STEELWORLD

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C H Sharma

- Automobile industry demands high strength steel to enhance the fuel efficiency
- Tenova Furnace Concepts for Heat Treatment of wire rod annealing
- PLI Scheme would become a game changer to High grade Steels

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Devoted to Iron & Steel Industry

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D. A. Chandekar
Editor

Dear Readers,

Since the beginning of the year 2020 the global pandemic of covid-19 started spreading and in no time the whole world was in its grip. The mankind suffered heavy fetalities during this period. Even industry had to digest heavy losses which gave rise to joblessness and unemployment. The iron & steel sector was no exception as in many steel mills the labour was not available, logistic support was almost non existant, demand shrunk to a all time low and limited financial resources to sustain this period. Of cource the big and integrated plants managed to pull on with somewhat less capacity utilisation but the smaller steel mills and the processors which fall in MSME category were the real sufferers. Unfortunately many could not re-open the shutters after the pandemic subsided to some extent by end of 2020.

The overall situation in the industry, everyone is pleasantly surprised by the way iron & steel sector in the country has recovered so far. It has almost manifested a V shaped recovery. While celebrating this recovery, we also must analyse and discuss the possible reasons behind this surge. Firstly, this year's mansoon was very satisfactory which ensured that majority of the population is financially comfortable. Further, as the economy was almost standstill for the first few months, there was something called as 'accumulated demand' which helped the steel demand to get a initial push. The 20 Lac crore package announced by the government somewhere in the later part of 2020 also helped the industry to sustain in this lean period. Now the steel production has almost reached the pre covid level.

Also the demand seems to be robust, thanks to the infra projects which are now restarted and also to a super performance by auto sector. These factors have really helped the steel demand to stabilise and grow.

As you may be knowing,'Steelworld' recently organised 10th Special Steels Convention on digital platform. Industry too responded well to this new platform. Among the many negatives of covid pandemic, there is one distinct positive.

It has taught us to use digital medium more effectively. On one hand digitalisation is being employed in the plants to increase the productivity, efficiency and also the quality. On the other hand digital products like magazines, workshops, conferences, exhibitions are getting more and more acceptance. With the help of social media tools, these products can have tremendous reach and penetration within the industry.

The scars of pandemic will gradually vanish as the time passes but the wisdom we gathered during this period will always remain with us.

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Low nox emission, High High Hot Blast Temperature,

Yuxing top fired stoves with a catenary dome for 2x2850m3 Bfs

Yuxing top fired stove with a catenary dome achieved monthly mean HBT of 1314.7 oC

Conventional 3-section top fired transformed into Yuxing top fired with a catenary dome by cutting the top portion of the existing stove shell

Reference of Yuxing Top Fired Stove for BF with volume 40-50% of China's steel capacity since 2017 to April

Sr. No	Client	BF no	Blast volume Nm3/min
1	Hebei Zongtie Steel	1	7800
2	Hebei Zongtie Steel	2	7800
3	Hebei Zongtie Steel	3	7800
4	Hebei Zongheng Steel	3	8400
5	Hebei Zongheng Steel	4	8400
6	HBIS LaoTing	1	9700
7	HBIS LaoTing	2	9700
8	HBIS LaoTing	3	9700
9	Tangshan RuiFeng Steel	4	8000
10	Tangshan JinXi Steel		6300
11	Tangshan JinXi Steel		6300

Notes: China accounts for 50% of the world's steel capacity, and Hebei
Since 2017 to the present moment, Yuxing top fired stove adoption rate
Total reference nos of Yuxing top fired: 550.

Low nox emission - temperature difference between dome
than 83mg (international standard less than 150 mg)
from 83.5-88.9% (9-10% greater than that for other top
Long life span - Application practice has proven that the
years (the lifetime of the catenary dome combustion
High HBT - Monthly mean HBT of 1314.7 oC delivered
than that by other stove under same conditions)
combustion technology, the lower the better concept is

YUXING

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Efficiency, Long Lifetimes & International Leading Technology

Conventional 3-section top fired stoves for 3x2500m3 BFs converted into Yuxing 4-section top fired by cutting the top portion of the existing stove shell

over 2000m3 at Hebei Province which accounts for 2019, adoption rate of Yuxing top fired up to 84.6%.

	Stove type	Blast time mins	HBT oC
	Yuxing 4-section	45	1250
	Yuxing 4-section	45	1250
	Yuxing 4-section	45	1250
	Yuxing Caternary	45	1250
	Yuxing Caternary	45	1250
	Yuxing 4-section	45	1250
	Yuxing 4-section	45	1250
	Yuxing 4-section	45	1250
	Yuxing Caternary	45	1250
	Yuxing 4-section	45	1250
	Yuxing 4-section	45	1250

province accounts for 40-50% of China's steel capacity.
for BFs with volume over 2000m3 in Hebei reaches to 84.6%.

and HB at 30 oC approximately, nox emission less
Higher thermal efficiency - Thermal efficiency ranging
fired stove)
lifetimes of catenary dome have been in excess of 44
chamber of Yuxing stove over 30 years)
(HBT delivered by Yuxing stove is 15-20 oC higher
Lower air excess - 1.05-1.06 (Associated with
not always right)

3x3580m3 BFs configured with Yuxing 4-section top fired stoves

Internal combustion chamber stoves for 1497m3 BF at JianLong Steel converted into Yuxing top fired with a catenary dome

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Face to Face

Automobile industry demands high strength steel to enhance the fuel efficiency

C H Sharma completed his Mechanical Engineering degree from College of Engineering Pune in 1972. Subsequently, he joined Mukand Ltd. (Steel Plant) and worked for almost more than 43 years.

Of the entire longer association with Mukand, 10 years he spent in the production department, 5 years in product & process development, 17 years he was heading the technical services division and remaining 11 years he was the Technical Advisor to Hospet Steel (a joint venture of Mukand & Kalyani Steels Ltd.). Thereafter, he retired in May 2015.

While working with Mukand Ltd, Sharma has developed stainless steel and special steel for domestic & export customers. As a part of project team , he has set up 0.3 million tonne which is currently became 0.7 million tonne steel plant established in Hospet with joint venture with Kalyani Steels with MBF- EOF LF/VD, Caster route,

Besides, Sharma has also worked with BMM & NECO Jayaswal for 2 and 5 years respectively as an advisor. Presently, he has been working as Technical Advisor with SLR Metaliks special steel plant located in Bellary District, Karnataka.

D A Chandekar, Editor & CEO had an exclusive interaction with C H Sharma, to understand the role of technology changes in the special steel sector, reviewed the specification for micro alloyed steel and understand the uncoming trends in Technology in special steel sector in the near future.

What are important technology changes special steel sector has undergone in last few years ?

In 1970's few steel plants like ASP, VISL, GKW, Bihar Albys, MUSCO & KSL (to name few) started manufacturing special steels by using Electric arc furnace (Melting & Refining) & Ingot casting. There was no secondary steel making (Ladle refining or vacuum degasser) or use of continues casting. There Ingots were annealed to remove Hydrogen & rolling into Billets/Blooms & then conditioned to roll into Bars/RCS etc. The production capacities were very small & largely Indian Industry was dependent on Imports.

In mid Eighties steel companies started setting up special steel plants by use of ladle refining vacuum degassing & cast with close stream & continuous casting. Initially acceptance of steels produced by continuous casting was very poor & lot of resistance from senior metallurgists. Most plants have to sell steel with lower price to make it popular with forgers. With time, good steel making &

casting practices helped to enhance the acceptance level became better & even steel with this process route started getting premium.

In late 1990' (1998) Mukand & Kalyani steel jointly set a steel plant using mini blast fumace (MBF) – Energy optimizing (EOF) – Ladle refining / vacuum degassing – continueous casting route to produce 0.3 million MT (Currently 0.7 million MT). This was done to reduce cost of Metallics, power & also to control harmful trace elements in cold heading & wiredrawing quality steels. Even special steels were not having any harmful elements.

Later on more plants came up to use hot metal input from 50-85% & balance scrap and DRI.

Today 90% capacity of special steel is using this route to produce 'Quality Special Steels' at competitive cost by reducing electrical energy & avoiding import of expensive steel scrap.

Today 'Forging Industry' for domestic as well as for export of components uses Indian Steels. The most plants have improved their systems/process and added necessary equipment to meet stringent demands of exports of such components.

Today setting a steel plant for special steels is only by use of hot metal partly or fully with EOF/Converter or Electric Arc furnace. Ladle refining vacuum degassing & continueous casting with close stream (Ladle to Tundish & Tundish to mould casting with auto mould control & electro magnetic stirrer in common.)

How is India placed in Global Steel Sector ?

Today the technology used by most plants producing special steel is common. Manufacturers have learned by audits to make their systems full proof. Most steel plants are able to meet demand of steels for export of auto or engineering components. Steel making in India is now world class & even auto inspection lines are set up to meet zero defect supplies by avoiding manual errors.

Today plant started as recently as 3 -4 yrs back are in position to meet most stringent quality requirement of domestic & export customers.

Is it possible to make national specification for micro alloyed steels ?

Most special steel plants have developed micro alloyed steels as per demand by customers. In India user industry depends on specifications given by their principle collaborators for special steels or micro alloyed steels. We have to supply steels in all specification based on demand receives from the Customer. Hence, we need to sit & decide for Indian specification use in most area. Users & producers can make a task force and work to arrive of India specification.

What are the Technology trends coming in special steel sector in near future ?

From current Estimated demand of 6 Million Tonne of special steels is may go to 10-12 Million Tonne Steel in next 8-10 yrs as there will be an increase of demand for forgings and components by developed counties.

Most plants are maximizing capacities & also adding or planning to add new capacities on quality front improved O2 levels (< 12 ppm) & higher cleaning to improve fatigue cycle of rotating components, is very important Area. Low cost high strength steels will be in demand to reduce weight of vehicle to improve fuel efficiency.

Plants will look for high level of automation (in manufacturing & inspection) to reduce manpower & also make systems full proof to enhance quality of products made & inspected before shipping.

New green field plants of Large capacities (0.5-1.0 Million) for special steel may improve on heat size of 35-50T to 70-100 Tonne to get improved process efficiency, reduced manpower costs and higher quality of finish goods.

