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Devoted to Iron & Steel Industry

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Indian Refractory matching with the World best for High Temperature Process

Dr Arup Kumar Chattopadhyay, MD, TRL Krosaki Refractories Ltd.

- Is India moving towards Green Steel Making
- Waste to Wealth
- Middle-East Steel demand hoping on revival of Infrastructural projects

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D. A. Chandekar
Editor

Dear Readers,

For more than four months the whole world is fighting the covid-19 pandemic but there is no remedy or the end of the virus spread in sight. Now the world seems to have accepted the principle that along with the life livelihood is also equally important. Thus the economic activity is slowly trying to gear up of course taking some risk. Many companies are managing the activities by asking the employees to work from home but a manufacturing based sector like iron & steel may not be able to do so for obvious reasons.

Of all the user industries of steel, the construction is the least affected sector and accordingly the plants producing the steel used for construction activity are in a better position to scale up the production. The worst hit amongst the user industries may be auto sector and that is why special steels producers are in deep trouble. As we are aware, these steels are used to make the auto parts which are in turn supplied to automakers. The vehicle body is made of flat steels and thus flat producers too have to depend on other user segments like consumer durables, white goods and also exports to fill the demand basket. Few of Indian steel companies have managed higher exports volumes and have strengthened their accounts books. I thought this was quite smart thinking especially when the domestic demand is still weak.

There are other factors too affecting the performance of this industry. Financing, availability of raw materials, logistics do play an important role but we all will have to agree that the real long term stability for the iron & steel sector will come only and only from demand restoration but how the demand can be restored is the biggest question of today. Given the fact that around 70 % of the steel is used in infrastructure and construction sectors, it is evident that if the activity in these sectors improve, it will automatically give a boost to the steel demand in the country. Thus the government has to restart the mega infra projects which are halted for the want of finance. Secondly, they have to further soften the housing loans so that the construction activity gets some forward push. We can only hope that by doing all this, the iron & steel sector gets some trigger and its present capacity utilization level of around 50 % is elevated substantially. Long term viability and sustainability are still far away and if everything goes well, we can expect to reach there only by end of this financial year !

Write your comments : https://steelworldblog.wordpress.com/

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Devoted to Iron & Steel Industry

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

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

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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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Indian Refractory matching with the World best for High Temperature Process

"India can become a hub of innovation because of abundance of production sources and the diversity of the consumption sources. We should use more of recycled /salvage refractory as substitutes of prime raw materials to make our environment cleaner and greener"

Dr Arup Kumar Chattopadhyay, MD, TRL Krosaki Refractories Ltd.

Profile :

Dr Arup Kumar Chattopadhyay is an M Tech in Chemical Technology- (Specialization in Ceramic Tech.) & completed his Ph.D. (Tech.) in "Kinetics of Dehydration and Rehydration of Aluminum Silicate Systems from Calcutta University in 70's.

Dr Chattopadhyay after spending four decades of his illustrious career including holding the coveted position of Managing Director of TRL Krosaki Refractories Ltd, and Chairmanship of TRL-China is still illuminating the following positions gracefully.

- Chairman – Heat works Delong
- Technical Consultant- National Refractories
- Chairman - Refractory Sectional Committee – MTD-15 of Bureau of Indian Standards (Two consecutive terms)

The Indian refractory industry is a Rs 9,000 crore market, with major players such as TRL Krosaki, Dalmia OCL, RHI Magnesita India.

About 75% of the refractories manufactured using magnesia, alumina or silica is used with the rest being consumed by cement and glass, ceramics, petrochemicals and boiler industries.

It is the necessary materials for various high-temperature equipment like in the internal linings of blast furnaces and converters used for steel making and in furnaces for heating materials before further processing etc.

Mr. Dnyanesh Chandekar, Editor, Steelworld had a close interaction with Dr Arup Kumar Chattopadhyay on Post-Covid challenges to Indian refractory sector and its solution to overcome such challenges.

Excerpts :

What is the present situation in Indian refractory Industry?

