting points, the mobility of the zinc atom is greater than that of iron. Thus, a series of alloy layers are formed having the phases listed in Table 5. i.e. the gamma, delta and zeta phase(4).

Table 5 : Properties and composition of alloy layers of a hot dip galvanizing coating

Phases	Designation	Hardness DPN	Composition % Zinc	% Iron	Melting point in °C
Eta	Zn	70	100	0	454
Zeta	FeZn13	179	94	6	530
Delta	FeZn7	244	90	10	530 - 670
Gamma	Fe3Zn10	—	75	25	670 - 780
Steel base	Fe	159	0	Nearly 100	1538

In order to study the reaction between the iron plate of the galvanizing pot and the molten zinc, the Fe -Zn phase diagram should first be examined and then the effect of other elements present in iron on the kinetics of the above reaction. Depending on the temperature at the pot wall, molten zinc interface, the arrangement of intermetallic layers is different. Three arrangements of these layers are possible as shown in Fig. 14. At temperatures below 495°C the layers of gamma, delta and zeta phases adhere to the iron base, which retard the attack of molten zinc on iron. In the temperature range of 495°C to 515°C, the gamma layer does not form and there is only a thin delta layer adhering to steel.

This is a conglomerate of delta crystal fragments and

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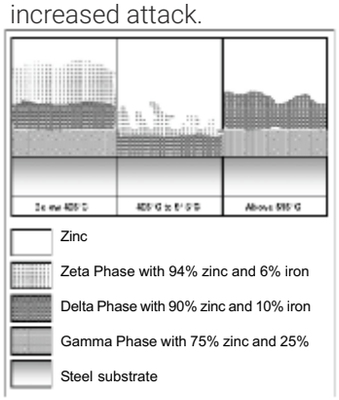
well formed zeta crystals in the basic mass of zinc.

Due to a thin layer of delta phase separating the iron phase from the molten zinc, the zinc reacts faster with iron. The loose delta +zeta crystals separate from the delta layer creating a physical loss of iron from the surface thus decreasing the thickness of the pot wall.

At temperatures above 515°C, tightly adhering alloy layers of gamma and delta form on the iron face preventing accelerated attack of zinc(5). The rate of dissolution of zinc in iron at various temperatures is shown in Fig. 15(3). Similar layers are formed on the inner surface of the galvanizing pots. The attack of zinc on the pot plate during operation depends on whether these layers adhere firmly to the steel base or whether they form base layers, which flake off from the surface of the walls. Formation of nonadherent layers help in exposing fresh surface of steel regularly to the molten zinc leading to increased attack.



deposit with temperature

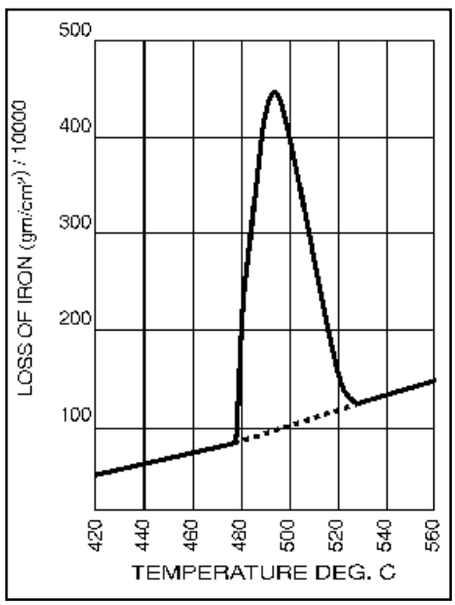
Zinc Zeta Phase with 94% zinc and 6% iron Delta Phase with 90% zinc and 10% iron

Gamma Phase with 75% zinc and 25% Steel substrate Over heating not only causes rapid dissolution of the pot wall, but if prolonged it can also change the microstructure of the pot steel wall and subsequently the physical properties.

The above phenomenon takes place uniformly on all surfaces of the pot. However, there are possibilities that only a localized area of the pot may be influenced by temperature. In a coal fired or liquid fuel fired galvanizing pot, the area where the flame is likely to impinge the

Fig. 15 : Effect of temperature on the rate of attack of zinc on steel

between the phases of



power supply resulting in one

of the heaters dissipating higher levels of heat. The position of the thermocouple could be far away from one of the heaters resulting the heater drawing more current. Similarly, in other forms of heating systems, even with sacrificial baffles it is possible to have the flame impinge the surface of the pot. Influence of “washouts” - The failure patterns of wash outs are quite similar to over heating. However, these take place at regions, which are uniformly heated. This form of erosion takes place because of the turbulence created due to the immersion of the product to be galvanized or addition of zinc ingots for topping up the bath.

During these additions, ripples are created in the bath, which wash away the eta and zeta layers, exposing the fragile delta layer to be attacked by fresh zinc(7).

Influence of composition of the pot material - The composition of the pot material plays a vital role in the corrosion mechanism of zinc with steel. Certain elements like Phosphorus and Silicon are not desirable in the pot chemistry. Phosphorus is the most detrimental element in the pot material followed by Silicon. Other elements like carbon also have a deleterious effect but to a much lesser extent(8,9).

INFERENCE ON THE FAILURE MODE

Galvanizing pot # 1

In this pot, the wall had corroded at only one location spanning an area of about 0.5-meter square. The nature of failure was typically the golf ball sized pits caused due to erosion of iron by zinc. Presence of spherodized carbides at the pearlite colonies in this area compared to the lamellar pearlite at other places in the pot substantiates the above hypothesis that this region of the pot was over heated(10).

The pot chemistry with a very low level of alloying, at carbon levels of 0.04% and phosphorus and silicon levels, each below 0.015% is adequate for the application. Other elements like manganese and aluminium and other residuals were also quite low.

The location of failure being about 300mm below the zinc meniscus and way above bottom of the pot is very unlikely to be influenced by either the top or the pot surface, is the area most susceptible to influence of high temperature. It is important to realize that, to achieve a temperature of 460°C at all points in the bath, the heat transfer being radiation, the flame temperature has to be much higher. Often this temperature tends to increase the temperature of the point of first contact with the pot. It is for this reason that, with the advent of electrically heated zinc pot systems in France in 1975 followed by induction heating systems in 1982, it was felt that pot leakages due to localized heating had been eliminated(6). However, in an electrically heated system, it is possible to encounter an imbalance of power bottom dross. This was an auxiliary pot with minimal reactions from fluxes, byproducts or turbulence / ripple caused by additions.

Once the root cause of failure was ascertained as localized over heating, etecting the reasons for this over heating gained prime importance. This is an electrically heated pot with the heater arrangement, as shown in Fig. 2. The heating element used is 80/20 Nichrome strip. Temperature recorders showed that the temperature was set at 600°C where as the recommended temperature was 460°C to 480°C. Records showed this condition had existed for about 45 hours. The fact that only one of the locations was severely effected, there must have been a higher heat input at

this location. The thickness of the walls adjacent to the heaters close to this region was also low compared to the rest of the pot. This would certainly indicate that the heating element connected to this phase was drawing more current than the rest of modules. The resistance of this module was not compared with other modules since the liquid zinc had melted on this element and broken it(5). Galvanizing pot # 2

The failure pattern in this pot is similar to the previous pot. In this case, however, the pot was fired by coke oven gas with a calorific value of 3200 kcal/Nm3. The point at which the coke ovens gas first impinges on the zinc pot was the location where the puncture took place. The coke oven gas after combustion in the furnace, attains a temperature close to 1000°C. The pot wall when impinged at such temperatures is bound to attain very high temperatures itself, leading to accelerated corrosion / erosion(11).

The location where the failure occurred is also the top level of the bottom dross that accumulates during galvanizing. The influence of bottom dross could have also resulted in this failure. However, the bottom dross would affect all four sides of the pot at that level and not

be restricted only to one localized area.

From the available evidence

it appears that high localized heat input was the reason for failure of this pot. Providing a refractory baffle around this area has eliminated the problem of over heating leading to extended life of the pot.

Galvanizing pot # 3

The nature of failure in this case appeared similar to the previous two cases. This pot is also a coke oven gas fired pot, (Fig. 4) fired from three sides. There are baffles between the pot plate and the flame to prevent any direct impingement of the flame on the pot. The baffles were intact and had not been affected by the flame. Erosion was observed only on the west sidewall. The erosion was predominantly at the zinc meniscus. The other three sides did not seem to be adversely affected by this. Interrogation of shop floor practicerevealed that this was the side, which was used for addition of zinc, and this side was closer to the material being charged(12). Puncture of this wall was primarily due to the turbulence of the meniscus resulting in wash out. Some amount of turbulence in the bath is necessary to maintain homogeneity of temperature and composition(13), but excess of it can be detrimental.

Galvanizing pot # 4

The failure of this pot was very different from the rest of the pots as can be seen in Fig. 8a and Fig. 8b. This pot is gas fired. The pot had failed on a side, which was likely to experience the lowest temperature among all the four walls. The failure was at the zinc meniscus level. This was also not the side where the material is charged.

The composition of the pot material when analyzed revealed 0.2% carbon steel with high levels of silicon. This is a chemistry, which is very susceptible to erosion attack by zinc(14). On further enquiry, it was revealed that reclamation of the pot for local erosion was a common practice. This side of the pot was repaired with a very undesirable material.

CONCLUSIONS

The galvanizing pots discussed in this article have failed primarily due to three reasons. The first two pots failed due to over heating in the range of 495°C to 515°C. At these temperatures, as discussed earlier, gamma layer does not form, resulting in higher erosion. Though the two pot failures discussed, had the same root cause, they failed under varying circumstances. It is tempting to hasten the process of heating during startups by increasing the temperature set points as in case of pot # 1. This invariably results in premature failure.

Maintaining the balance of power supply to all the phases of the heating system, in an electrically heated pot, is also essential to avoid localized over heating. In gas fired or liquid fuel fired systems, the location of first impingement of the flame is always susceptible to over heating, which was the case with pot # 2.

The third pot failed due to turbulence created in the bath during addition of zinc. A number of organizations have extended the longevity of the pots by alternating the side from where the additions are made in the bath. Location of the submerged rolls in a continuous galvanizing line is also important. Though turbulence created by the submerged rolls is necessary to maintain homogeneity of temperature and composition of the bath, excess of turbulence or skewness of position can also at times affect the pot life.