Tenova Furnace Concepts for Heat Treatment of wire rod annealing

Prasanta Saha,
TENOVA Technologies Pvt. Ltd.; INDIA

Many mechanical parts of automotive power train and under carriage are manufactured by drawing, forging, machning and heat treatment of special steel bars & wire rods.

Spherodization heat treatment in steel wires is used to increase their formability during drawing of high strength wire rods at ambient temperature.

For the spheroidization annealing of wire rod three different types of furnace are used in the wire producing industry.

This paper gives an overview of the technology of the three furnace concepts (bell-type annealing furnace plant, roller hearth furnace and semi- continuous roller hearth furnace). A comparison of the three different furnace concepts with regard to technical and commercial aspects is given. The annealing process technology and the logistics required for each furnace are described.

1. INTRODUCTION

The automobile industry accounts for a major share in the steel wire currently produced. The forming processes to which this wire is subjected have become increasingly complex. As a result, the material has had to meet more and more stringent requirements in terms of microstructure and deformation properties.

The vehicle components produced from steel wire are shown in Fig. 1. These components currently account for about 80 to 90 kg of the weight of a vehicle. It is expected that the figure will rise above 100 kg per vehicle in the near future.

Fig. 1: Wire Car

For the required heat treatment of wire rod materials three different furnace concepts are in widespread use in the wire producing industry.

These different types are bell-type annealing furnace plant, roller hearth furnace and semi- continuous roller hearth furnace.

2 Different furnace concepts

2.1 Bell-type annealing plants for wire androd

The design of bell-type annealing plants for wire and rod is shown in Fig. 2. Usually, bell-type annealing plants for wire are of multi-stack type. To ensure high-convection technology even for large diameter bases, special attention must be paid to the design of the diffuser and confuser system of the annealing base. The atmosphere gas flow is guided by a baffle inside the innercover. Useful dimensions of the plants built worldwide are having diameters between 1,500 and 4,600 mm. The useful height may range from 1,500 to 5,400 mm.

2.1.1 Annealing process description

Following the stacking of the stems with the wire rod coils onto the annealing base, the inner cover is set and clamped against the base flange seal, providing an absolutely gas-tight seal. A tightness test of the valves and the base/inner cover system is the next step prior to nitrogen purging. If both the valves and the inner cover/base system are tight, the air below the inner cover is displaced by nitrogen. The system is purged at a high volume rate N_2 for a duration of approx. 30 minutes.

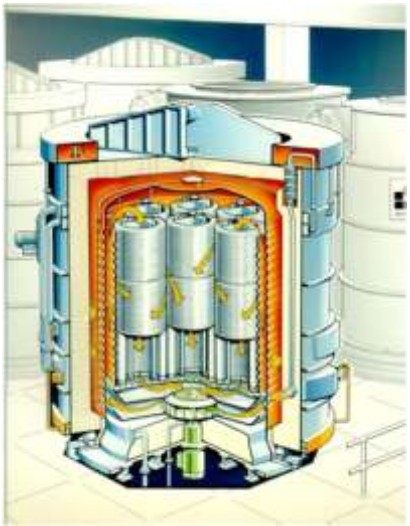

Fig. 2: Schematic of bell-type annealing plant for wire and rod

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Purging is terminated when the base control unit has verified that the following three conditions have been satisfied:

- a total minimum nitrogen volume must have passed into the inner cover.
- the minimum purge time must have elapsed.
- the oxygen concentration of the atmosphere below the inner cover must have decreased to less than 1%

The heating hood should be set during nitrogen purging. As soon as the oxygen concentration below the inner cover has decreased to less than 1 %, the heating hood burners are fired.

For the spheroidizing annealing of rolled wire, a controlled atmosphere of nitrogen represents the most economical solution. The length of the annealing cycle is mainly determined by metallurgical factors and cannot be significantly shortened by using another controlled atmosphere such as hydrogen.

Purging with a controlled atmosphere of nitrogen is initiated automatically. The required flow rates are an integral part of the annealing program and are self-controlled. As the atmosphere gas temperature is increased by the heating hood, the annealing base fan speed increases as a function of the temperature of the atmosphere gas, providing for optimum atmosphere gas recirculation conditions within the charge.

The annealing base fan motor is controlled by a variable frequency drive allowing for infinitely variable control to closely match the heating and cooling cycle requirements. After the heating-up phase the charge is soaked for a certain time until the required Delta t has been reached. Depending on the steel grade concerned, a controlled cooling stage with the heating hood may follow soaking.

After annealing has been completed, the heating hood is removed from the annealing base and the jet cooling hood is placed over the annealing base to cool the wire charge and inner cover to a discharge temperature below the oxidation temperature threshold. The JET cooling hood was developed and patented by TenovaLOI.

Cooling is provided by air jets targete directly at the outside of the inner cover. These jets are generated by a large number of air nozzles installed on the outside of the steel casing of the JET cooling hood. For highly effective cooling, nozzles of different diameters are distributed over the height of the cooling hood with different spacings.

In addition, the top of the hood also has a large number of air cooling nozzles for intensive cooling in this area. Three radial-flow fans extract air from the cooling hood. Compared with a parallel-flow air cooling hood, heat transfer with a JET cooling hood is three times more intensive. With JET cooling, the service life of the inner cover is significantly prolonged, compared with a water spray cooling process.

During the cooling cycle the annealing base fan speed is automatically adjusted to the atmosphere gas temperature to minimize the cooling time. At the end of the cooling cycle, the cooling hood and the inner cover are removed and the charge can be unloaded from the annealing base.

2.2 Roller hearth furnace plants for wire androd

The design of a common roller hearth furnace plant for the heat treatment of wire rod materials is shown in Fig. 3. The main

Fig. 3: Roller hearth furnace plant

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components are: charging and tilting device, vacuum vestibules at charging and discharging ends, heating and controlled cooling section, rapid cooling section and finally discharging device.

2.2.1 Annealing process description

The furnace is charged at intervals corresponding to the required annealing program. Each coil is transferred to the tilting device by fork-lift truck, tilted to an upright position on a special annealing tray and positioned on the charging table upstream from the furnace. Compliance with the cycle time is very important for a continuous roller hearth furnace. It is useful to store a certain amount of wire rod coils near to the annealing furnace.

The passage of the wire rod coils through the roller hearth furnace is controlled by photo cells. When the annealing tray with the wire coils has entered the vacuum vestibule, the vestibule is evacuated and then flooded with protective gas. When this cycle has been completed, the annealing tray is transferred to the furnace.

The transfer speed inside the furnace is set in accordance with the annealing program required for the steel grade concerned.

The annealing furnace is heated by radiant tubes which are arranged vertically in a row between the furnace wall and baffle plates. Protective atmosphere gas circulates through this channel in each zone, forced by the fan in the furnace roof.

The heating system is divided into different control zones. Each zone is equipped with several radiant tubes, recirculation fans and a baffle plate system.

The convective heat transfer baffle plate system ensures defined circulation of the protective atmosphere gas and a high temperature uniformity of ± 5 K in the soaking zones. The design of the baffle plates prevents wire ends from hooking on to the baffles during coil movement.

The energy supply is controlled by an on/off mode of electrical heating elements or by switching the burners on and off using special solenoid valves for gas and air supply. The radiant tubes are designed for heating and cooling zones. In the final zone additional cooling tubes are installed to cool the wire coils from 800 °C to approx. 730°C.

When the annealing cycle has been completed the wire rod coils are transferred to the cooling section.

The cooling section is equipped with rapid jet cooling devices. Each rapid cooling device features baffle plates with nozzles in the cooling tunnel and an external cooling unit with radial-flow recirculation fan and a gas/water heat exchanger.

At the end of the cooling section the wire rod coils on the annealing tray are transferred to the outlet vacuum vestibule. When the evacuation phase has been completed, the trays are transferred to the storage roller table and the tilting device for discharging the annealed wire rod coils.

2.3 Semi-continuous roller hearth furnace plants for wire androd

A semi-continuous roller hearth furnace is shown in Figure 4. The main components of the plant are a tilting table for charging and discharging the coils transported by a fork-lift truck, a charging/discharging roller table, a chamber annealing furnace and optionally a rapid cooling chamber.

Fig. 4: Semi-continuous roller hearth furnace plant

2.3.1 Annealing process description

The hot rolled coils are charged onto the tilting table by a fork-lift truck or by hall crane. The charge on the storage roller table is transferred into the furnace and the inlet doors are closed. The furnace is

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operated at a constant temperature set point of about 650°C. Following the completion of the preceding annealing cycle, the furnace atmosphere consists mainly of N_2.

Oxygen entering the furnace chamber during the charging process is purged out at the beginning of the annealing cycle until the oxygen concentration is below 1 %. When this concentration has been reached, purging is stopped and the heating-up process starts. Nitrogen is supplied to the furnace via gas lances at a base flow rate. When the furnace temperature reached about 700°C, endothermic gas will be supplied to the furnace. The carbon potential in the furnace atmosphere is controlled by infrared atmosphere analyser. When equilibrium has been established in the furnace atmosphere, the charge can be annealed without carburization ordecarburization.
If material with scale deposits is to be heat-treated, it takes considerably longer to establish equilibrium than with descaled material. At the end of the cycle, endothermic gas injection is stopped and the furnace is purged with nitrogen to remove the endothermic atmosphere. The charge is then transferred to the unloading roller table for a suitable time to cool down before being moved by the operator to the storage location.