Indian Refractory industry started its journey way back in 1874. This happened in the Ranigunj work of Burn& company at Lalkhoti (near Asansol in WB). That supplied fireclay based refractories for the Royal Mint of Calcutta. The second organized unit came up in Jabalpur, again for Burn & company in 1890 and was

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producing wet, pugged and hand molded fireclay bricks & shapes. The next unit came up in 1907 in the name of Kumardubi Fireclay & Pottery works (in Kumardubi village, in the then state of Bihar, now known as Jharkhand) .These units were entirely managed by British & Scots and the first refractory plant to come under wholly Indian ownership was that of Bihar Firebricks & Potteries Ltd which started in mid-1920 and was promoted by Mukherjee family who had sizeable properties in coal, fireclay & quartzite mines.

From these early production facilities, today Indian Refractory Industry has come across an arduous but a fulfilling journey and today the Indian refractory industry produces 1.2 million tonnes of refractory. During 90's, when a new wave was sweeping Indian economic landscape and the economy opened up ,some of the world famous refractory manufacturers came up with their production facility, technology and also with shareholding.

Today Indian refractory industry is capable to give the best refractory match for a specified high temperature process. Indian Refractory industry is having both its hardware as well as software in place to meet the exacting demand of the consuming industry and the organizations have deployed initiatives for achieving quality function both with respect to plant and equipment as well as technology. Indian refractory industry is at par with any best known name in the world.

Indian refractory industry presently can provide refractory solution, through product development and changing the design for structural improvement also. Among the recent development in the refractory industry we can give a few milestone projects.

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Today refractories are continuously supporting its major consumers, the Iron and Steel industry with their continuous product optimization.

What are major challenges posed by Covid pandemic to refractory sector and how can they be overcome?

There are as such many challenges for the refractory industry irrespective of Covid pandemic. However Covid pandemic has aggravated the situation. Among many challenges being faced by refractory industry the following are major:

1. The specific consumption is decreasing day by day and as per the figure goes that only 20 years back the refractory consumption used to be anywhere between 30 to 35 kg/ ton of steel production and today it is only 8- 10 kg/ton of steel production. After all refractory is a non-metallic inclusion in steel and obviously it will not be a welcome thing to go to the steel melt as the steel maker is trying to produce more and more cleaner steel . How then the refractory industry will survive when the demands are going down day by day. The possible remedy may be to diversify the market and targeting producers of material other than Iron, steel, cement , fertilizers etc. Some new developments are taking place such as nanotech refractories, chrome free material for secondary refining, cordearite based refractory coating and the industry should look to thermal protection system in space crafts, new rare earth materials based magnets etc.

2. Indian refractory industry is suffering from quality raw material such as magnesite, bauxite, silicon carbide etc and for which we are fully dependent on China ,Europe , Australia etc. we must invest in R & D specially for raw material beneficiation as we have both magnesite & bauxite plenty in quantity but not suitable to be used for quality refractory manufacturing and we must engage research institute, academia and the industry together for creating innovative beneficiation methods for making these raw materials suitable for the industry. We have plenty of silimanite sand and very pure which should be converted to synthetic aggregate. The recent border conflicts with China have created the opportunity for the Indian scientists & engineers to beneficiate all these important raw materials.

3. We must attract and retain talents through long term strategic HRD interventions. We are to change the old and current "Dirty, messy, polluting "image of the industry to a "clean, green and challenging" one.

4. As on day the ROI for refractory industry is very poor and for that there is a need for proper risk management policy and cash flow management.

India can become a hub of innovation because of abundance of production sources and the diversity of the consumption sources. Cost of knowledge in India is amongst the lowest in the world. Finally we should use more of recycled /salvage refractory as substitutes of prime raw materials, since refractory innovation must be guided to make our environment cleaner and greener.

What is the situation in Indian steel sector? How can it convert this situation into an opportunity?

As such Indian steel sector presently is producing 110 million tonnes of crude steel and though few companies have made remarkable results even with the pandemic excellent EBIDTA , there is a general shortfall almost close to 40% of production in the first

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quarter of this financial year due to Covid 19. Govt have taken lot of steps including the avoidance of any disruption of iron ore supply and Govt have announced different packages for increasing the demand. Real estate sector and the infrastructure improvement are the key areas where Govt is putting huge emphasis and the steel experts are of the opinion that demand of Steel is expected to bounce back with the double digit growth in 2021.