The fourth pot failed due to improper chemical composition of the pot material.

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Society of Indian Automobile Manufacturers

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Auto Industry Sales Performance of October & April-October 2020

Monthly Performance: October 2020

Production: The total production of Passenger Vehicles*, Three Wheelers, Two Wheelers and Quadricycle in the month of October 2020 was 2,830,153 units, as against 2,086,479 units in October 2019 marking a growth of 35.64 %.

Domestic Sales:

- Passenger Vehicles* sales was 310,294 units in October 2020, compared to 271,737 units in October 2019, marking a growth of 14.19%.
- Three-wheeler sales was 26,187 units in October 2020 compared to 66,985 units in October 2019 marking a decrease by (-) 60.91%.
- Two-wheeler sales was 2,053,814 units in October 2020, compared to 1,757,180 units in October 2019, with a growth of 16.88%.

Performance: April - October 2020

Production: Total production of Passenger Vehicles**, Three Wheelers, Two Wheelers and Quadricycle in April-October 2020 was 10,840,307 units as against 16,098,141 units in April-October 2019 with a decline of (-) 32.66 %.

Domestic Sales:

- Passenger Vehicles** sales was 1,190,260 units in April-October 2020, compared to 1,605,041 units in April-October 2019, down by (-) 25.84%.
- Three-wheeler sales was 84,849 units in April-October 2020 compared to 397,681 units in April- October 2019, down by (-) 78.66 %.
- Two-wheeler sales was 8,037,492 units in April-October 2020, compared to 11,452,818 units in April-October 2019, down by (-) 29.82 %

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

*** BMW, Mercedes & Volvo Auto data is not available, Tata Motors data is only available for Apr-Sep*

Commenting on the October 2020 data, Mr Rajesh Menon, Director General, SIAM said *"The month of October saw continuity in sales growth trajectory, drawing on from the previous month. There were marked improvements witnessed across certain segments due to very good festive demand. The sale of Passenger vehicles went up by 14.19% and that of two-wheelers, grew by 16.88%, compared to October last year. Three wheelers saw a slight improvement in sales, compared to the last month, however, it has still registered de-growth of (-)60.91 %, over the corresponding month of last year. October wholesale numbers have been good on account of dealers preparing to serve demand for the upcoming Diwali festival, which is in November this year."*

Category	Domestic Sales		
Segment/Subsegment	October		
	2019	2020	% Change
Passenger Vehicles (Pvs)*			
Passenger Cars	166,568	182,692	9.68
Utility Vehicles (UVs)	94,637	113,990	20.45
Vans	10,532	13,612	29.24
Total Passenger Vehicles (PVs)	**271,737**	**310,294**	**14.19**
Three Wheelers			
Passenger Carrier	56,067	16,458	-70.65
Goods Carrier	10,918	9,729	-10.89
Total Three Wheelers	**66,985**	**26,187**	**-60.91**
Two Wheelers			
Scooter/ Scooterettee	580,120	590,507	1.79
Motorcycle/Step-Throughs	1,116,886	1,382,749	23.80
Mopeds	60,174	80,268	33.39
Electric Two Wheelers	0	290	-
Total Two Wheelers	**1,757,180**	**2,053,814**	**16.88**
Quadricycle			
Quadricycle	87	0	-
Total	**87**	**0**	-

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

Category	Domestic Sales		
Segment/Subsegment	April-October		
	2019-2020	2020-2021	% Change
Passenger Vehicles (Pvs)**			
Passenger Cars	981,782	689,059	-29.82
Utility Vehicles (UVs)	541,480	451,821	-16.56
Vans	81,779	49,380	-39.62
Total Passenger Vehicles (PVs)	**1,605,041**	**1,190,260**	**-25.84**
Three Wheelers			
Passenger Carrier	329,456	49,544	-84.96
Goods Carrier	68,225	35,305	-48.25
Total Three Wheelers	**397,681**	**84,849**	**-78.66**
Two Wheelers			
Scooter/ Scooterettee	3,697,478	2,276,855	-38.42
Motorcycle/Step-Throughs	7,362,882	5,428,210	-26.28
Mopeds	392,458	331,434	-15.55
Electric Two Wheelers	0	993	-
Total Two Wheelers	**11,452,818**	**8,037,492**	**-29.82**
Quadricycle			
Quadricycle	903	-27	-102.99
Total	**903**	**-27**	**-102.99**

*** BMW, Mercedes & Volvo Auto data is not available, Tata Motors data is only available for Apr-Sep*

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Statistics

SIAM

Segment wise Comparative Production, Domestic Sales & Exports data for the month of October 2020

(Number of Vehicles)

Category	Production			Domestic Sales			Exports		
Segment/Subsegment	October			October			October		
	2019	2020	% Change	2019	2020	% Change	2019	2020	% Change
Passenger Vehicles (PVs)*									
Passenger Cars	157,094	205,939	31.09	166,568	182,692	9.68	37,930	29,276	-22.82
Utility Vehicles(UVs)	93,835	121,322	29.29	94,637	113,990	20.45	12,013	11,126	-7.38
Vans	7,830	13,630	74.07	10,532	13,612	29.24	201	126	-37.31
Total Passenger Vehicles (PVs)	**258,759**	**340,891**	**31.74**	**271,737**	**310,294**	**14.19**	**50,144**	**40,528**	**-19.18**
Three Wheelers									
Passenger Carrier	91,274	60,191	-34.05	56,067	16,458	-70.65	44,469	41,909	-5.76
Goods Carrier	10,666	10,557	-1.02	10,918	9,729	-10.89	596	761	27.68
Total Three Wheelers	**101,940**	**70,748**	**-30.60**	**66,985**	**26,187**	**-60.91**	**45,065**	**42,670**	**-5.31**
Two Wheelers									
Scooter/ Scooterettee	505,644	620,991	22.81	580,120	590,507	1.79	33,154	37,280	12.44
Motorcycle/Step-Throughs	1,169,495	1,715,210	46.66	1,116,886	1,382,749	23.80	261,248	332,281	27.19
Mopeds	50,323	81,578	62.11	60,174	80,268	33.39	890	1,452	63.15
Electric Two Wheelers	0	249	-	0	290	-	0	0	-
Total Two Wheelers	**1,725,462**	**2,418,028**	**40.14**	**1,757,180**	**2,053,814**	**16.88**	**295,292**	**371,013**	**25.64**
Quadricycle									
Quadricycle	318	486	52.83	87	0	-	388	426	9.79
Total	**318**	**486**	**52.83**	**87**	**0**	**-**	**388**	**426**	**9.79**

Society of Indian Automobile Manufacturers (11/11/2020)

*** BMW, Mercedes ,Tata Motors and Volvo Auto data is not available**

SIAM

Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April-October 2020 with % Change

Report I

(Number of Vehicles)

Category	Production			Domestic Sales			Exports		
Segment/Subsegment	April-October			April-October			April-October		
	2019-2020	2020-2021	% Change	2019-2020	2020-2021	% Change	2019-2020	2020-2021	% Change
Passenger Vehicles (PVs)*									
Passenger Cars	1,308,196	780,128	-40.37	981,782	689,059	-29.82	324,548	129,805	-60.00
Utility Vehicles(UVs)	634,630	500,076	-21.20	541,480	451,821	-16.56	89,322	65,502	-26.67
Vans	82,713	46,670	-43.58	81,779	49,380	-39.62	1,521	378	-75.15
Total Passenger Vehicles (PVs)	**2,025,539**	**1,326,874**	**-34.49**	**1,605,041**	**1,190,260**	**-25.84**	**415,391**	**195,685**	**-52.89**
Three Wheelers									
Passenger Carrier	615,899	239,354	-61.14	329,456	49,544	-84.96	297,337	192,899	-35.12
Goods Carrier	71,416	37,986	-46.81	68,225	35,305	-48.25	4,121	2,543	-38.29
Total Three Wheelers	**687,315**	**277,340**	**-59.65**	**397,681**	**84,849**	**-78.66**	**301,458**	**195,442**	**-35.17**
Two Wheelers									
Scooter/ Scooterettee	3,838,904	2,197,824	-42.75	3,697,478	2,276,855	-38.42	234,481	103,652	-55.80
Motorcycle/Step-Throughs	9,151,745	6,709,296	-26.69	7,362,882	5,428,210	-26.28	1,845,667	1,369,502	-25.80
Mopeds	390,299	326,531	-16.34	392,458	331,434	-15.55	8,232	3,937	-52.17
Electric Two Wheelers	0	1,051	-	0	993	-	0	0	-
Total Two Wheelers	**13,380,948**	**9,234,702**	**-30.99**	**11,452,818**	**8,037,492**	**-29.82**	**2,088,380**	**1,477,091**	**-29.27**
Quadricycle									
Quadricycle	4,339	1,391	-67.94	903	-27	-102.99	3,834	1,411	-63.20
Total	**4,339**	**1,391**	**-67.94**	**903**	**-27**	**-102.99**	**3,834**	**1,411**	**-63.20**

Society of Indian Automobile Manufacturers (11/11/2020)

*** BMW, Mercedes and Volvo Auto data is not available and Tata Motors data is available for Apr-Sep only**

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Category & Company wise Summary Report for the month of October 2020 and Cumulative for April-October 2020 with % Change