3. Comparison

A comparison between the three different furnace concepts is made on the following basis:

Technical Data
Charge material : Wire rod coils
Steel grade : Ball bearing grade (100Cr6 = SAE52100)
Surface condition : pickled anddried
Annealing through put : 40,000tons/year
Coil dimensions :
Wire diameter : 5.0 – 32.0 mm
Outer diameter : 1300 mm
Inner diameter : 850 mm
Height : 1300mm
Coil weight : 1500 kg

Table 1 shows a comparison of the three different furnace types available for the heat treatment of wire rod coils on the basis of this data:

Tab.1: Comparison of different furnace concepts

	Cf mtype annealing furnace plant	Spmfsli f bsui ! furnace plant	Tf n j-continuous roller hearth furnace plant
Tuf f rfhsbef	211Ds7	211Ds7	211Ds7
Boof bnjoh!ui spvhi qvuqf s! year (t)	36900	41250	35280
Ovn cf slpdgysobdf t! required	4	2	4
Qspevdujpo!i pvs! !)i *	9511	9361	9511
Uf n qf sbuvsf !vojgpsn juz! during soaking phase	ê!6èD	ê!6èD	ê!6èD
Ef dbscvsj{bujpo!jn ju	> 0.01 mm	> 0.01 mm	> 0.01 mm
Dbscvsj{bujpo!boof bnjoh! possible	No	restricted	Yes (not 100Cr6)
Qspdf t t!bun pt qi f sf	O_2	O_2 or endothermic gas	O_2 or endothermic gas
Sf r vjsf n f out!gps!ui f ! production hall			
Gppstspace (m x m)	41!y!33	227!y!22	4!y!53!y!35
Bt t pdjbuf e!t f dpoebsz! installations			

	Bell-type annealing furnace plant	Roller hearth furnace plant	Semi-continuous roller hearth furnace plant
Hall crane			
Crane hook height (mm)	17500	8500	9000
Crane capacity (t)	32 / 10	5 / 10	5 / 10
Fork lift truck (capacity 5 t)	Yes	Yes	Yes
Charging stems (pc)	80	50	84
Tilting device	Yes	Yes	Yes
Personnel requirements per shift			
Fork-lift driver	1 employee	1 employee (50%)	1 employee (15%)
Furnace operator	1 employee (50%)	1 employee (30%)	1 employee (30%)
Flexibility of production			
Change of annealing program	No idle time	3-4 hours idle time	No idle time
Reduced plant utilization	Yes	Possible, but special conditions apply	Yes
Start-up time after shut-off	1 day	Up to 7 days	1 day
Service life of plant	30 years	30 years	30 years

Total Cost Comparison

In addition to the technical comparison we compared the cost of the three different furnace concepts. We evaluated the specific costs for the annual annealing capacity of 40,000 tons of wire rod coils (material grade 100Cr6/SAE 52100) as described in the technical comparison.
The total cost comparison for this specific scenario is shown in figure5.
The total costs of the annealing plant include the investment, maintenance, labour and utility consumption for one year of operation.

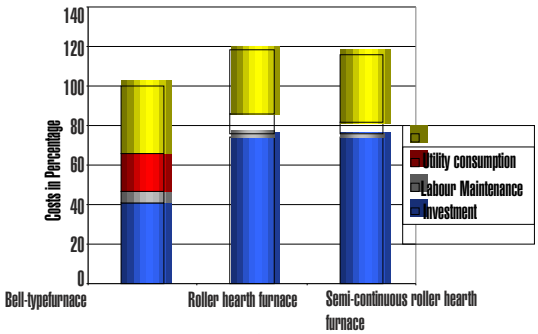
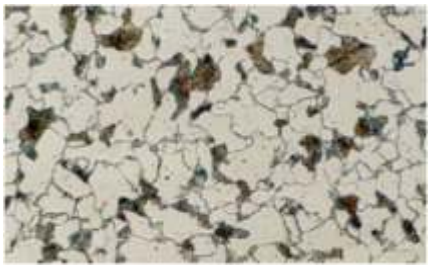


Fig. 5: Total cost comparison

4. Annealing and metallurgical results

The purpose of spheroidization annealing is to transform the initial structure of cementite and ferrite or pearlite into spheroidal cementite and ferrite. The carbide grain size should be even and as round as possible.



Before Heat Treatment

After Heat Treatment

Fig. 6: Transformation

The crystalline structure for the different steel qualities after annealing is shown in Fig. 7 to 9. The micrographs show the required uniform structure and 100% spheroidization. No pearlite residues can be seen.

Fig. 7: 17MnB4 5.5 mm

Fig. 8 : 58CrV4 6.0 mm

Fig. 9: 100Cr6 6.0mm

Spherodisation results are ususally accomplished bu y heating the charge just above AC1 and holding for a prolonged time just below the critical temperature for the metallurgical transformation. The rate of spherodisation is a function of the initial structure. The finer the perlite, the more readily spherodisation may be accomplished. A artensitic structure is amenable to spherodisation. Figure:11 is a typical curve obtained in a batch annealing furnace having useful dimensions of 4.6 M diameter & 5.6 M height having a capacity for heat treatment of 42 tons. The test was acrried out using 12 charge thermocouples located at different strategic location of the wire coils. During the annealing test in the batch annealing furnace carried out using spring steel, the required temperature tolerance of 10 K at a temperature setpoint of 750°C was reached after less than 8 hours. After about 9 hours, the temperature difference throughout the entire charge was as low as 7 K. The annealing tests showed that the homogeneous heating throughout the charge which is required can be ensured even with the large useful of the plant.

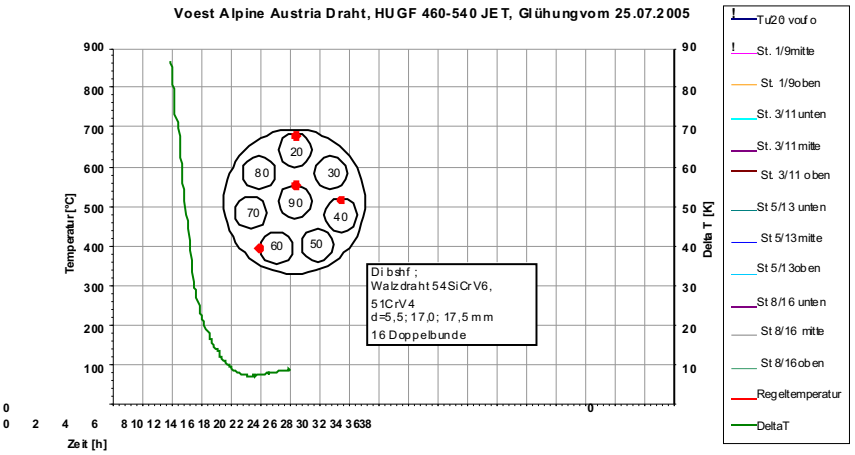


Fig 11: Temperature equalization results

To check the decarburization depth due solely to annealing a number of samples were added to the annealing charge. These samples were superficially ground to remove the decarburization in the non-annealed condition caused by the rolling process. The decarburization found here after annealing is therefore due solely to the process of annealing. The decarburization depth found at these samples was always below 0.01 mm.
The metallurgical results after annealing of the different steel grades are shown in Table 2. Due to the good temperature equalization within the charge the very uniform mechanical properties specified for the annealed wire rod were achieved.

Tab. 2: Metallurgical results

!	28NoC5		69DsV5		211Ds7	
	Sn ! [N/mm²]	! Z [%]	Sn ! [N/mm²]	! Z [%]	Sn ! [N/mm²]	! Z [%]
Bwf sbhf	577	87-:	721	7: -6	755	73-4
Tuboe/!ef wjbujpo	6/3	1/9	21	6/5	3/7	1/:
!	!	!	!	!	!	!
Ubshf dln jo/	551	YY	661	YY	751	YY
Ubshf dln by/	621	YY	761	YY	781	YY

!

5. Conclusion

Tenova LOI Group is the only furnace supplier with a product range including all three commonly used types of heat treatment plants for wire rod annealing. We are therefore in a position to make an objective compariso n of all three furnace concepts with regard to technical and commercia l aspects. All three different type of furnace are in widespread use in the wire rod producing industry and have their special advantages for customers.

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PLI Scheme would become a game changer to High grade Steels

Indian Steel industry has always been the foundation of a nation's rapid Industrial Development. Rapid industrialisation consequent to liberalisation of the economy post 1990-91 resulted in India becoming the 2nd largest producer of steel in CY 2019 with a production of 111.2 M ton of crude steel*. China continues to be the largest steel producer in the world with 996.2 M ton production (2019) out of the total world production of 1869 M ton (2019).*

Steel is a product of large and technologically complex industry having strong forward and backward linkages in terms of material flows and income generation. It is also one of the most important products of the modern world and of strategic importance to any industrial nation.

India has a very big advantage for production of steel in the form of availability of high-grade iron ore and non -coking coal, both key input materials for steel making. India has a vast & rapidly expanding market for steel consequent to focus on infrastructure and construction by the Govt of India. Availability of comparatively cheaper and younger labour force also adds to India's advantages. However, India's per capita consumption is 74 kg as against world average of 223 kg and China 633 kg. That's where the Global Steel majors saw a great opportunity.

Nitin Bhat
President - Sales & Marketing
LK Group, Mumbai

India saw significant investments in steel sector post 2004 driven by the positive outlook of the markets and higher steel prices. Global majors like Arcelor-Mittal, POSCO, Nippon Steel started looking at India as a high potential market and investments started moving to India. The home grown Steel Groups like TATA, JSW, ESSAR, JSPL too came out with new projects. Mineral rich states like Odisha, Karnataka, Chhattisgarh saw new capacities in the steel

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sector coming up. Simultaneously, existing units including State owned SAIL too underwent expansion and modernisation.

While the main focus of the Indian steel industry remains on the domestic market, India has a strategic locational advantage for export of finished goods.

Though India is the 2nd largest producer, India's Long : Flat product ratio continues to be skewed in favour of Long products. Long products continue to be ~ 53-55% of total while the developed countries have less than 35% of long products. This means India is essentially a high volume producer of commodity steels used in construction and less critical applications with limited value addition. India imported in 2019 steel products worth USD 8032 millions as per ministry of Commerce and Industry, GOI. Large portion of this import as in the form of high grade steels not produced in India.

Keeping all of above in mind and to boost Indian steel production and to guide Indian steel industry towards self-reliance, Government of India came out with a vison document called "STEEL POLICY 2017".

The National Steel Policy* aims at achieving the following objectives –

i. Build a globally competitive industry
Ii. Increase per Capita Steel Consumption to 160 Kgs by 2030-31
iii. To domestically meet entire demand of high grade automotive steel, electrical steel, special steels and alloys for strategic applications by 2030-31
iv. Increase domestic availability of washed coking coal so as to reduce import dependence on coking coal from ~85% to ~65% by 2030-31
v. To have a wider presence globally in value added/ high grade steel
vi. Encourage industry to be a world leader in energy efficient steel production in an environmentally sustainable manner.
vii. Establish domestic industry as a cost-effective and quality steel producer
viii. Attain global standards in Industrial Safety and Health
ix. To substantially reduce the carbon foot-print of the steel industry

The Policy covers mainly following :

1. Technological Efficiency
2. Value Addition in Stainless Steel
3. Value Addition in Alloy & Special Steel
4. Focus on High-End Research: Steel Research & Technology Mission of India

This policy envisages Indian steel demand to reach 230 m ton by 2030 in line with current rate growth in GDP and per capita consumption to160kg . Targeted Production of crude steel is 300 M ton by 2030. BF-BOF route is likely to to be around 60-65 % of total production and 35-40 % to be from EAF/IF route.