The sponge iron manufacturers Association of Chattisgarh, Orissa and West Bengal where the major concentration of sponge iron is there, have demanded a 30% duty for the palate export and once this demand is fulfilled, we will see a huge growth of exports of palate for which technology in India is already fully matured and we are the second largest producer of sponge iron in the whole world. Thus overall there are not many issues on the supply side and there is a need through Govt intervention to look into the demand side. National steel policy of 2017 charted a trajectory for production of 300million tonnes of steel in the country, with the present situation it appears to be little bit optimistic and my considered view is that with proper institutionalization by Govt we can bridge the gap and we can reach close to the target fixed by 2030.

How, according to you, are the short term and long term prospects for refractory as well as steel sectors in India?

We are aware that refractory industry's destiny mainly depends on steel production as 75% of the refractory produced anywhere in the world is consumed by Iron & steel sector.

Our per capita consumption of steel presently is 70 kg and the world figure is 225 kg .So even we consider that we will definitely consume from present level of 75 kg to at least 125 kg by 2030, we will have steel demand more than 200 million tonnes approximately close to 220 million tonnes. One more important factor is the routes for steel making in India are changing fast where IF/ EAF route is increasing day by day and BF/ BOF route is reducing. and this fits well into our availability of the natural resources such as iron ore and coking coal . Depleting resource of iron ore lump and lack of availability of coking coal is forcing the steel maker to depend more on iron ore fines to be converted into palate and sponge for which the IF/ EAF route is suitable.

Having said that the steel sector is bound to grow both in short term and long term and the refractory industries future is also very bright. However the refractory industry to ensure that the entire demand is produced in this country need to immediately overcome few of the challenges already discussed while answering Q 2.

Finally the refractory industry is able to provide the full range of refractory products along with solution to enhance the performance during the entire steel making process . Today we can improve the lining performance by suitably adapting the fundamentals of particle size distribution and correlating all thermomechanical & thermo dynamic simulation and finally arriving at optimal composition for any steel making process . The refractory industry is also capable to combat all possible harsh conditions arising out of steel making of the finest grades of steel.

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ANSWER 04

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DANIELI GREEN STEEL

Is India moving towards Green Steel Making

Background

India is a Party to the UNFCCC and has been part of all its Treaties and Agreements aimed at addressing Global Warming. In line with its commitments, India has also ratified the Paris Climate Agreement or COP21. The agreement adopted on 12th December 2015, aims at restricting the global warming below 2 degree centigrade above the level and also to pursue efforts to limit the increase its temperature to 1.5 deg C. In response to its commitments to UNFCCC, India has also submitted its Intended Nationally Determined Contributions (INDC) on 2nd October 2015, committing to improve emission intensity of its GDP by 33-36% by 2030 below 2005 levels.

Now, very recently, during the Leadership Group Meeting for industry Transition at the COP25 India has signed the Joint Ministerial Statement on 7th July 2020, to accelerate the low carbon transition of the industry.

All these commitments call for action plans by India and particularly, by the Indian steel industry to minimise, if not phase out, use of fossil fuel inputs in iron & steel making. Now the question arises, is it possible or doable?

ACR Das
Former Industrial Advisor
Ministry of Steel

Status of Steel

Needless to mention, steel is one of the most important material for our economic development. Steel enjoys exceptionally high strength together with very good formability properties. Steel, therefore, remains the material of choice for use in housing, construction, infrastructure, automotive,

rails white goods, energy structure and many more applications.

Globally, 1870 million tonnes (MT) of steel is produced and India remains the 2nd largest producer of steel in the world. According the WSA, India produced 111 MT of steel in 2019. Further, Government has announced a very ambitious plan to more than double the steel capacity by the need of this decade. According to National Steel Policy, 2017, India's crude steel making capacity is projected to increase to 300 MT from the present level of 142 MT.