Report II

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
	For the month of		Cumulative		For the month of		Cumulative		For the month of		Cumulative	
Segment/Subsegment	October		April-October		October		April-October		October		April-October	
Manufacturer	2020	% Change	2020-2021	% Change	2020	% Change	2020-2021	% Change	2020	% Change	2020-2021	% Change
Passenger Vehicles (PVs)*												
FCA India Automobiles Pvt Ltd	961	116.93	5,182	-34.23	832	-2.58	2,593	-53.22	164	60.78	3,086	57.13
Fiat India Automobiles Pvt Ltd	0	-	0	-	0	-	0	-	0	-	0	-
Force Motors Ltd	276	249.37	659	-24.43	330	69.23	668	-25.70	0	-	0	-
Ford India Private Ltd	8,951	-37.54	49,301	-58.53	7,084	0.95	24,727	-41.93	1,837	-74.38	27,926	-64.66
General Motors India Pvt Ltd	5,639	-8.80	22,036	-52.26	0	-	0	-	5,075	-8.53	21,705	-52.45
Hindustan Motor Finance Corporation Ltd	0	-	0	-	0	-	0	-	0	-	0	-
Honda Cars India Ltd	10,272	88.44	36,305	-45.22	10,836	8.25	35,700	-49.63	84	-85.34	1,118	-62.60
Hyundai Motor India Ltd	65,700	26.83	250,750	-38.13	56,605	13.19	219,130	-25.58	12,230	-10.07	44,271	-62.13
Isuzu Motors India Pvt Ltd	11	-92.09	44	-94.99	0	-	0	-	0	-	22	-66.67
Kia Motors India Pvt Ltd	22,936	68.13	86,504	164.74	20,621	61.25	67,588	154.31	4,213	127.73	20,819	796.98
Mahindra & Mahindra Ltd	19,203	20.62	70,928	-42.60	18,621	0.96	70,096	-42.78	796	-32.08	3,472	-58.92
Mahindra Electric Mobility Ltd	0	-	5	-	1	-93.75	1	-95.24	0	-	16	-77.14
Maruti Suzuki India Ltd	176,942	50.74	618,449	-30.58	163,656	17.64	587,345	-26.82	9,462	4.77	41,011	-33.46
MG Motor India Pvt Ltd	3,850	21.91	15,524	52.02	3,750	6.05	13,965	44.42	0	-	0	-
Nissan Motor India Pvt Ltd	1,375	-82.65	10,468	-81.24	1,105	-30.11	4,431	-60.26	75	-98.98	7,251	-82.43
Renault India Pvt Ltd	10,656	-4.95	35,713	-37.37	11,005	-4.44	40,679	-13.13	165	-81.85	2,932	-62.38
SkodaAuto India Pvt Ltd	1,157	2.84	6,071	-35.82	1,421	3.12	5,944	-26.69	0	-	12	200.00
Tata Motors Ltd**	NA	-	62,517	-14.49	NA	-	70,081	2.63	NA	-	125	-88.90
Toyota Kirloskar Motor Pvt Ltd	6,600	0.96	24,480	-64.32	12,373	4.27	36,937	-51.43	0	-	0	-
Volkswagen India Pvt Ltd	6,362	85.37	31,938	-44.98	2,054	-36.07	10,375	-41.49	6,427	222.96	21,919	-45.06
Total Passenger Vehicles (PVs)	**340,891**	**31.74**	**1,326,874**	**-34.49**	**310,294**	**14.19**	**1,190,260**	**-25.84**	**40,528**	**-19.18**	**195,685**	**-52.89**

** Tata Motors data is available for Apr-Sep only

* BMW, Mercedes & Volvo Auto data not available

NA=Not Available

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Category & Company wise Summary Report for the month of October 2020 and Cumulative for April-October 2020 with % Change

Report II

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
	For the month of		Cumulative		For the month of		Cumulative		For the month of		Cumulative	
Segment/Subsegment	October		April-October		October		April-October		October		April-October	
Manufacturer	2020	% Change	2020-2021	% Change	2020	% Change	2020-2021	% Change	2020	% Change	2020-2021	% Change
Three Wheelers												
Atul Auto Ltd	2,573	-46.61	8,346	-69.61	2,205	-55.22	7,324	-71.46	106	-57.09	649	-71.52
Bajaj Auto Ltd	40,174	-29.84	166,321	-59.19	12,529	-65.36	41,230	-82.02	28,793	4.15	131,180	-28.77
Force Motors Ltd	177	60.91	805	38.08	0	-	0	-	280	300.00	812	75.76
Mahindra & Mahindra Ltd	3,133	-53.26	4,189	-88.42	3,118	-56.40	4,147	-89.04	72	-55.56	278	-67.26
Piaggio Vehicles Pvt Ltd	9,965	-47.58	39,328	-66.29	7,511	-55.47	28,546	-69.88	1,640	-46.70	8,518	-63.19
Scooters India Ltd	0	-	0	-	0	-	11	-99.57	0	-	0	-
TVS Motor Company Ltd	14,726	8.39	58,351	-39.81	824	-38.74	3,591	-52.44	11,779	-15.03	54,005	-40.37
Total Three Wheelers	**70,748**	**-30.60**	**277,340**	**-59.65**	**26,187**	**-60.91**	**84,849**	**-78.66**	**42,670**	**-5.31**	**195,442**	**-35.17**
Two Wheelers												
Bajaj Auto Ltd	476,082	31.75	1,813,458	-25.42	268,631	10.77	1,004,806	-26.91	201,659	28.94	829,878	-23.93
H-D Motor Company India Pvt Ltd	0	-	1,098	-56.94	12	-95.00	600	-63.41	0	-	921	-12.70
Hero MotoCorp Ltd	804,742	57.10	3,139,510	-24.38	791,137	34.78	3,102,391	-22.99	15,711	28.15	75,648	-28.01
Honda Motorcycle & Scooter India Pvt Ltd	501,680	27.52	1,901,233	-42.42	494,459	1.36	1,989,754	-37.19	32,721	8.98	98,180	-51.99
India Kawasaki Motors Pvt Ltd	56	-55.56	515	-64.89	138	-66.01	543	-70.00	0	-	0	-
India Yamaha Motor Pvt Ltd	87,636	34.05	356,844	-33.25	60,176	30.82	274,874	-26.12	23,236	-12.72	82,974	-54.41
Mahindra Two Wheelers Ltd	92	43.75	240	-82.76	77	-70.61	123	-84.25	0	-	64	-78.45
Piaggio Vehicles Pvt Ltd	10,881	48.75	36,659	-37.23	7,629	18.02	25,269	-41.84	3,272	138.83	12,186	-20.97
Royal-Enfield (Unit of Eicher Motors)	72,508	32.58	273,088	-32.40	62,858	-6.93	259,203	-34.34	4,033	-8.88	15,476	-43.48
Suzuki Motorcycle India Pvt Ltd	76,555	3.63	266,213	-47.01	67,225	1.53	242,516	-43.79	9,640	14.83	26,880	-57.24
Triumph Motorcycles India Pvt Ltd	28	12.00	215	70.63	92	84.00	402	18.58	0	-	0	-
TVS Motor Company Ltd	387,768	51.16	1,445,629	-27.37	301,380	19.27	1,137,011	-30.47	80,741	45.54	334,884	-16.03
Total Two Wheelers	**2,418,028**	**40.14**	**9,234,702**	**-30.99**	**2,053,814**	**16.88**	**8,037,492**	**-29.82**	**371,013**	**25.64**	**1,477,091**	**-29.27**
Quadricycle												
Bajaj Auto Ltd	486	52.83	1,391	-67.94	0	-	-27	-102.99	426	9.79	1,411	-63.20
Total	**486**	**52.83**	**1,391**	**-67.94**	**0**	**-**	**-27**	**-102.99**	**426**	**9.79**	**1,411**	**-63.20**

Society of Indian Automobile Manufacturers (11/11/2020)

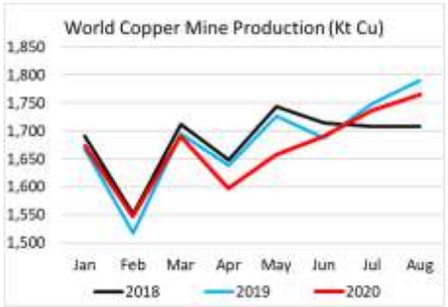
ICSG

Copper: Preliminary Data for August 2020

The International Copper Study Group (ICSG) released preliminary data for August 2020 world copper supply and demand in its November 2020 Copper Bulletin. The Bulletin and ICSG online statistical database provide detailed data, on a country basis, for copper mine, smelter, refined and semis production, copper refined usage, trade, stocks and prices. The bulletin is available for sale (annual subscription €550/€850 for orders originating from/outside institutions based in ICSG member countries).

Preliminary data indicates that world copper mine production fall by 0.8% in the first eight months of 2020, with both concentrate production and solvent extraction-electrowinning (SX-EW) declining by 0.8%:

- World mine production is estimated to have decreased by 4% in April-May as these two months were the most affected by the COVID-19 related global lockdown that resulted in temporary mine shutdowns/reduced production levels. However, world mine production started to recover in May as lockdown measures eased and the copper industry adapted to the strict health protocols.

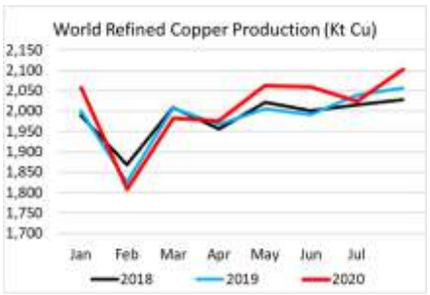


- In Peru, stoppages resulting from the COVID-19 pandemic combined with operational issues/adverse weather that affected a few major mines, resulted in a 16.5% decline in mine output over the first eight months of 2020 including a significant decline of 38% in April-May compared to the same period of 2019. However, as the Peruvian mining industry started to recover the extent of the reduction narrowed to 6% in July-August, compared to the same period of 2019.
- COVID-19 related constraints and other operational issues also resulted in declines in production in other major copper mine producing countries, most notably Australia, Mexico and the United States.
- In Chile, the world's biggest copper mine producing country, output increased by 0.5%, recovering from production constraints in early 2019 (production was down by 5% in 1st quarter 2019 and by 0.5% in the first eight months of 2019).
- Production in the Democratic Republic of Congo (DRC) and Panama increased significantly mainly due to the ramp-up of new mines or expansions. In Indonesia, production grew by 23% as output levels improved following the transition of the country's major two copper mines to different ore zones in 2019.

Preliminary data indicates that world refined copper production increased by 1.2% during the first eight months of 2020

with primary production (electrolytic and electrowinning) up by 2.5% and secondary production (from scrap) down by 5%.

- Chilean electrolytic refined output increased by 36% as in the comparative period of 2019 production was negatively affected by temporary smelter shutdowns as a result of upgrades to comply with new environmental regulations. Total Chilean refined copper production (including Electrowinning) increased by 7%.