"Make in India" and "Atma Nirbhar Bharat" initiatives have been launched to result in higher production and consumption of "Made in India Steel". This effort has been further strengthened by the launch of PRODUCTION LIKNED INCENTIVES (PLI) schemes.

PLI scheme that aims to give companies incentives on incremental sales from products manufactured in domestic units.

The scheme invites foreign companies to set units in India, however, it also aims to encourage local companies to set up or expand existing manufacturing units

Broadly, the PLI scheme plans following :

- Rs2tn of incentives over 5 years for 13 sectors
- 5-10% of revenues if output targets are met
- incentivise downstream output
- time-bound incentives to gain scale
- rely on 5-10 champions in each sector/sub-sector instead of spreading the incentive thinly
- Large part of funding through replacement of MEIS with WTO

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compliant schemes

- To take advantage of the drop in China's industrial labour force

The government's Production Linked Incentive Scheme (PLI) for large-scaleis based on the design principle of *"A 5-8% incentive on output value is 50-70% of assembly value-add which is very attractive"* as per Credit Suisse report. It estimates that the schemes can generate US$144bn in incremental sales by FY27 and US$70bn of GVA 1.7% of FY27 GDP.

Very important point to note that PLI scheme has been preceded by regular increase in import duties from 2014 onwards. Speciality steel sector has seen import duties going up from 5% in 2014 to 15% from 2018 onwards to reduce imports and encourage domestic production.

India imports, as per industry sources, USD 15 Bn (FY 20) worth of auto components annually of which Drive & Transmission share 29%, engine components 16%, Body &Chasis 10%, Suspension & braking 8%. Steel imported by India in 2019-20 was 6.7 M ton

This article will cover only areas related to Steel – Speciality steels and Auto sector which has the largest allocation of 29 %at Rs 570 bn over 5 yearsand it may incentivize i) EVs ii) PV export iii) component import substitution

Bajaj Auto , TVS Motor Company , Ashok Leyland Maruti Suzuki, Escorts M&M ,TML among auto OEMs and Bosch , Bharat Forge Ltd., Sundaram Clayton , Wabco India ,Ramkrishna Forgings , MM forgings etc in auto parts are potential beneficiaries of the performance-linked incentive scheme.

Speciality Steel has an allocation of 3 % of Rs2 trillion PLI spend over a period of 5 years which is Rs 63 Bn. Steel majors like TATA Steel, JSW, AM/NS,SAILamong flat product Mills and Mahindra Sanyo, SarLoha (Kalyani), Star Wires , Sunflag are the long product Mills who will benefit from the PLI scheme.

PLI scheme covers the following Speciality Steels :

1. Coated Steels
   - Colour coated
   - Galvanised
   - Tinmill products
   - Coated/plated products of metallic/non metallic alloys
2. High Strength Steels
   - High tensile HR coils/sheets/plates
   - HR coils /sheets of API grades
   - High strength steel
   - Boiler & Pressure vessel grades
   - Abrasion & wear resistant steel
3. Rails
   - Head Hardened Rails
   - Asymmetric rails
4. Alloy steel bars and rods
   - Bearing Steels
   - Tool & Die Steels
   - Engine valve steels

The steel ministry has finalised a plan for specialty steel manufacturing under the Production Linked Incentive (PLI) scheme. The ministry has proposed a three incentive slab of 3 percent, 6 percent and 9 percent. The PLI per company will be subject to a ceiling of Rs 200 crore and the outlay for specialty steel is marked Rs 6,322 crore for the five-year period.

Indian industry has wholeheartedly welcomed the PLI scheme across all sectors and is confident of achieving its goals by making best use of the PLI scheme. PLI scheme is expected to generate large scale employment derived out of the resultant industrial growth. Large number of MNCs will find India as an attractive destination for investments including high tech areas , especially those wanting to exit China post Covid -19 imposed disruptions and damage. Higher exports and reduced imports too will result in significant monetary gains for the country.

In conclusion, the Indian Industry in general and Steel industry in particular, will immensely benefit from the PLI scheme in monetary and technological fronts.

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H12 / AISI H12 / DIN 2606

COLD WORK STEEL (IND/USA/EUR)

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HCHCR-D3/AISI D3/DIN 2080 | O1/AISI O1/DIN 2510
D5/Cr12MoV/DIN 2601

PLASTIC MOULD STEEL (IND/USA/EUR)

P20+Ni/AISI P20+Ni/DIN 2738
P20/AISI P20/DIN 2311

ALLOY STEEL (IND/USA/EUR)

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EN19/AISI 4140/ 42CrMo4
EN31/AISI 52100/100Cr6

SPRING STEEL

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Union Budget Reactions

PLI Scheme, Vehicle Scrapping Policy, Ujjwala Yojana boost domestic production : *Soma Mondal, Chairman, SAIL on Union Budget 2021-2022*

The Budget for 2021-22 has put emphasis on accelerating the growth momentum of the country by targeting infrastructural growth including road, rails, urban, power, ports, shipping etc. The National Infrastructure Pipeline (NIP) incorporates 500 more new projects. The creation of Development Financial Institution will help address the funds requirements of different agencies. The announcement of Production Linked Incentive Scheme, Vehicle Scrapping Policy, coverage of 1 crore more families under Ujjwala Yojana etc. will boost domestic production. All these measures and thrust on infra development will have a major positive impact on the demand for steel in the long run.

The increased capital expenditure will help the steel industry : *Dilip Oommen, CEO, ArcelorMittal Nippon Steel India*

Union Budget 2021: ArcelorMittal Nippon Steel India CEO Dilip Oommen said heavy spending on infrastructure and increased spending for capital expenditure creation are "welcome moves."The increased capital expenditure for infrastructure projects in Union Budget 2021-22 will push the demand for steel in the country, steel players and experts said.

To augment the country's infrastructure, the Budget proposed significant enhancing of capital expenditure to Rs 5.54 lakh crore in the next fiscal, besides creating institutional structures and giving a big thrust to monetizing assets to achieve the goals of the National Infrastructure Pipeline (NIP).

Digital Budget 2021 focuss on 6th pillar of economic growth : *P K Rath, CMD, RINL*

In view of the new resurgent India in the post-covid era the Digital Budget proposed by FM Smt Nirmala Sitharaman which is based on 6 pillars of economic growth is very much in alignment with making India self reliant – Atmanirbhar Bharat. It focused on sound structural reforms with a sight to improve sustainable macro-economic of the country. The increased capital expenditure with enhanced outlay for infrastructure projects including highways, housing, metro, railways etc augurs well for the long product category of steel.

OEM's to support MSME with respect to prices increase : *V. R. Sharma, MD JSPL*

1. Budget is good for industry:
2. Demand of steel is good.
3. Steel prices are increasing but this is global specific.
4. OEM's to support MSME with respect to price increase
5. Govt to lure investors for green field projects
6. One country one power tariff policy
7. Due to forward booking of orders, steel sector to look into how to support msme financially
8. In domestic market: major OEM's do not give LC to vendors. This is a big problem as there is no support to MSME.

Development Finance Institution proposed set up to ease of lending to steel Sector :

Sajjan Jindal, MD, JSW Ltd.

One of the key highlights of the union budget 2021 was setting up a development finance institution called the National Bank for Financing Infrastructure and Development with a capital base of Rs 20,000 crore. The move is said to promote ease of lending to steel, cement and other infrastructure development sectors.

"Infrastructure needs long term debt financing. A professionally managed Development Financial Institution is necessary to act as a provider

Investment in core sectors to spur the demand for steel :
Jayanta Roy, Senior Vice-President & Group Head, ICRA Ltd.

"Investments in core sectors like railways, roadways, and petroleum and natural gas, which have the potential for spurring demand for metals, has seen a healthy increase across the board,"

K K Pahuja, ISSDA President

The Union Budget 2021-22 is focused on growth, with higher capital expenditure and push for infrastructure. This will certainly boost steel demand, which is great positive going forward. Removal of import duty on scrap is another big positive. However, revocation of anti subsidy CVD on stainless steel flat products may lead to increased demand being captured by subsidized and dumped Chinese steel and jeopardize domestic stainless steel industry

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Quarterly Result Update

SAIL registers Rs 3645 Crore PBT during Q3 FY21 marking a substantial growth over CPLY

Steel Authority of India Limited (SAIL), the Maharatna steelmaker, has declared its financial performance results for the third quarter of current financial year (Q3 FY21) and nine months (9M FY21), both ending 31st December, 2020.

Key highlights of Q3 FY21

- Hot metal production at 4.8 MT, growth of 12% over CPLY
- Crude steel production at 4.37 MT, growth of 9% over CPLY
- Saleable steel production at 4.15 MT, growth of 6% over CPLY
- Total sales (domestic + exports) of 4.15 MT, growth of around 1% over CPLY

** MT is Million Tonnes*

Tata Steel reports the highest ever consolidated quarterly EBITDA;

- Consolidated EBITDA increased 53%QoQ and 2.6x YoY to Rs.9,540 crores with improved realization across key entities
- Consolidated Profit after tax improved 2.4x QoQ and 4.3x YoY to Rs.4,011 crores.
- Consolidated Free Cash Flow was Rs.12,078 crores during 3QFY21 and Rs.20,588 crores in the first nine months of the current financial year driven by strong operating performance, disciplined capital expenditure and working capital management.
- The company continues to prioritize on capital expenditure; it spent Rs.1,394 crores on capex during the quarter. The Company has decided to restart work on Pellet plant and Cold Roll Mill complex at Tata Steel Kalinganagar. Both the Pellet plant and Cold Roll Mill complex, once completed, will expand margin.
- As part of the enterprise deleveraging plan, Tata Steel has completed reduction of net debt by Rs.18,609 crores in the first nine months of the current financial year. During the third quarter, the company reduced the leverage by Rs.10,325 crores. As part of the continued de-leveraging strategy further deleveraging is being undertaken in 4QFY21.
- **India operations –**

  Crude steel production remained strong at 4.60 mn tons; registered a 3%YoY growth in 3QFY21, Domestic deliveries grew 8%QoQ and 4%YoY to 4.16 mn tons. Exports shrank below 11% of overall deliveries. Sales witnessed strong momentum but was constrained by lower opening inventory.