Iron ore is the basic raw material for production of steel. Today, approx 72% steel is produced through the primary route (BF-BOF), partially supplemented by Smelting Reduction Processes (COREX and FINEX) and the balance quantity (28%) was produced through the Electric Furnace route. In India, position is different. During FY 2019-20, India produced 109 MT of crude steel which was contributed by three routes namely :

- Oxygen Route (BF-BOF and BF-EOF):45%
- Electric Arc Furnace Route : 26%
- Electric Induction Route : 29%

Environmental implication of Steel

According to data available from the Energy Statistics, 2019, Ministry of Statistics & Programme Implementation, Government of India, it is noted that Indian steel sector accounts for approx 8% of total energy consumption of 554 million tonnes of oil equivalent (MTOE) in the country (2017-18):

Sectors	Energy Consumption	
	MTOE	% Share
Iron & Steel Industry	46	8
Other Industry	261	48
Total Industry	307	56
Transport	53	9.6
Building	58	11
Others	117	21
Non Energy use	19	3.4

In view of high energy consumption particularly, fossil fuel consumption, CO2 emission intensity of steel production is also very high. Globally, iron & steel sector accounts for 7-8% of total CO2 emission (33.1 Giga tonnes). A comparitive analysis of Indian steel companies vis-a-vis their counter parts abroad, shows that CO2 emission intensity in Indian steel plants is much higher (Table-).

Table: CO2 emission intensity in Indian and international steel plants (2015-16)

Indian Plants*	CO2 emission intensity (tonnes/tonnes of crude steel)	International plants**	CO2 emission intensity (tonnes/tonnes of crude steel)
RINL, Vizag	2.91	Tata Steel	1.87
JSPL, Raigarh	3.15	Tata Steel, Europe	1.98
BSL, Bokaro	2.76	Nippon Steel, Japan	2.02
BSP, Bhilai	2.76	ArcelorMittal	2.12
JSW, Bellary	2.67	JFE Steel, Japan	2.02
JSW, Dolvi	2.25	ThyssenKrupp, Germany	2.04
DSP, Durgapur	2.64		
RSP, Rourkela	2.57		
TSL, Jamshedpur	2.40	WSA benchmark	1.67 (Global Average)

**Source :www.greenbusinesscentre.com*
*** Source: Corporate Sustainability Reports of individual companies*

There are several reasons those attribute to these state of affairs namely :

i) Technological Obsolescence: Though several new and modern have been set up in the recent past and several others have been modernised and capacity expanded, overall technological status is not comparable to the global players. As such, while some Indian plants/facilities are operating almost at global benchmark level, many lag behind the global level of performance. This is particularly, so in respect of the public sector steel plants and coal sponge iron based steel plants.

ii) Lack of adoption of relevant technologies for harnessing waste energy: Of late, several clean and green technologies for harnessing waste heat have been adopted by some plant but limited to only some production facilities. Other plants need to adopt these best practices to improve their performance.

iii) Raw Material Constraints: One of the main factors

responsible for poor key performance indicators in Indian plant is poor quality of raw material particularly, high alumina and silica and their adverse ration in iron ore and high ash of coal when compared with global practices. Though, washing and beneficiation practices are adopted to remove gangue from ore or coal, a lot need to be done.

The above factors summarily explains the relatively poorer performance of Indian steel plants resulting in lower productivity, higher resource consumption, higher energy consumption and CO2 emission besides higher waste generation

Government Initiatives

Government has launched several initiatives towards improving the overall efficiency in the economy by adopting climate friendly low carbon cleaner pathways. One of the flagship programme launched by Bureau of Energy Efficiency, Ministry of Power is the Perform Achieve and Trade (PAT). This is a market based energy efficiency trading mechanism launched under the National Mission for National Mission for Enhanced Energy Efficiency (NMEE) directing to reduce specific energy consumption in industrial sector including steel. The scheme was launched in 2012 when the first PAT Cycle was announced, and so far six PAT Cycles have been announced. The outcome and evaluation for the first cycle has been completed and it shows that the scheme has exceeded the allocated target energy consumption by 42%. This has also results in avoiding coal consumption by 4.9 MT and CO2(equal) emission by 6.51MT.