- Chinese refined production growth was negatively impacted by temporary shutdowns related to COVID-19 restrictions, tight scrap supply and constraints associated with concentrate imports and oversupply in the sulphuric acid market.
- In Africa, refined production was up 6% in the DRC, due to the ramp-up of new or expanded SX-EW plants and by 15% in Zambia, where output has been recovering from smelters' operational issues and temporary shutdowns in 2019.
- Indian refined output decreased by 21% primarily as a consequence of the temporary suspension of Birla Copper's operations in March-May following a nationwide lockdown due to COVID-19.
- Japanese refined production rose by 3% mainly as a consequence of a recovery from a number of

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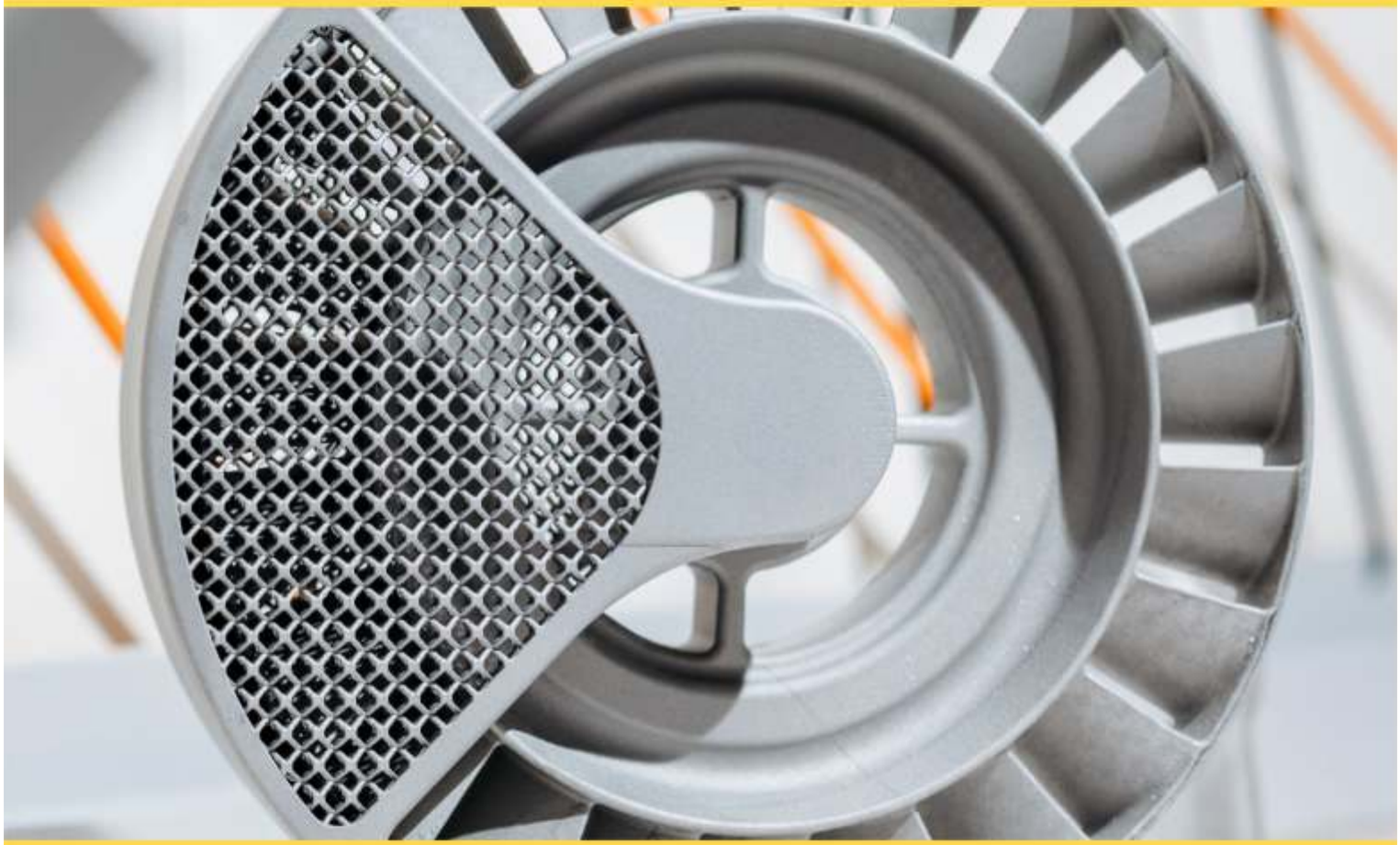

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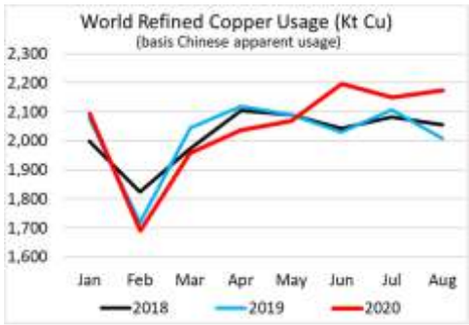
maintenance shutdowns over the same period of 2019.

- In the United States, temporary shutdowns and a long strike at Asarco's operations led to a 13% decline in refined output.
- Globally, constrained scrap supply due to the COVID-19 lockdown and lower copper prices during the first half of the year have negatively impacted world secondary refined production.

Preliminary data indicates that world apparent refined copper usage increased by 1% over the first eight months of 2020:

- The COVID-19 related global lockdown has had a significant negative impact on the world economy and subsequently on key copper end-use sectors in all regions.



- World ex-China refined copper usage was significantly impacted and is estimated to have declined by about 10%: among the biggest copper using regions, refined usage fall by 17% in Japan, 11% in the EU, 5% in the United States and by about 13% in Asia (Ex-China).
- However, due to a 48% (940,000 t) increase in net refined copper imports, Chinese apparent usage increased by 12.5% offsetting the declines in other regions of the world. Real Chinese industrial usage was negatively impacted by the COVID-19 related production suspensions at semis fabricators early in the year and weaker external demand and should present much lower growth than apparent usage.

Preliminary world refined copper balance in the first eight months of 2020 indicates an apparent deficit of about 293,000 t:

- In developing its global market balance, ICSG uses an apparent demand calculation for China that does not take into account changes in unreported stocks [State Reserve Bureau (SRB), producer, consumer, merchant/trader, bonded]. To facilitate global market analysis, however, an additional line item—Refined World Balance Adjusted for Chinese Bonded Stock Changes—is included in the attached table that adjusts the world refined copper balance based on an average estimate of changes in unreported inventories provided by three consultants with expertise in China's copper market.
- Over the first eight months of 2020, the world refined copper balance, based on Chinese apparent usage (excluding unreported/bonded stocks), indicated a deficit of about 293,000 t. The world refined copper balance adjusted for changes in Chinese bonded stocks indicated a market deficit of about 296,000 t. (World Refined Copper Usage and Supply Trends table)

Copper Prices and Stocks:

- Based on the average of estimates provided by independent consultants, China's bonded stocks are thought to have declined by about 3,000 t over the first eight months of 2020 compared to the year-end 2019 level.
- As of the end of October, copper stocks held at the major metal exchanges (LME, COMEX, SHFE) totalled 381,782 t, an increase of 79,395 t (26%) from stocks held at the end of December 2019. Stocks were up at the LME (17%), at COMEX (+113%) and SHFE (+13%).
- The average LME cash price for October 2020 was US$ 6,702,77 /t, down 0.14% from the September average of US$ 6,712,41 /t. The 2020 high and low copper prices through the end of October were US$ 6,953 /t (on 21st Oct) and US$ 4,617.50 /t (on 23rd Mar), respectively, and the year average was US$ 5,937,20 /t (1% below the 2019 annual average).

Please visit the ICSG website www.icsg.org for further copper market related information.

World Refined Copper Usage and Supply Trends

Thousand metric tonnes, copper

	2017	2018	2019	2019	2020	2020			
				Jan-Aug		May	Jun	Jul	Aug
World Mine Production	20,058	20,565	20,528	13,471	13,360	1,658	1,690	1,737	1,765
World Mine Capacity	23,993	24,062	24,139	16,481	16,629	2,134	2,073	2,113	2,120
Mine Capacity Utilization (%)	83.6	85.5	85.0	81.7	80.3	77.7	81.5	82.2	83.2
Primary Refined Production	19,485	20,023	20,018	13,186	13,502	1,726	1,723	1,705	1,778
Secondary Refined Production	4,063	4,035	4,028	2,707	2,574	337	337	320	325
World Refined Production (Secondary+Primary)	23,548	24,058	24,047	15,893	16,076	2,063	2,060	2,025	2,103
World Refinery Capacity	27,545	27,979	28,794	19,104	19,673	2,513	2,438	2,524	2,529
Refineries Capacity Utilization (%)	85.5	86.0	83.5	83.2	81.7	82.1	84.5	80.2	83.1
World Refined Usage1/	23,705	24,484	24,427	16,195	16,369	2,070	2,196	2,149	2,175
World Refined Stocks End of Period	1,375	1,227	1,220	1,399	1,254	1,410	1,314	1,264	1,254
Period Stock Change	10	-148	-7	172	34	-67	-96	-50	-10
Refined Balance 2/	-157	-426	-381	-302	-293	-7	-136	-125	-72
Seasonally Adjusted Refined Balance 3/				-308	-297	24	-124	-99	-123
Refined Balance Adjusted for Chinese bonded stock change4/	-154	-486	-559	-380	-296	-82	-141	-112	-52

Due to the nature of statistical reporting, the published data should be considered as preliminary as some figures are currently based on estimates and could change.
1/ Based on Chinese and EU apparent usage.
2/ Surplus/deficit is calculated using refined production minus refined usage.
3/ Surplus/deficit is calculated using seasonally adjusted refined production minus seasonally adjusted refined usage.
4/ For details of this adjustment see the paragraph of the press release on "World refined copper balance".

ILZSG SESSION/FORECASTS

1. The International Lead and Zinc Study Group held its Sixty-fifth Session via a web-conference on 16 and 19 October 2020.
2. The Session included a joint meeting of the Study Group's Statistical and Forecasting Committee / Mine and Smelter Committee / Industry Advisory Panel to review the current levels of world supply and demand for lead and zinc and the outlook for 2021. A meeting of the Economic and Environment Committee also took place. In each of the Committees a number of speakers made presentations containing valuable information about current trends and issues in the global lead and zinc sectors.