  Achieved the highest ever quarterly EBITDA of Rs.8,811 crores with 46%QoQ and 2.14x YoY growth; driven by higher prices, better product mix, lower exports and operating efficiency initiatives. This translates into an EBITDA per ton of Rs.18,931 and an EBITDA margin of 34.9%.

  Tata Steel standalone achieved the highest ever quarterly EBITDA Rs.6,737 crores with 43%QoQ and 78%YoY growth. This translates into an EBITDA per ton of Rs.20,175 and an EBITDA margin of 37.5%.

  Key Indian subsidiaries also delivered robust financial performance with Tata Steel BSL and Tata Steel Long Products generating an EBITDA of Rs.1,634 crores and Rs. 440 crores during the quarter. This translates into an EBITDA/t of Rs.14,223 and Rs.26,471, respectively.
- TSBSL merger with Tata Steel is progressing ahead. The merger of Tata Metaliks and Indian Steel and Wire Products with Tata Steel Long Products in also underway.
- Following the termination of the discussions with SSAB on Tata Steel Netherland (TSN), the company will be focusing on performance and cash flows in the immediate term. Tata Steel is committed to arrive at a strategic and sustainable resolution for its European portfolio. Tata Steel's IJmuiden plant is among the most environmentally efficient and cost competitive steel producers in Europe. The process to separate Tata Steel Netherlands and Tata Steel UK is currently underway.
- Tata Steel is committed to sustainability of operations. We are taking initiatives to adopt best available technologies and pursuing collaborations for decarbonization and water neutrality. We are also increasing our efforts towards ensuring a responsible supply chain and circular economy including development of environmentally sustainable products. Tata Steel continues to drive increased transparency and disclosure on climate standard. Tata Steel's climate disclosure has been rated "A-" by CDP in its recent review.

New Danieli reheating furnace in operation at JSW Toranagallu

Danieli Centro Combustion India completed the scheduled start-up of the new, 220-tph walking-beam reheating furnace at wirerod mill #2 of JSW's Toranagallu site in India.

The furnace heats up cold billets with excellent temperature uniformity thanks to tailor-made burners along with proprietary Proportional High Low - PHL technology in the combustion control system.

Electrical and automation controls were provided by Danieli Automation India.

Furnace dry-out was performed before the startup of the rolling mill.

Most of the commissioning was executed using remote connection (communication and I/O tests). Very limited presence of Danieli experts for the last few days of hot commissioning was enough to complete tuning of the system and to achieve the first hot billet. Strong cooperation by JSW and Danieli teams contributed significantly to a timely project execution.

This 220-tph furnace is the third reheating furnace supplied by Danieli Centro Combustion operating at JSW and the second in Toranagallu. The 245-tph walking-beam furnace in operation at Dolvi since 2014, is the largest billet reheating furnace in operation in India.

To date, more than 205 reheating furnaces have been supplied by Danieli Centro Combustion worldwide.

H&K India team bags 100 quenching system orders in 2019, 2020

In a little over 21 months the H&K India group hit a century. Led by its Chairman, Raj Kumar Markan, the competent H&K India team has bagged 100 quenching system orders in just 2 calendar years viz. 2019 and 2020 - this, despite the strict 11-week COVID-19 lockdown in Mumbai city which houses the company's head office and manufacturing facilities. This stellar performance is testament to the worldwide acceptance of Thermex and Tegum – the two flagships systems on offer by the team.

Noteworthy is the fact that out of 100 quenching system orders, 31 are conversion orders. Conversion orders involve a rolling mill replacing its existing quenching system to Thermex orTegum. At 31%, this number speaks volumes.

Another striking highlight is the 45 repeat orders received during this period – signalling a strong vote of confidence by existing clients who repeatedly opt for Thermex and/or Tegum forevery new project of theirs.

Markan thanked the steel industry for reposing its faith in the H&K India team over the past 35 years, since the company's foundation in May 1985. He noted, "While the Government of India (GOI) may have introduced its 'Make-in-India'initiative in 2014, it gives me great pride to say that H&K India has been making in India, the world's most successful quenching system since 1990. Our Thermex and Tegum systems are designed and manufactured in India for the Indian and international markets.

"Our systems can

· quench rebars from 6mm to 45mm

· operate at speeds in excess of 40m/s

· achieve grades as high as Fe700 (as per IS:1786-2008)

· offer 1-strand, 2-strand, 3-strand, 4-strand, 5-strand, 6-strand configurations"

Clients are impressed because Thermex and Tegum systems can seamlessly achieve the desired grades in the very first billet rolled. Every single quenching system is specifically designed for the rolling mill under consideration. This high degree of individualization guarantees a successful commissioning with zero trial and error. The H&K India team crossed its 400 project order milestone in Year 2020.

SULB and SMS digital join forces in optimizing energy efficiency in integrated steelworks in Bahrain

SULB and SMS digital, a company of SMS group, cooperate in identifying and tapping potentials for energy savings in SULB's integrated steelworks in Bahrain. Alongside SMS group (www.sms-group.com), Brazil-based SMS group company Vetta and Midrex Technologies, Inc., based in North Carolina, USA, are partners to the project.

SULB operates an integrated steelworks in Hidd, Bahrain. This steel complex covers the complete production chain from direct reduction to finish-rolled products. A key asset of the mill is the flexible combi-caster, designed to produce a wide range of cast formats and sizes, ranging from billets to heavy beam blanks. In 2011, SMS supplied the complete equipment for the steelworks on a turnkey basis as a minimill with an annual capacity of 850,000 tons of steel. In 2012, a 1.5 million tons-per-year MIDREX® Direct Reduction Plant was added to the complex.

In 2020, SULB initiated the Energy Audit project with the support of Tamkeen, a public authority helping industries and businesses in Bahrain. The objective of the project is to improve energy efficiency through increasing plant operational efficiency and making full use of secondary energy and residual heat. The long-term strategy for reducing GHG emission will also be outlined. In order to achieve these objectives and to secure successful positioning in the global market, SULB has entered into a consulting project with the above-mentioned SMS companies.

SMS has set up a consulting team made up of its top process and metallurgy specialists from its various plant technology areas, energy experts and specialists in AI-based digitalization. Other partners inthe project – alongside SMS digital and SMS group – are Vetta, an SMS group company specialized in energy management and related solutions, and Midrex Technologies, the world leader in direct reduced iron technology. Only this unique, concerted approach by all partners involved and their in-depth and highly focused expertise enables a holistic investigation and implementation of solutions that will allow SULB to tap the full scope of energy savings opportunities.

As early as in spring 2020, when the "Quick Assessment" (Module A of the cooperation agreement) was performed, SULB took a first key step in making its operations more efficient and, as a result, more cost-effective. The aims of that first phase of the project were to identify the focus areas and specific measures to reduce the energy consumption, including natural gas, electricity and process gas.

Along the complete production chain, fifty measures were identified. A full host of levers were proposed, from the use of smart management systems via adaptation of processes to an improved product mix. For every identified measure, a comprehensive and detailed description, a qualitative assessment of the underlying energy savings potential and the associated implementation effort were provided. An implementation plan was set up, including the milestones on the path to SULB's strategic energy-efficiency goal.

With Module B "Deep Dive Analysis and Implementation", the second phase of the project has been kicked off. This phase will see SULB and SMS digital draw up a strategy to achieve a fast and significant Return on Investment. Module B concentrates on four areas: direct reduction plant, electric arc furnace and ladle furnace, heavy-section mill and integrated energy management. Vetta, for example, will play a key role in the analysis and proposition of an integrated energy management system. The company will evaluate the energy-related key performance indicators (KPIs) of the complete works, derive conclusions and make recommendations as to how energy efficiency can be improved. This analysis will form a key element for the implementation of a digital solution for intelligent energy management. For the direct reduction plant, Midrex will show how the MIDREX H2 technology can help reduce the carbon footprint via the use of green hydrogen, paving the way for a step-wise transition to emission-free steelmaking. Midrex will support SULB via remote-monitoring of the MIDREX plant via the Remote Professional Services (RPS) option to help make operation of the MIDREX direct reduction plant more energy- and cost-efficient.


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All Module activities will be performed via real-time data transferconnections by requesting data via remote access. First measures will be completed in early February 2021, while others will be implemented successively until mid-2021. After completion of all project measures, SULB will be able to achieve significant cost savings as a result of lower natural gas and electricity consumption and will be a pioneer in the region with its smart and highly efficient steelworks.

The project cooperation combining various competence areas of SMS assures that SULB can work with a partner of broad-based competence and expertise in the technological domain, indigitalization and in energy management. This powerful combination

SMS group is a group of companies internationally active in plant construction and mechanical engineering for the steel and nonferrous metals industry. It has some 14,000 employees who generate worldwide sales of more than EUR 2.9 billion.

Primetals Technologies receives final acceptance for ERT-EBROS billet welding system

In late December 2020, Italian steel producer Ferriera Valsabbia S.p.A. issued the Final Acceptance Certificate (FAC) to Primetals Technologies for the supply ERT-EBROS of endless rolling technology for the company's existing bar rolling mill in Odolo, Brescia province. The aim was to boost plant output and utilization levels. The system welds together billets intended for rolling, thus enabling a continuous rolling process with a consistently high product quality.

The new ERT-EBROS plant is the first system of its kind installed in Italy. Primetals Technologies was responsible for the project engineering as well as for assembly and commissioning supervision of the new equipment, and supplied the ERT-EBROS billet welding system, including a deburring station, extraction system and complementary equipment such as pinch roll, shear and roller table.

The ERT-EBROS system is designed for an annual production capacity of 900,000 metric tons. The scope of supply also included the fluid systems, the electrical equipment and automation system and also technology packages for controlling the welding. An induction furnace was installed before the rolling train to make up for temperature losses.

Some innovative solutions were implemented by Primetals Technologies, so to comply with Ferriera Valsabbia's requirements about both metallurgy and mechanical features along the entire length of the bar. A specifically-engineered interactive software suite analyzes the operation results and produces an array of statistics about system productivity, number of joints and duration of welding sequences. In order to minimize the impact of travel limitations during the early phases of COVID-19 pandemic, remote commissioning activities made use of a dedicated Virtual Private Network (VPN).