Forecasts

Lead Outlook for 2020 and 2021

Usage

3. Global demand for refined lead metal is forecast to fall by 6.5% to 11.39 million tonnes this year and to rise by 4.4% to 11.89 million tonnes in 2021.
4. In 2020, usage in China is expected to fall by 1.6%, primarily influenced by a decline in automotive production that should be partially offset by rises in the output of e-bikes and lead-acid batteries. Chinese demand is anticipated to increase by 0.4% in 2021.
5. Lead usage is forecast to decrease by 9.7% in Europe and 7.5% in the United States in 2020. The automotive sector in these regions was particularly affected by the COVID19 pandemic related nationwide lockdowns, with unprecedented falls in new car sales in a number of European countries, lower rates of automobile utilization that reduced the demand for replacement batteries and temporary suspensions at major automotive assembly plants. However, according to the Group's latest predictions, refined lead usage will recover by 7.9% in Europe and 2.6% in the United States in 2021.

Supply

6. A decline of 4.7% to 4.50 million tonnes and an increase of 4.8% to 4.72 million tonnes are forecast for world lead mine supply in 2020 and 2021 respectively.
7. In China, production is expected to decline by 0.5% in 2020 but to rise by 1% in the following year.
8. In 2020, COVID19 related restrictive measures severely impacted the mining industry in a number of countries including Bolivia, Mexico, Peru and South Africa. Output is also expected to fall in Argentina, Australia, Kazakhstan and Canada, where activities at the Silvertip and Caribou mines were suspended during the first quarter of 2020.
9. The forecast rise in global supply in 2021 will be driven mainly by increases in Australia, Bolivia, India, Kazakhstan, Mexico, Peru and South Africa. In Poland, however, output is expected to fall significantly due to the closure of the Olkusz-Pomorzany operation in December 2020.
10. The Group expects world refined lead supply to fall by 4.3% to 11.66 million tonnes in 2020. In 2021, a 3.6% rise to 12.08 million tonnes is forecast.
11. In 2020, it is anticipated that a substantial increase in Australian production will be more than balanced by falls in a number of other countries including Belgium, China, France, India, the Republic of Korea, Mexico and the United States. Reductions are also expected in Canada, due to the closure of Glencore's Belledune smelter in December 2019, and Germany, where activities at the Nordenham smelter were suspended in July.
12. In 2021, lead supply is expected to benefit from significantly higher output in China and India. Production is also forecast to rise in Belgium, France, Italy, Japan, Mexico and the United States.

World Refined Lead Metal Balance

13. Having taken into account all of the information recently received from its member countries, the Group anticipates that the global supply of refined lead metal will exceed demand by 276,000 tonnes in 2020. In 2021, a further surplus of 192,000 tonnes is expected.

Zinc Outlook for 2020 and 2021

Usage

14. World demand for refined zinc metal is forecast to fall by 5.3% to 12.98 million tonnes in 2020 and to rise by 4.2% to 13.52 million tonnes in 2021.
15. In China, refined zinc usage is expected to remain stable in 2020 mainly because, despite a significant fall in automobile production, output of galvanised plate during first seven months of 2020 was at a similar level to that over the same period of 2019. In 2021, Chinese usage is forecast to rise by 2%.
16. Demand in Europe fell by 4.6% in 2019, after nearly a decade of relative stability. In 2020, demand is forecast to fall by a further 7.7% mainly influenced by decreases in France, Germany, Norway, Poland, the Russian Federation and Spain. In 2021, however, zinc usage in Europe is expected to recover by 6.5%.
17. Elsewhere, demand is anticipated to fall in a

number of other countries, including Australia, India, Japan, the Republic of Korea, Taiwan (China) and the United States. This widespread global reduction in zinc usage is however, expected to be followed in 2021 by a recovery in most of the countries previously mentioned.

Supply

18. World zinc mine production is forecast to fall by 4.4% to 12.33 million tonnes in 2020 and to increase by 6.6% to 13.14 million tonnes in 2021.
19. In 2020, zinc mining activity has been negatively impacted by national restrictive measures aimed at containing the spread of the COVID19 pandemic in a number of countries. This trend was particularly evident in Latin American countries including Bolivia, Mexico and Peru during the first half of the year. Furthermore, after those limitations were alleviated, a resumption to pre-pandemic production levels is proving to be a challenging process at a number of major mining operations.
20. Falls in production are also expected in Canada, influenced by the closure of the Langlois mine in December 2019 and the suspension of activities at the Silvertip and Caribou mines in the first quarter of 2020, Namibia, due to the suspension of the Skorpion mine in the first quarter of 2020 and the United States, where activities at Teck's Pend Oreille operation were halted in July 2019.
21. Output is also forecast to decline in China, Finland, Kazakhstan, Sweden and Turkey. However, in Australia, South Africa and India, where expansions at some of the Hindustan Zinc's mines were recently completed, a rise in production is anticipated.
22. In 2021, zinc mine supply is predicted to rise in nearly all of the countries previously mentioned, but to fall in Namibia and Poland, where the Olkusz-Pomorzany mine is due to close in December 2020.
23. Global refined zinc metal production is forecast to increase by 0.9% to 13.60 million tonnes in 2020.
24. This will primarily be a result of an anticipated 1.6% growth in Chinese output and further rises in Australia, Canada, France, Italy, India and the United States, where American Zinc Recycling's secondary plant in Mooresboro, North Carolina reopened in March. However, output is expected to fall in Japan, Peru and Namibia, due to the suspension of activities at Vedanta's Skorpion refinery in April 2020.
25. In 2021, a predicted increase in world output of 2.9% to 13.99 million tonnes will mainly be a consequence of further rises in China, India and the United States, combined with higher output in Japan, Mexico and Peru.

World Refined Zinc Metal Balance

26. Regarding the global market balance, the Group anticipates that global supply for refined zinc metal will exceed demand significantly in 2020 with the extent of the surplus forecast at 620,000 tonnes. In 2021, supply is expected to continue to exceed demand resulting in a surplus of 463,000 tonnes.

Economic and Environment

The Study Group's Economic and Environment Committee reviewed current developments in the areas of economics, environment, recycling and sustainability.

A panel of guest speakers spoke at the meeting on a wide range of topics. Mr. Louis Maréchal of the OECD updated the audience on the implementation of the OECD´s due diligence guidance along the minerals and metals supply chains. Mr. Adam C.T. Mathews of The Church of England Pensions Board introduced the key social, environmental, economic and governance considerations undertaken while assessing mining and metals projects for investment. Dr Andy Bush, from the International Lead Association (ILA), spoke on a range of issues currently impacting the lead industry. Mr Rachid Amui from UNCTAD presented an overview of UNCTAD's work in the mining sector and highlights from a recent report on metals and minerals driving electric mobility. Mr. Andrew Green, from the International Zinc Association (IZA), briefed the audience on key market development initiatives for zinc.

Future Meetings

27. It is anticipated that the Study Group will hold its next Annual Session and meetings of its Committees and Industry Advisory Panel from 6 to 8 October 2021 in Lisbon. The Standing Committee and Economic and Environment Committee is also intending to meet in Lisbon on 28 April 2021.

New Publications

28. The following new reports will be published by the Study Group in 2020/2021:
    - The World Zinc Factbook
    - Lead and Zinc National Trade Tariffs and Measures
    - Lead and Zinc New Mine and Smelter Projects
    - World Directory of Lead and Zinc Mines
    - World Directory of Primary and Secondary Lead Plants
    - World Directory of Primary and Secondary Zinc Plants
    - World Directory of Continuous Galvanizing Plants
    - Report on the Chinese Primary and Secondary

Lead Metal Sector

Website

29. Further information on the topics covered by this Press Release can be obtained on the ILZSG website at www.ilzsg.org or by contacting the Secretariat.

Discovery of copper plate inscriptions at Halebelagola excites scholars

A slew of copper plate inscriptions dated to the 8th and 9th century CE have been discovered in and around Halebelagola in Channarayapatnataluk of Hassan district in the recent months.

The discovery has been described as significant by scholars as it adds to the corpus of information pertaining to the age and provides additional material evidence for the understanding of the social and economic conditions of the region.

The former Director of the Epigraphy Branch Ravishankar who shared some of these discoveries said many such set of copper plates have also been discovered during renovation exercise at Srisailam in Andhra Pradesh and belong to the period of the Vijayanagar rulers and Gajapati kings of Odisha.

He said 17 sets of copper plates with 122 leaves were found while taking up the earth work for conservation of a Jain basadi at Halebelagola. This is reckoned to belong to the period of the Western Ganga king Sripurusha and is written in Sanskrit and Kananda and has Kannada characters of the 8th century CE. It records the gift of a village Sokanevadi as "Brahmamdeya" to a brahminSokanebhatta of Koushikagotra by Sripurusha.

Hindalco ranked world's most sustainable aluminium company

Metals flagship of Aditya Birla Group, HindalcoIndustries has been ranked as the Aluminium Industry Leader for its sustainability performance in the 2020 edition of the S&P Dow Jones Sustainability Indices (DJSI) corporate sustainability assessment (CSA) rankings.

Out of 61 Industries represented in the DJSI, Hindalco is the only company from India to be recognised as an Industry Leader this year.

"The ranking is a profound affirmation of our commitment to our Resilient, Responsible and Reliable business model," said SatishPai, managing director, Hindalco Industries Ltd in a statement on Wednesday.

Hindalco got a total score of 75 points as against the industry average of 51.

"Hindalco's scores are in the 100th percentile in most aspects of all 3 dimensions of the Environmental, Social and Governance (ESG) in the DJSI Corporate Sustainability Assessment (CSA)," the companies statement said.

The ESG assessment dimensions include aspects like climate strategy, biodiversity, environment and social reporting, water-related risks, policy influence, customer relationship management, human capital development, among others.

We have shown significant improvement in our overall sustainability scores from 60 to 75 in the past year, which is both an indication that we are very much on the right path, as well as an inspiration for us to accelerate this journey," Pai Said

In a move to utilise the aluminium processing by-product, Hindalco has tied-up with cement manufacturers to use red mud as a replacement for mined resources.