Severstal commissions Cherepovets blast furnace #3

Leading Russian steel producer Severstal has successfully commissioned the blast furnace #3 at its Cherepovets integrated plant.

This furnace was idled and dismantled in 2007. The activities related to the project were revitalized in 2018. At that same time Severstal and Danieli Corus signed a contract for the design, equipment supply and performing services for erection and commissioning supervision for the blast furnace and gas cleaning system.

The furnace was built with a 3290 m³ useful volume and was equipped with a "Hoogovens" design cooling and lining system – selected by Severstal's based on the excellent experience with this design on blast furnace #4, modernized with Danieli Corus technology in 2005.

Severstal has been able to accomplish the commissioning of blast furnace #3 as per original schedule.

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- RAIC Integrated Sponge & Power Pvt. Ltd., West Bengal
- SBIW Steel Pvt. Ltd., West Bengal
- Shambhavi Ispat, Chhattisgarh
- Shree Parmeshwar Steels Pvt. Ltd., Gujarat
- Shree Sidhbali Ispat Ltd., Maharashtra

Pre 2020

- Amit Metaliks Ltd., West Bengal
- Captain Steel India Ltd., West Bengal
- Electrotherm India Ltd., Gujarat
- Gagan Ferrotech Ltd., West Bengal
- Grace Castings Ltd., Gujarat
- Haq Steels & Metaliks Ltd., Gujarat
- JBA Metal Company, Puducherry
- JMD Alloys Ltd., Bihar
- Radha Smelters Pvt. Ltd., Telangana
- Shyam Steel Manufacturing Ltd., West Bengal
- Shritirupati Steelcast Ltd., Andhra Pradesh
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Progressive and growth-oriented Union Budget : TV Narendran, CEO & MD, Tata Steel

Union budget 2021-22 as "very progressive and growth-oriented", while maintaining that proper implementation of the reforms was critical for the benefits to reach all sectors.

The increased capex in the infrastructure sector will have a "multiplier effect" as it will create demand across product categories, including steel, he said.

"We welcome the proposed reforms. However, the implementation of these reforms will be critical for the benefits to percolate across the economy," he said in a statement.

Heaping praise on the central government for the announcements made with respect to the national rail plan, Jal Jeevan Mission, and City Gas Distribution Network, Narendran said the decisions taken will generate new employment opportunities and spur demand in multiple sectors.

The Budget has also tried to address myriad concerns of the informal sector, of which migrant workers are a part, by announcing a social security scheme, he said.

Exemption of duty on steel scrap and reduction of customs duty on steel products would benefit the MSME sector, the Tata Steel CEO stated.

"The reduction in customs duty will have no significant impact on the steel industry as the alloy is mostly imported from countries, with which we have an FTA (Free Trade Agreement)," the statement said.

Union Budget expected to have a positive impact on MSME : Yash Munot, CEO, Varsha Forgings Ltd.

Positive

1. Steel consumption demand has increased.
2. budget expected to have a positive impact on msme
3. Duty structure has improved
4. Bottom line are good for most companies in this qtr.

Negatives:

1. Migration of labor to hometown during COVID
2. Increase of RM prices but no increase in forged product prices
3. Setback in export due to container cost and delivery time increase
4. Msme not financially supported either by steel industry or oem when RM price increase is there.

Low customs duty, iron ore costs may melt steel prices

Domestic prices of hot-rolled (HR) coil, a flat steel product that is further processed and used in transport, construction, shipbuilding and capital goods surged 54% from a year ago in the December quarter amid a robust recovery in domestic demand and mirroring higher global steel prices.

Steel prices are expected to fall by as much as 10% from their January highs over the next few months, industry analysts said, retreating from a runaway rise that led end-consumers to seek government intervention.

Softening of inputs costs, especially of iron ore, and increased competition from cheaper imports with India cutting customs duty on steel will likely drive down steel prices.

Prices of HR coil climbed to ₹58,000 a tonne this January from ₹36,250 a tonne last June, prompting an outcry from the associations of builders and construction firms and even Union minister Nitin Gadkari.

In the budget, finance minister Nirmala Sitharaman announced a reduction in customs duty on flat steel products to 7.5% from 12.5%, and on long products to 7.5% from 10% earlier, making imports cheaper.

Iron ore price retreats on higher steel inventories in China

According to Fastmarkets MB, benchmark 62% Fe fines imported into Northern China (CFR Qingdao) were changing hands for $173.55 a tonne, down 0.85% from Thursday's trade.

Consumption among steel end-users stagnated during the February 11-17 holiday while mills continued to produce during the break, Mysteel reported.

"Previously, the market had expectations for better post-holiday demand," said analysts at Sinosteel Futures in a note, but added demand does not usually pick up until after China's Lantern Festival, which falls on February 26.

Concerns about tight supply and brightening prospects for demand outside top steel producer China should continue supporting iron ore prices, analysts said.

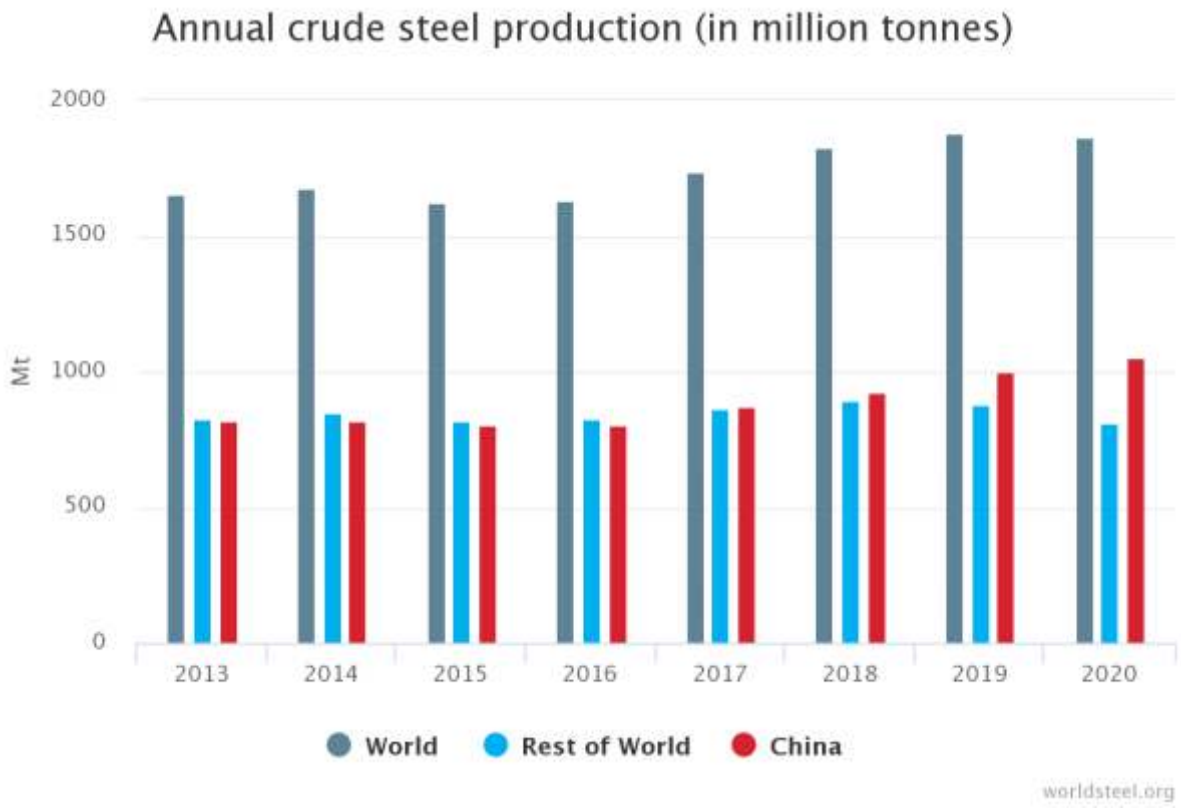
On Tuesday, BHP Group said it expected a continuation of strong Chinese demand in 2021, and a recovery in global crude steel production.

Shares of BHP and Rio Tinto have risen by 7.5% and 6.8% over the week, respectively, and Vale is up 3.4% since last Friday.

"Not only in China, but the ex-China activity is also picking up to pre-covid levels," Fortescue Metals Group Chief Executive Elizabeth Gaines said during a media conference call.

Global crude steel output decreases by 0.9% in 2020

Global crude steel production reached 1,864.0 million tonnes (Mt) for the year 2020, down by 0.9% compared to 2019.



Asia produced 1,374.9 Mt of of crude steel in 2020, an increase of 1.5% compared to 2019. China's crude steel production in 2020 reached 1,053.0 Mt, up by 5.2% on 2019. China's share of global crude steel production increased from 53.3% in 2019 to 56.5% in 2020.

India's crude steel production for 2020 was 99.6 Mt, down by 10.6% on 2019. Japan produced 83.2 Mt in 2020, down 16.2% on 2019. South Korea produced 67.1 Mt, down 6.0% on 2019.

The EU produced 138.8 Mt of crude steel in 2020, a decrease of 11.8% compared to 2019. Germany produced 35.7 Mt of crude steel in 2020, down 10.0% on 2019.

In the CIS, production was 102.0 Mt in 2020, up by 1.5% on 2019. Russia is estimated to have produced 73.4 Mt in 2020, up 2.6% on 2019. Ukraine produced 20.6 Mt in 2020, down 1.1% on 2019.

Crude steel production in North America was 101.1 Mt in 2020, down 15.5% on 2019. The United States produced 72.7 Mt in 2020, down 17.2% on 2019.