"This is a pioneering effort in reducing the environmental impact on both aluminium and cement sectors. Hindalco is the first aluminium company in the world to achieve this breakthrough on red mud utilization," the company said.

Hindalco Q2 results: Net profit falls 60% YoY to Rs 387 crore

Hindalco on Tuesday posted a 60 per cent year-on-year (YoY) fall in consolidated net profit at Rs 387 crore for the quarter ended September 30 after considering net loss from running and divestiture of discontinued operations of Rs 1,398 crore.

However, profit from continuing operations increased by 83 per cent YoY to Rs 1,785 crore. Consolidated revenue from operations grew 5.32 per cent YoY to Rs 31,237 crore.

EBITDA from aluminium India business increased 32 per cent YoY and to 22 per cent.

Consolidated net debt to EBITDA stood at 3.52 times as on September 30 against 3.83 times in the preceding quarter ended June 30.

"The results were driven by a strong performance by Novelis and India aluminium business, supported by higher volumes and better product mix, lower input costs, stability in operations, and cost saving initiatives. The copper business also bounced back from the disruption in Q1FY21 with ramped up operations in the second quarter. Nov .

Nalco Q2 results: Reports net profit of Rs 107 cr

National Aluminium Company NSE -0.14 % Ltd (Nalco) on Wednesday reported a consolidated profit of Rs 107.27 crore for the quarter ended September 30.

The company had posted a loss of Rs 28.25 crore for the year-ago period, Nalco said in a filing to BSE. The company's income during July-September period declined to Rs 2,399.05 crore from Rs 2,420.11 crore in the year-ago period, the filing said.

"The year began with unforeseeable challenges, which has affected the entire world. NALCO collective rose to the challenge and braved all odds to overcome the sluggishness in the market and get the business operations back on track amidst the pandemic.

"The company is geared up to take all necessary actions to remain competitive, deliver world-class products to our customers and contribute towards building an Atmanirbhar Bharat," NALCO CMD Sridhar Patra said in a statement.

During the quarter, the leading manufacturer and exporter of alumina and aluminium in the country achieved strong growth in export, registering sales of 58,574 metric tonne (MT) of aluminium compared to 16,305 MT in corresponding period last year.

The total alumina sales during the second quarter was 285,718 MT.

During the first half of the ongoing fiscal, the company achieved 3-fold jump with export of 9,3730 MT aluminiumcompared to 3,0561 MT in the corresponding period last ..

China's Svolt to build power battery plant in Germany

Chinese battery producer Svolt Energy Technology plans to build a power battery plant in Saarland, Germany.Svolt said that the plant's battery capacity will reach 24GWh/yr, with demand from its European customers reaching 7GWh/yr as of June this year.

With total investment of €2bn ($2.37bn), the plant includes a module pack factory scheduled to start production as early as mid-2022, along with a cell module factory that will be completed and put into production at the end of 2023.

Svolt is targeting to reach 100GWh/yr of global capacity by 2025, including 76GWh/yr of Chinese domestic production, according to Svolt president Yang Hongxin.

The EU has renewed its focus on creating an independent battery supply chain in Europe by investing in battery projects across the continent over the past year. This progress will speed up this year in the wake of the Covid-19 pandemic, which has strengthened the importance of a domestic supply chain. This is expected to support long-term demand for power batteries.

The market share for electric vehicles (EVs) in the EU rose in this year's second quarter, despite an overall year-on-year fall in passenger car registrations.

Global battery manufacturers and battery material producers are investing in domestic production bases to open up the European market. South Korean refiner SK Innovation plans to build an additional lithium-ion battery separator production line in Poland, while Chinese battery separator Senior will set up a wholly-owned branch and invest in a new lithium-ion battery separator plant in Sweden.

Svolt, formerly a subsidiary of Chinese auto producer Great Wall Automobile, set up a power battery arm in December 2016. It has operated as an independent firm since February 2018. The firm launched first phase production of 4GWh/yr at its power battery plant in Changzhou city in east China's Jiangsu province in December last year.

Evs are expected to drive demand for cobalt, lithium, nickel and graphite in the coming years. Argus assessed prices for alloy and chemical grade cobalt metal at $15.55-16.10/lb yesterday, holding stable since 10 November. Discussions on long term-contracts are entering into their final couple of weeks, with most business being done in the chemicals sector.

Cochilco sees 2020 copper production and price rising

Chile's copper production will likely rise by 0.6% to 5.82-million tonnes in 2020, State copper commission Cochilco said on Monday, and to 5.99-million tonnes in 2021.Cochilco estimated that the copper price will average $2.75/lb in 2020, before rising to $2.90/lb in 2021.

In August, Cochilco's price estimate was $2.62/lb for 2020 and $2.85/lb for 2021.

BaldoProkurica, the mines minister, said in announcing the Cochilco figures on Monday that the higher price estimate was due to positive expectations on demand from China, economic recuperation, a drop in copper inventories and the increasing likelihood that a coronavirus vaccine will be widely available within the first six months of next year.

Victor Garay, Cochilco's markets coordinator, said projections were contingent on possible second waves of the virus which could result in movement restrictions and impact production as well as demand.

Rio Tinto Launches new aluminium alloys to support recycling by die casters

Rio Tinto is introducing a new family of unique aluminium alloys designed to allow North American die casters to increase their use of recycled content in the production of automotive parts, delivering improvements on both environmental footprint and production costs.

Rio Tinto's new high-quality alloy series has been developed for high pressure vacuum die casters to mix with their own scrap and recycled cleaned crushed wheels. As an alternative to buying Lower grade secondary remelt ingots, the final blend will cost Less, have Lower carbon footprint and meet stringent industry standards.

The company's technical marketing experts will work with customers to tailor specific mixes of alloy and recycled content to meet their needs.

Rio Tinto Aluminium vice president Sales and Marketing TolgaEgrilmezer said: "Our focus is on working with customers to deliver high quality products that meet their needs. We have developed this new series of alloys to help die casters not only produce the highest quality automotive parts, but also enhance their competitiveness and contribution to a more sustainable, circular economy."

With expertise provided through it Arvida Research and Development Center, Rio Tinto has the ca pa city to produce up to 100 000 metric tons of the new alloy series per year across its Canadian sites, which make some of the world's Lowest carbon footprint primary aluminium."

EGA signs agreement with Colombian company to developed aluminium production technology

Emirates Global Aluminium has signed an agreement with NEO Aluminio Colombia, which could lead to the export of EGA's UAE-developed state-of-the art technology for the development of the first aluminium production facility in the South American country.

NEO Aluminio Colombia is currently assessing the feasibility of building a low carbon aluminium production facility, the Green Aluminium Transformation Complex for Colombia (GALTCO), in the northwest of the country. The project, powered with hydroelectricity and intended to reach a capacity of 540 thousand tonnes of aluminium per year, would be the heart of a new industrial cluster creating jobs and economic opportunity.

The agreement envisages EGA licensing its UAE-developed aluminium smelting technology to NEO Aluminio Colombia, and providing an array of technical

services to the Colombian company during the construction and ramp-up of the project.

The agreement was signed by Abdulnasser Bin Kalban, EGA's Chief Executive Officer, and Carlos Santiago, Chief Executive Officer of NEO Aluminio Colombia.

EGA has developed aluminium smelting technology in the UAE for more than 25 years. EGA has used its own technology in every smelter expansion since the 1990s and retrofitted all its older production lines. EGA's latest technology is amongst the most efficient in the global aluminium industry.

In 2016, EGA became the first UAE industrial company to license its core process technology internationally, in a major milestone for the development of a knowledge economy in the UAE. Aluminium Bahrain's Line 6 expansion project, built with EGA's DX+ Ultra technology, began production in December 2018.

Abdulnasser Bin Kalban, CEO of EGA, said: "Technology innovation has been an important foundation of EGA's development and success. One of our strategic priorities is to make EGA the technology partner of choice for new smelter projects, building on our success in Bahrain and strengthening technology sales as a revenue stream for our company. We look forward to growing this project with NEO Aluminio Colombia and ultimately to the successful application of EGA's UAE-developed industrial technology in their project."

Carlos Santiago, CEO of NEO Aluminio Colombia, said: "Finding the right technology partner is an important milestone in the development of our proposed new aluminium transformation complex. After a global search, we have selected EGA based on the performance of their technology, the depth of their technological expertise, and their track record in some of the world's most significant recent greenfield and brownfield production developments. Ultimately, we are proud and honoured to have a partner that cares, as we do, about creating both jobs and opportunity for decades to come."

International Aluminium Institute Publishes New Fatigue Risk Management Guidelines for Industry

The International Aluminium Institute (IAI) has published a set of guidelines on how to develop systems to manage fatigue risks in the aluminium industry.

The Fatigue Risk Management Guidelines will provide IAI member companies and other aluminium industry stakeholders with a systematic approach to managing fatigue in the workplace.

Key recommendations:

- IAI Member companies should include "fatigue" as a specifically listed contributing factor in incident reporting and in accident investigation systems.
- As appropriate, IAI Member companies should integrate the fatigue risk management approach within existing health & safety, wellness, and human resources initiatives.
- IAI Member companies should deploy comprehensive training that focuses on the science of sleep, fatigue physiology, sleep disorders, alertness, etc.
- IAI Member companies may also make use of technologies (such as app-based personal monitoring, vehicle operator-centred systems, pre-shift testing etc.) to assist in the measurement and management of fatigue.

Commenting on the Guidelines, IAI Deputy Secretary General, ChrisBayliss said: *"There is overwhelming evidence that fatigue, a consequence of lack of sleep, negatively impacts the health and safety of workers. It is therefore important that fatigue is identified as a health and safety risk and management system are put in place to control that risk. This is particularly relevant as the industry adapts its working practices to manage Covid and other disease transmission risks."*

Fatigue is about lack of sleep and is a feeling of constant tiredness or weakness and can be physical, mental or a combination of both. It can affect anyone, and most adults will experience fatigue at some point in their life.

The IAI, therefore, considers these guidelines to be of the utmost importance in protecting the safety and wellbeing of the industry's workforce and safety in the workplace.