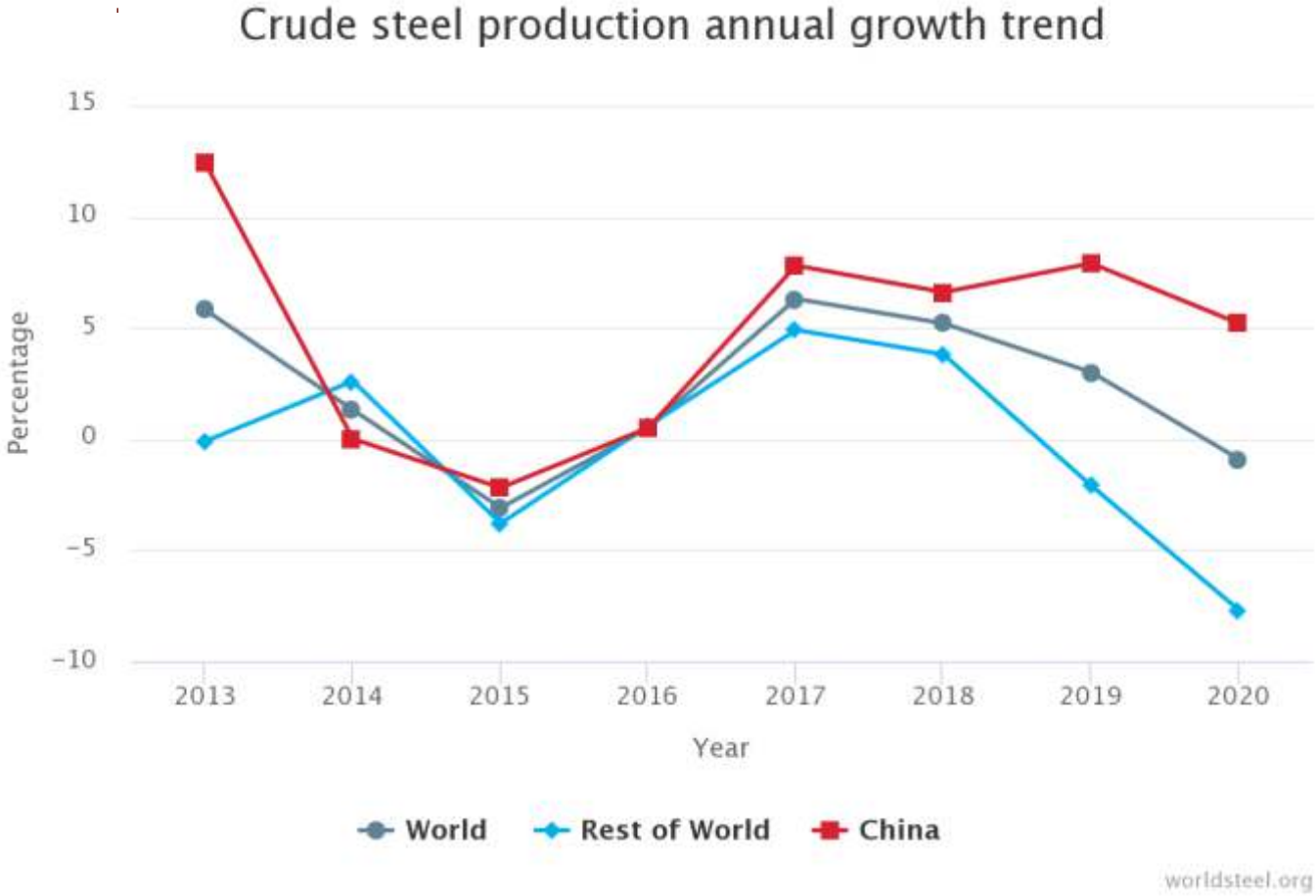
The Middle East produced 45.4 Mt of crude steel in 2020, an increase of 2.5% on 2019. Iran is estimated to have produced 29.0 Mt in 2020, up 13.4% on 2019.

Annual crude steel production for South America was 38.2 Mt in 2020, a decrease of 8.4% on 2019. Brazil produced 31.0 Mt in 2020, down by 4.9% compared to 2019.

Turkey's crude steel production for 2020 was 35.8 Mt, up by 6.0% on 2019.

Africa produced 17.2 Mt of crude steel in 2020, the same as the 2019 production figure.

Oceania produced 6.1 Mt of crude steel in 2020, down 1.4% on 2019.



Top 10 steel-producing countries

Rank	Country	2020 (Mt)	2019 (Mt)	%2020/2019
1	China	1053.0	1001.3	5.2
2	India	99.6	111.4	-10.6
3	Japan	83.2	99.3	-16.2
4	Russia (e)	73.4	71.6	2.6
5	United States	72.7	87.8	-17.2
6	South Korea	67.1	71.4	-6.0
7	Turkey	35.8	33.7	6.0
8	Germany	35.7	39.6	-10.0
9	Brazil	31.0	32.6	-4.9
10	Iran (e)	29.0	25.6	13.4

Source : World Steel Association

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Automobile Statistics

SIAM

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

Report I
(Number of Vehicles)

Category Segment/Subsegment	Production April-December			Domestic Sales April-December			Exports April-December		
	2019-2020	2020-2021	% Change	2019-2020	2020-2021	% Change	2019-2020	2020-2021	% Change
Passenger Vehicles (PVs)*									
Passenger Cars	1,643,739	1,178,942	-28.28	1,291,234	1,028,101	-20.38	404,675	190,612	-52.90
Utility Vehicles(UVs)	852,686	756,835	-11.24	725,650	677,107	-6.69	133,322	99,684	-25.23
Vans	97,580	70,139	-28.12	101,036	72,666	-28.08	2,274	877	-61.43
Total Passenger Vehicles (PVs)	**2,594,005**	**2,005,916**	**-22.67**	**2,117,920**	**1,777,874**	**-16.06**	**540,271**	**291,173**	**-46.11**
Commercial Vehicles (CVs)**									
M&HCVs									
Passenger Carrier	33,554	5,067	-84.90	29,206	2,578	-91.17	5,885	2,829	-51.93
Goods Carrier	154,159	88,610	-42.52	146,682	77,576	-47.11	11,128	6,915	-37.86
Total M&HCVs	**187,713**	**93,677**	**-50.10**	**175,888**	**80,154**	**-54.43**	**17,013**	**9,744**	**-42.73**
LCVs									
Passenger Carrier	33,862	9,787	-71.10	35,644	7,426	-79.17	3,132	908	-71.01
Goods Carrier	379,612	286,283	-24.59	359,162	270,623	-24.65	26,232	19,642	-25.12
Total LCVs	**413,474**	**296,070**	**-28.39**	**394,806**	**278,049**	**-29.57**	**29,364**	**20,550**	**-30.02**
Total Commercial Vehicles (CVs)	**601,187**	**389,747**	**-35.17**	**570,694**	**358,203**	**-37.23**	**46,377**	**30,294**	**-34.68**
Three Wheelers									
Passenger Carrier	794,692	346,407	-56.41	420,269	76,835	-81.72	384,905	268,065	-30.36
Goods Carrier	91,704	58,067	-36.68	86,985	53,766	-38.19	5,324	3,269	-38.60
Total Three Wheelers	**886,396**	**404,474**	**-54.37**	**507,254**	**130,601**	**-74.25**	**390,229**	**271,334**	**-30.47**
Two Wheelers									
Scooter/ Scooterettee	4,767,058	3,056,748	-35.88	4,463,879	3,103,112	-30.48	286,278	149,607	-47.74
Motorcycle/Step-Throughs	11,388,624	9,182,647	-19.37	8,954,239	7,199,152	-19.60	2,387,116	2,015,869	-15.55
Mopeds	497,827	459,867	-7.63	495,677	462,107	-6.77	11,437	6,539	-42.83
Electric Two Wheelers	0	1,475	-	0	1,417	-	0	0	-
Total Two Wheelers	**16,653,509**	**12,700,737**	**-23.74**	**13,913,795**	**10,765,788**	**-22.63**	**2,684,831**	**2,172,015**	**-19.10**
Quadricycle									
Quadricycle	4,996	2,300	-53.96	954	-27	-102.83	4,434	2,257	-49.10
Total	**4,996**	**2,300**	**-53.96**	**954**	**-27.00**	**-102.83**	**4,434**	**2,257**	**-49.10**
Grand Total of All Categories	**20,740,093**	**15,503,174**	**-25.25**	**17,110,617**	**13,032,439**	**-23.83**	**3,666,142**	**2,767,073**	**-24.52**

Society of Indian Automobile Manufacturers (14/01/2021)
*** BMW, Mercedes and Volvo Auto data is not available**
**** Daimler & Scania data is not available**

SIAM

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

(Number of Vehicles)

Category Segment/Subsegment	Production January -December			Domestic Sales January -December			Exports January -December		
	2019	2020	% Change	2019	2020	% Change	2019	2020	% Change
I Passenger Vehicles (PVs)*									
Passenger Cars	2,313,062	1,706,797	-26.21	1,819,884	1,432,304	-21.30	531,226	276,808	-47.89
Utility Vehicles(UVs)	1,156,634	1,039,764	-10.10	984,928	897,406	-8.89	171,440	149,842	-12.60
Vans	159,312	104,707	-34.28	157,303	103,754	-34.04	3,493	1,448	-58.55
Total Passenger Vehicles (PVs)	**3,629,008**	**2,851,268**	**-21.43**	**2,962,115**	**2,433,464**	**-17.85**	**706,159**	**428,098**	**-39.38**
II Commercial Vehicles (CVs)**									
M&HCVs									
Passenger Carrier	48,859	15,793	-67.68	41,620	13,413	-67.77	8,174	5,392	-34.03
Goods Carrier	254,165	123,621	-51.36	246,681	115,345	-53.24	20,150	10,338	-48.69
Total M&HCVs	**303,024**	**139,414**	**-53.99**	**288,301**	**128,758**	**-55.34**	**28,324**	**15,730**	**-44.46**
LCVs									
Passenger Carrier	49,474	19,747	-60.09	51,820	17,525	-66.18	4,399	1,518	-65.49
Goods Carrier	542,860	384,017	-29.26	514,622	358,906	-30.26	37,979	27,439	-27.75
Total LCVs	**592,334**	**403,764**	**-31.84**	**566,442**	**376,431**	**-33.54**	**42,378**	**28,957**	**-31.67**
Total Commercial Vehicles (CVs)	**895,358**	**543,178**	**-39.33**	**854,743**	**505,189**	**-40.90**	**70,702**	**44,687**	**-36.80**
III Three Wheelers									
Passenger Carrier	1,081,579	567,972	-47.49	564,251	182,096	-67.73	522,329	378,438	-27.55
Goods Carrier	130,232	83,079	-36.21	123,195	78,316	-36.43	7,125	4,318	-39.40
Total Three Wheelers	**1,211,811**	**651,051**	**-46.27**	**687,446**	**260,412**	**-62.12**	**529,454**	**382,756**	**-27.71**
IV Two Wheelers									
Scooter/ Scooterettee	6,248,114	4,316,888	-30.91	5,841,184	4,205,194	-28.01	372,025	233,327	-37.28
Motorcycle/Step-Throughs	15,087,432	12,150,069	-19.47	12,011,692	9,458,577	-21.26	3,067,153	2,764,301	-9.87
Mopeds	722,845	611,718	-15.37	713,981	603,242	-15.51	13,305	8,961	-32.65
Electric Two Wheelers	0	1,475	-	0	1,417	-	0	0	-
Total Two Wheelers	**22,058,391**	**17,080,150**	**-22.57**	**18,566,857**	**14,268,430**	**-23.15**	**3,452,483**	**3,006,589**	**-12.92**
Quadricycle									
Quadricycle	6,629	3,399	-48.73	1,403	-39	-102.78	5,162	3,008	-41.73
Total	**6,629**	**3,399**	**-48.73**	**1,403**	**-39**	**-102.78**	**5,162**	**3,008**	**-41.73**
Grand Total of All Categories	**27,801,197**	**21,129,046**	**-24.00**	**23,072,564**	**17,467,456**	**-24.29**	**4,763,960**	**3,865,138**	**-18.87**