Bayliss added: *"It is essential that organisations begin to look at how fatigue can be considered within existing or emerging health and safety risk management systems and that such systems get buy in from workers as well as management. Fatigue risk management is a shared responsibility of both the employer and the employee and must be implemented across organisations. If all stakeholders work together, they can build a culture of fatigue awareness which will benefit all."*

This newly published document aligns with global standardised approaches used for managing occupational health and safety and workplace psychological health and safety.

RUSAL completes its installation of the innovative crude aluminium cleaning system at KhAZ

RUSAL has completed the installation of a modern automated system for cleaning crude aluminium in crucibles at the Khakasaluminium smelter (KhAZ).

The Company has invested USD 2.7 million in the project. The introduction of the automated complex will result in an expansion in both the share of alloys and the value-added products produced at KhAZ that are in demand across the rolling, automotive, food, aircraft and construction industries.

The innovative equipment produced for RUSAL in Canada will process metal in a 10-tonne crucible. It will effectively remove alkaline and alkaline earth metals from the molten aluminium and reduce the concentration of nonmetallic inclusions. One of the main advantages of the TAC (Treatment of aluminium in Crucible®) technology is the complete automation of the production process it provides.

"Improving the quality and purity of the products is a key goal in our modernisationprogramme, that is currently being carried out across RUSAL's production facilities. The TAC cleaning system has been operating for two years at the Sayanogorskaluminium plant, and we are well aware of its advantages – it not only reduces metallurgical losses, but also decreases the personnel workload as the process can be completed through automation. Moreover, with the new cleaning system reaching its design performance, KhAZ will be able to significantly increase the pool of potential consumers for its products," said RUSAL CEO EvgeniiNikitin.

The unit will be commissioned in the coming month and tests with heated metal will be performed soon after. It is planned the equipment will be put into commercial operation by the end of this year.

Tenova: Hot rolling mill for JW Aluminum

Tenova has successfully commissioned the Roll Grinding Machine and Roll Shop Equipment for the new Hot Rolling Mill for the expansion plant of JW Aluminum – a leading producer of flat rolled aluminium products – in Goose Creek, South Carolina (USA).

PominiTenova, the Tenova brand worldwide leader in production of roll grinders, was chosen by the American manufacturer in 2018 for the supply of a new fully automatic grinding machine for work rolls and back-up rolls, of a combined chocking-dechocking machine for work rolls and back-up rolls and for a chock tilter. All Equipment was designed to be used also with the rolls of the cold rolling lines already in operation at JW Aluminum.

Pomini's equipment was designed with the aim of combining the highest accuracies and quality required by the aluminium industry with the flexibility required by the extended range of dimensions, surface requirements and materials of rolls to be taken care of. For this reason, the roll grinding machine features an advanced wheel load control system, for increased stability of roughness finishing along the roll barrel; the Pomini Continuous Profile Compensation system (CPC), for true and undisturbed in-process measurement and correction of roll profile during grinding; and the hydrostatic steady rests used for back-up rolls are equipped with a single hydrostatic pad set, which can be changed quickly and does not require roll alignment after a roll type change. The chock changer features two back-up roll stands with rotation system, for ease of chock insertion and extraction.

“The effective collaboration between Tenova and JW Aluminum has made possible to overcome the significant hurdles posed by the ongoing COVID-19 pandemic. By means of goodwill and cooperation, the installation and commissioning of the equipment have been carried out without compromising equipment performance and – most importantly – the safety of all personnel involved on site”, affirmed LivioTaccani, PominiTenova Commercial Director. “This success is a further confirmation of the high quality and performance of Pomini's roll grinders in the aluminium field, as well as of the high design flexibility of our equipment”.

Rockwell Automation Improves Productivity, Drives Profitability and Reduces Risk Across Plant Operations with the Release of PlantPAx 5.0

Rockwell Automation has released the PlantPAx® 5.0 distributed control system (DCS). This latest DCS version from Rockwell Automation helps industrial producers positively impact the lifecycle of their plant operations with plant-wide and scalable systems to drive digital transformation and operational excellence.

New system capabilities help digitally transform operations by introducing process functionality native to the controller, improving the availability of system assets driving compliance in regulated industries, while enabling the adoption of analytics at all levels of the enterprise. Intuitive workflows and the use of industry-leading cybersecurity standards will help teams design, deploy, and support a DCS infrastructure which reduces time-to-market and helps plants realise profit at a faster rate.

"We're excited to bring PlantPAx DCS 5.0 to our customers," said Jim Winter, Global Process Director, Rockwell Automation. "New system features are step changes in helping our customers lower the overall costs to design and commission. The functionality improves the overall effort to integrate the process control layer to the enterprise. By reducing the lifecycle cost of the system and lowering operational risks, we are continuing to find innovative ways to bring more value to end users."

Process end users desire a system that offers the benefits of a modern experience without the burdens that come with a traditional DCS. The new 5.0 release innovates the modern DCS in the following areas:

Reduced Footprint

- This release introduces new process controllers and extends the Logix family with cutting-edge processing power and capacity to reduce the complexity of PlantPAx architectures. This footprint reduction reduces total cost of ownership of the system throughout the lifecycle.

Project Consistency

- With native process instructions embedded in the controller firmware, project teams can adopt approaches to control strategies that drive consistency for individual projects or multi-site deployments. Consistency simplifies the lifecycle management of deployed systems as teams modernise their automation infrastructure. Consistency lowers total cost of ownership (TCO).

Streamlined Workflows

- PlantPAx 5.0 provides improved design and operational user experiences. Development teams will realise savings in the configuration of instrumentation, alarms and diagnostic system elements. Operators will have the extended ability to view underlying control logic in a safe and secured manner. Maintenance will have controlled view access for troubleshooting.

TÜV -Certified for Cybersecurity

- To operate at peak performance and minimisecybersecurity threats, PlantPAx 5.0 system architectures are TÜV certified to the international standard ISA-99/IEC 62443-3-3 which provides guidance

on the implementation of an electronically secured system.

Analytics Enabled

- Process end users recognise the value of analytics as an essential strategy to realise profit in their process operations. The PlantPAx 5.0 release has purpose-built frameworks that easily connect live and historical data from the DCS into reporting and analytical tools.

- Enables extended experiences, such as Augmented Reality, using workflows aligned with process strategies controlling plant operations.

- Allows extensible scalable analytic packages leveraging predictive and prescriptive models for process applications such as soft sensors, anomaly detection, or model predictive control.

As producers continue their digital transformation journey, the advances from this system release will help them unlock value and reduce overall costs at all phases of the plant lifecycle. For more information about PlantPAx DCS 5.0, please visit rok.auto/plantpax.

Aluminium packaging recycling rates surpass 2020 target

According to data released by the Environment Agency earlier this week (22 October), aluminium packaging recycling rates have officially exceeded their 2020 target with three months of the year still remaining.

Q3 saw 42,265 tonnes of aluminium packaging collected for recycling, an increase of 41% compared to the same period in 2019 and 4% higher than the previous quarter in 2020 (40,653). To date in 2020, 119,198 tonnes of aluminium packaging has been collected for recycling – an increase of 48% compared to the same period in 2019.

With a net annual requirement of 113,390 tonnes, taking into consideration a 2019 carry-in of 7,746 tonnes, this means that aluminium packaging recycling rates have already exceeded 2020 targets by more than 5%.

Aluminium packaging collected through kerbside, bring and on-the-go systems totalled 78,685 tonnes (an increase of 28% compared to 2019), while tonnage recovered from incinerator bottom ash (IBA) more than doubled (from 19,139 in 2019 to 40,513 in 2020).

Rick Hindley, executive director at Alupro (pictured), commented: “The UK's PRN data for Q3 shows an astonishing year-on-year increase among separately collected aluminium packaging, other local protocol fractions and aluminium packaging recovered from IBA. I'm delighted that rates have surpassed their target with three months of the year still remaining!

“Following the UK's COVID-19 lockdown in March and resulting spike in home working, it's great to see the results of the nation's continued commitment to recycling its aluminium packaging. This, alongside greater public awareness of the benefits of recycling, have combined to drive the highest aluminium packaging recycling rate ever reported.

“As we move into Q4, assuming volumes remain high and residents continue to consume at home rather than on-the-go, we could see recycling rates reach close to 70% for all aluminium packaging and more than 80% for aluminium beverage cans before the end of the year.”

Vedanta wins Zambian appeal in Konkola Copper Mines case

A Zambian court recently ordered a halt to liquidation proceedings for Konkola Copper Mines (KCM) to allow owners Vedanta and ZCCM-IH to proceed to arbitration, the provisional liquidator said in a statement.

The ruling by the Court of Appeal represents a significant win for Vedanta, which is seeking the removal of the liquidator appointed by state mining investment firm ZCCM-IH - which owns 20% of KCM on the government's behalf - to run the company.

The India-based group has been locked in a dispute with the Zambian government since May last year, when Lusaka appointed the liquidator. Legal arguments over the case have been heard in both Zambia and South Africa.

Provisional liquidator MilingoLungu said the court has not discharged him, and that he would continue to run the company.

A spokesman for Vedanta said: "Vedanta notes reports of the judgement from The Court of Appeal ruling in favour of Vedanta on all counts, with costs being awarded ..

South Africa's mine after accident

Vedanta Zinc International (VZI), a unit of Vedanta Ltd, has suspended all mining-related activities at its Gamsberg zinc mine in South Africa after a geotechnical failure trapped ten employees.

Eight of the workers were rescued after the accident at 0115 local time (2315 GMT) on Tuesday, and the company said efforts to locate and rescue the remaining two were its "main priority".

Gamsberg, which opened in early 2019, is owned 69.6% by VZI and 24.4% by Exxaro Resources, with the remaining 6% held by the Employee Share Ownership Plan.

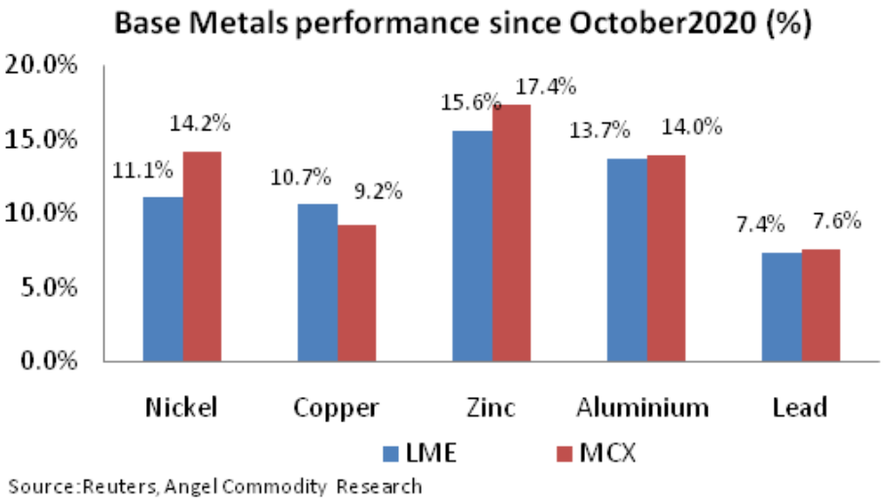
At full production capacity in phase 1, Gamsberg will produce 250,000 tonnes a year of zinc in concentrate, according to the VZI website.

Analysis

Industrial metals powering through additional monetary stimulus

The incredible rally in the base metals spectrum continued in October 2020 as increasing bets on additional monetary stimulus by global central banks coupled with a steady expansion in China's economy improved the demand outlook.

But for how long will this optimism continue to overpower the global worries and support the industrial metals is now coming out as a genuine concern for the market participants.



Source:Reuters, Angel Commodity Research

Soon after global economic activities began to resume in June'20 & July'20 many nations came across a second wave of the covid-19 virus. Many nations including United Kingdom, Germany and France reinforced strict curbs after record number of infected cases were reported.The global number of reported cases is now nearing 57 million with a death toll of over 1.35 million. Widening impact of the pandemic is expected to further slowdown the economic recovery to the pre pandemic levels which weighed on the market sentiments.

However, optimism post Joe Biden's victory in the U.S. Presidential elections and hopes over a potential vaccine against the covid19 virus boosted hopes of betterment in the global economic scenario and further elevated the industrial metal prices (since Nivember'20).

After Pfizer Inc, Moderna and Germany's CureVac has also claimed to make progress with its vaccine which further elevated market sentiments. A potential vaccine after a yearlong battle with the lethal virus which roiled the global markets led to the recent rally in the base metals spectrum.

Zinc Rallies

Zinc, the highest gainer amongst the pack, rose over 15 percent and 17 percent on the LME and MCX respectivelysince the month of October'20 as solid demand narrative and disrupted mining activities helped the galvanizing metal pave its way through all the global tensions.The demand for Zinc also witnessed a steady growth in India, majorly from the infrastructure and steel producing companies.

Another supporting element for Zinc prices has been the sliding mine output, majorly from South America. The global Zinc Mine production is expected to dip by 4.4 percent in 2020 (as per the ILZSG) reflecting the halt in mining activities in key producingnations such as Peru, Bolivia and Mexico.

Even the Treatment charges for Zinc concentrate in China slipped down to the range of $100-120 per tonne as on 25th September'20 i.e. around 39 percent lower from the range that prevailed in the end of August'20. Lower availability of ores due to the pandemic triggered curbs and growing demand from global smelter led to the massive fall in Zinc's TC. Near term supply tightness amid growing demand from China led to the massive rally in Zinc prices.

Copper–the leader metal

Since October'20, Copper posted gains of about 11 percent and 9 percent on the LME & MCX respectively. The solid revival in China, the largest metal consuming nation, layered a base for recovery in the industrial metals prices in these past months.

The stimulus driven demand from China outpaced all the

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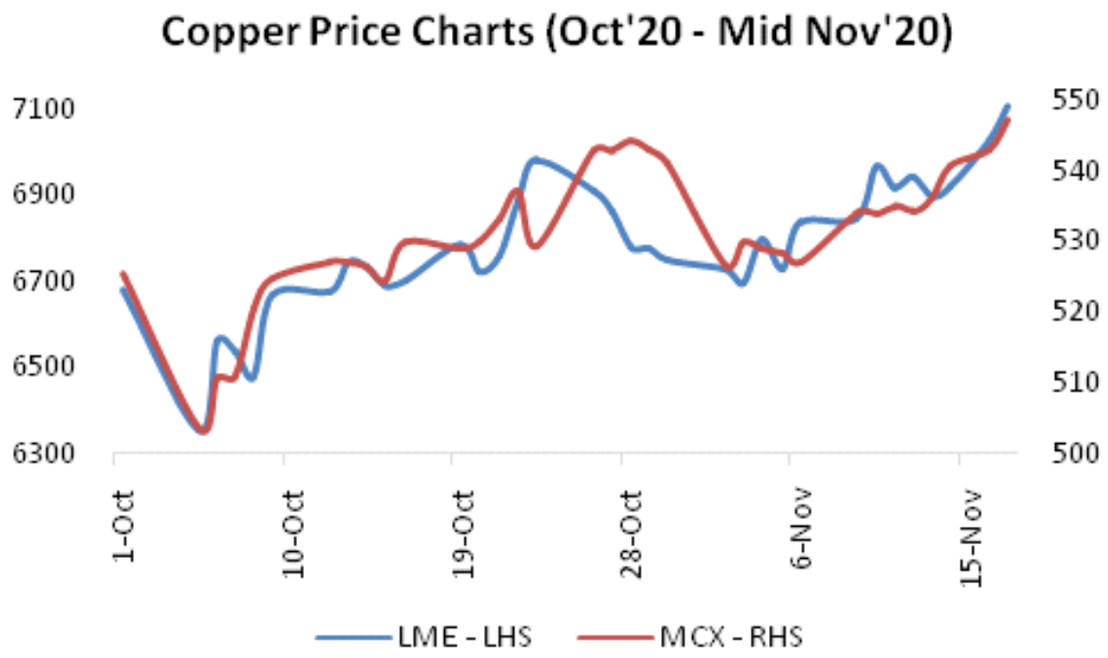
Analysis



negativesand helped Copper and other industrial metals post double figure gains since the second quarter of 2020.

China's economy continued to expand at a steady pace in the month of October'20 as well indicating towards a speedy recovery from pandemic led economic slump. As per the National Statistics Bureau, China's factory production increased by 6.9 percent (yoy) and its manufacturing PMI stood at 51.4 in October'20 as the world's second-largest economy gained momentum.

Retail and auto sales also witnessed a solid growth signaling towards improvement in China's consumer spending. Increase in demand for Electric Vehicles (EV's) helped China's auto sales surge to 2.573 million units i.e. 12.5 percent higher than a year earlier.

Moreover, China's non-manufacturing PMI which tracks the sentiment in the services and construction sectors, increased to 56.2 in the similar time frame up from 55.9 reported in September'20 signaling towards an overall recovery in the world's largest metal consuming economy.

Another factor underlining the speedy recovery in China's economy was the surge in China's metal imports. China's copper purchases in the first ten months of 2020 stood at 5.61 million tonnes, surpassing the previous annual record of 5.297 million tonnes reported in 2018.Imports soared as rapid revival from the coronavirus led economic slump driven byheavy infrastructural investment proposed by the China's governmentwhich uplifted the domestic demand and helped the Shanghai Futures Exchange (ShFE) outrun the London Metal Exchange (LME).

A spread between Shanghai and London prices opened an arbitrage window in May'20, leading to a significant rise in Chinese imports. Rising imports from China also helped ease the global market supply glut, as the rest of the world struggled to pave its way through the pandemic which further supported the prices.However, the prices discrepancy narrowed since September 2020 as economies outside China revived which made imports costlier for Chinese traders

Outlook

The outlook for industrial metals seems to be adverse considering the alarming increase in the covid19 cases around the globe and major economies reinforcing lockdowns. However, hopes over a potential vaccine against the ongoing pandemic and global central banks coming back into action might lend some support to the industrial metals going ahead. But there is no confirmed new about the same yet.

Taking into consideration the wide spread of the coronavirus pandemic and disrupted demand in the near future; we expect Copper prices to trade lower towards Rs.535 per kg (CMP : Rs.547) in a months' time.

Yash Sawant, Research Associate, Angel Broking

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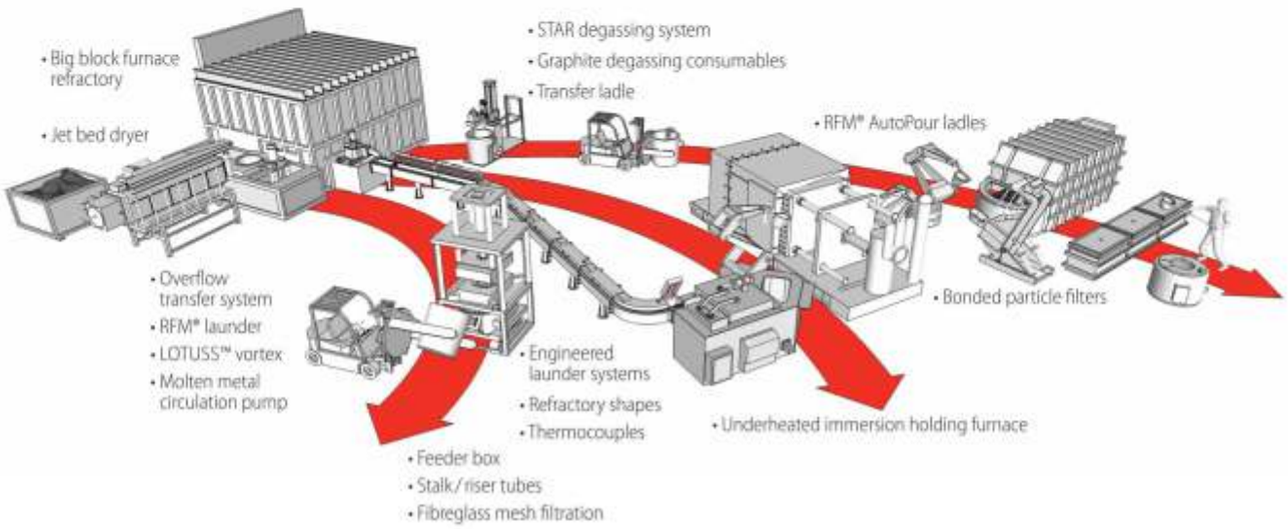

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