Society of Indian Automobile Manufacturers (14/01/2021)
*** BMW, Mercedes and Volvo Auto data is not available**
**** Daimler & Scania data is not available**

Source - SIAM

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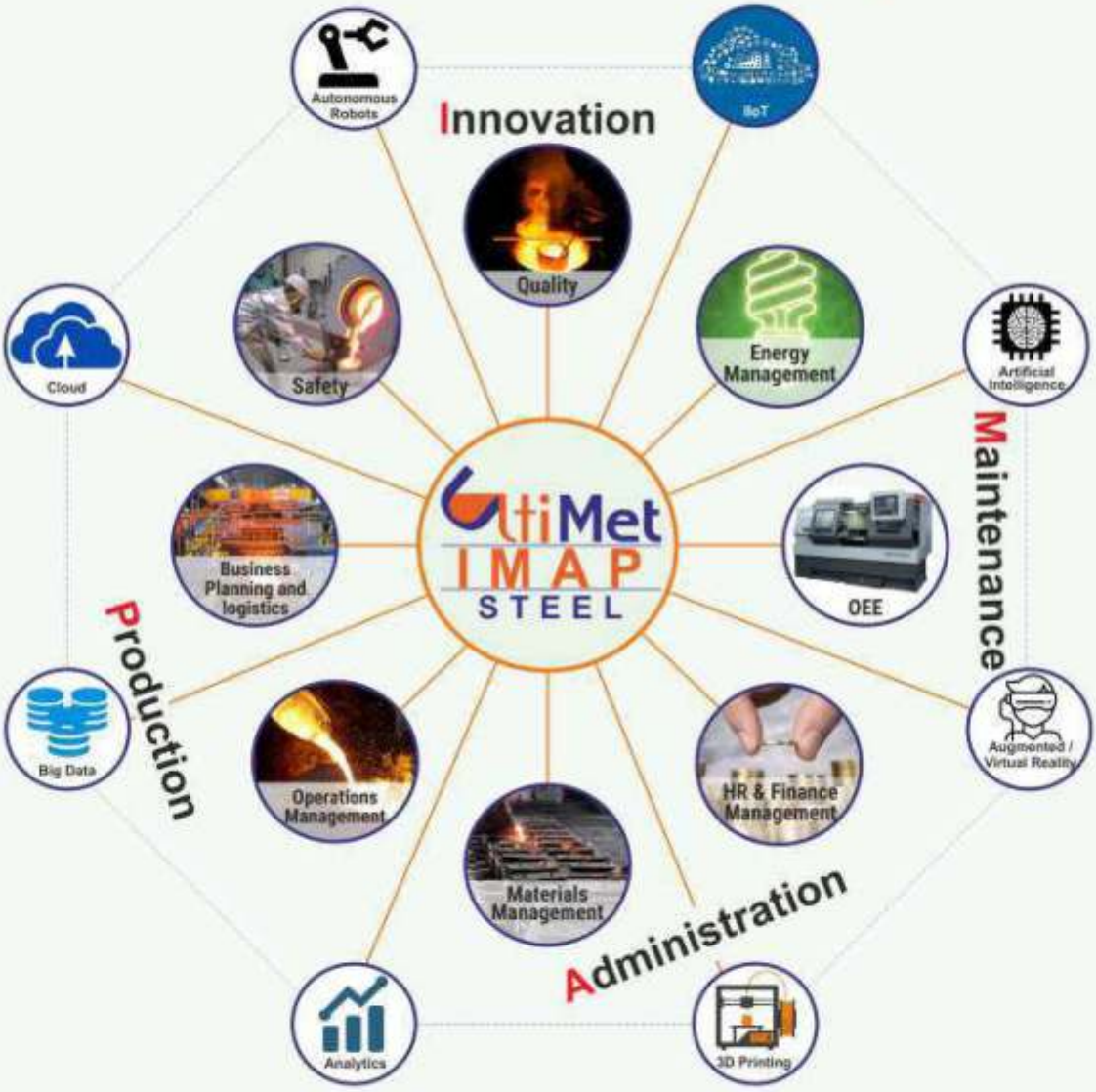

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Email : info@ulti-met.com / rajesh@ulti-met.com

Web : www.ulti-met.com

10th Special Steel Convention (Digital Platform)

Government to support Greenfield projects to meet the rising demand

The Chandekar Group of Publication - Steelworld had successfully conducted its 10th edition of Special Steel Convention (Digital Platform) The on 5th February 2021 which was attended by Steelmakers and automakers companies. Steelworld has been continuously organizing this convention in the past nine years to discuss the various issues faced by the Special Steel Sector.

Special steel applications are widely used in the automobile, railways, engineering, transport, power sector, defenses etc. Special steel is used for parts or manufacturing and maintenance components in equipment which is essential in modern society. So it is the barometer of the Indian Economy and Steel Fraternity. It was attended by Steel makers, Automaker, Forging sector etc.

D A Chandekar, Editor & CEO of Steelworld welcomed V R Sharma, MD, Jindal Steel & Power Ltd. and Yash Munot, VP, The Association of Indian Forging Industry (AIFI). Yash Munot, Vice President of Indian Forging Association which is a user industry of Special Steel. Munot who started the

Yash Munot, VP,
The Association of Indian Forging Industry (AIFI)

V R Sharma, MD,
Jindal Steel & Power Ltd.

Brief Introduction of ACRE

ACRE is a wholly owned subsidiary of CHINA MINMETALS CORPORATION, an important state-owned backbone enterprise and ranked 112nd among the Fortune Global 500 companies, 2019.

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4.3m~8m Top charging coke oven battery

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- Waste water treatment
- Coke oven hot repairing
- Coal moisture control
- By-product refining

Projects overseas

ACRE has completed an array of overseas projects in Brazil, Burma, India, Japan, Kazakhstan, Vietnam and South Africa. Totally, 37 coke oven batteries (output over 20 million tons of coke per year.)
ACRE now has 96% market share of large-capacity coke oven battery in China and 60% market share globally from 2008 to 2018.

Projects in China

ACRE has successfully implemented domestically over 2000 coke oven batteries (total output over 400 million tons of coke per year.)

Greatest honor in technological research and development

- The National Science and Technology Award Conference.
- Held in Great hall of China Council in Beijing on 8th January 2019
- Prize Class One for Progress in Science and Technology for research of "Development & Application in an Environmental-friendly and Efficient Coke making Technology and its equipments".
- Granted by Chinese president Xi presented

- ACRE has the highest turnover and the biggest human resource company among the international enterprises in coke making technology business.

forging business as a first-generation entrepreneur in 2005. He is currently the CEO at Varsha Forgings and MD at KCTR Varsha Automotive.

At the opening remarks of the 10th Edition of Special Steel Convention, Mr. Munot highlighted the effects of pandemic on forging industry, most of the OEMs, two wheelers including infrastructure sector who had lost their initial couple of months due to strict lockdown across India. During lockdown time, we were facing the biggest challenges sharp rise in raw material price of iron ore and dealing in the settlement of price increase was a very tough for the Forging Industry. Now things are improving along with the steel mills are operating at a pre-covid level.

While highlighting the Union Budget 2021, it's a promising budget and fund allocated to 5.53 bln should see the good development in the commercial vehicle segment and specially bus transport segment Rs,.18,200 crore allocation would be the key demand factor for forging sector in the year 2021.

He further highlighted the reduction in duties on specialized machine segment which is the backbone of MSMEs. We are also seeing the biggest setback on the export market is especially global companies are sourcing the India as the market for forging and casting and thereby the export container availability and time is causing a big problem and due to which logistic cost has been increased sharply.

Hopefully things are improving and volumes are also increasing. Looking at the overall demand and Union Budget 2021, we are very optimistic for the forging industry. He also highlighted that bottom-line has increased during this quarter improving along with the volumes of business is also enhancing.

While at the inaugural address, Mr.V R Sharma, MD, JSPL acknowledge the efforts of Indian PM, Shri Narendra Modiji and Finance Minister Smt Nirmala Sitharaman ji for presenting the budget 2021 for infra and going to give a thrust for domestic consumption and export as well.

Industry is opening up and expecting V shape recovery in the coming year. In the infrastructure spending would be a great opportunity for MSME and steel sector. Reduction in custom duty in the steel segment which is a good sign for the industry.

Production of India steel Industry was very low as compared to China which was largely due to strict lockdown measures. Mr. Sharma also highlighted the major concern was about the migration of labour was the major reason for the under utilisation of steel capacity and 12 hours working schedule announcement by some of the state government was one of the best measures to tackle the pandemic effects on steel industry.

He also draw the government towards the lack of new investment coming in the steel sector which is a causing concern to meet the target of 300 ml tonne by 2030 and greenfield project expansion needs to be given the full support for the steel investment in India.

There is a big potential demand in India for the steel industry but we need to have the best support from the government for Greenfields and brownfield projects coming up in India.

He also highlights globally steel prices increase is causing the problem for the OEM and MSME units and OEM must support vendors to pass on the benefits.

Also draw the attention of policy makers to think about power cost which is vary from state to state and therefore we should make it that every state will have the uniform power pricing mechanism which will help the industry to compete with the global market and GOI to work accordingly for the benefit of MSME industry.

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aiding Atma Nirbhara Bharat

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