PAT Cycle	Duration	No of Steel Units	Energy Consumption (MTOE)	Energy Consumption Targets (MTOE)	Achievements
I	2012-15	67	25.32	1.481	2.10
II	2015-18	71	40.44	2.41	Under Assessment
III	2016-19	29	7.648	0.457	-do-
IV	2017-20	35	3.22	0.193	Under implementation
V	2018-21	23	2.82	0.169	-do-
VI	2019-22	5	0.515	0.031	-do-

Besides , Government has launched several other schemes such as increase in renewable energy capacity , National Solar Mission, Nationwide campaign for energy conservation, Zero Effect Zero Defect with Make in India campaign to enhance energy and resource efficiency and waste management in India.

Outcome Analysis & Suggested Strategies

Notwithstanding the above initiatives, the Indian steel plants have to go a long way to catch up the global best practices and benchmarks. This would call for multi-pronged initiatives and strategies in short term and long term perspectives not only to facilitate the Government to achieve COP21 targets but also to address its carbon neutrality objectives by 2050.

According to a recent study by TERI, it is noted that Indian steel demand would grow to around 490 MT by 2050. If this comes true, it would imply that steel sector's energy demand would grow from the present level of 56 MTOE to 235 MTOE and CO2 emission from the current level of around 242 MT to 837 MT by 2050 under the BAU assumptions. The very fact that India is a signatory to the Low Carbon Transition Pathways, it goes without saying that India cannot sustain this level of production and emission.

Under this backdrop, it is not only necessary but essential that Indian steel industry addresses the problems and issues to substantially reduce green house gas emissions from steel production to achieve the global commitments. This would also call for strategies for adoption of innovative and disruptive green technologies and pathways towards the near net carbon neutrality by the mid of the century.

But the question arises, can India afford to limit its steel production to limit CO2

emission and if not, are there cost-effective affordable technologies. The answer as of today, is clear No. If so, what would be the appropriate roadmap and course of action to direct the future growth of Indian steel industry?

Thus, challenges are many and solutions are few which mainly revolve around enhanced energy and resource efficiency with circular economy, to catch-up the global benchmarks by existing integrated and mini steel plants by end of this decade. This is possible only through adoption of BATs and SOACTs (Best Available Technologies/State-of-the-Art Clean Coal Technologies) to substantially reduce their resource consumption, energy consumption and GHG emissions.

Special efforts are particularly, needed by coal based DRI-EAF/EIF plants to modify/improve their technologies so as to substantially reduce coal consumption, failing which by phasing out the existing technologies by alternative greener options. Alongside maximising energy and resource efficiency product side solutions also need to be resorted to reduce steel intensity of products, increasing lifetime of steel use, adoption of new innovative products like AHSS in vehicles which have direct impact on reduction of CO_2 emission over life cycle.

Needless to mention here that if the Indian steel industry is to sustain its operation in longer term perspective, it has to find innovative ways and means to reduce CO_2 emission from the existing plants. Simultaneously, the industry has to explore adoption of radically different technologies and practices to reduce dependence on fossil fuel as far as possible in favour of greener options. Some of the suggested course of action in the near and long term perspective are explained in following paragraphs.

- **Enhanced Use of Steel** Scrap: Steel is 100% recyclable and can be infinitely re-melted and reused. Recycling of scrap replaces the use of virgin inputs like iron ore or coal, which has direct impact on energy consumption and CO_2 emission reduction.

  According to available information, steel production using scrap is 85% less CO_2 intensive than iron primary route. In India, for various reasons, there is no action plan either at Government level or company level to direct scrap consumption as a strategy to reduce energy or CO_2 emission. The integrated plants still use as low as 10-12% scrap as against the normal practice of 20-25% abroad. Similarly, in Mini steel plants, particularly EIFs, use of scrap, due to limited indigenous availability and higher price of imported scrap vis-a-vis locally available sponge iron,is too less (only around 15-20%). In order to achieve the reduced carbon foot print objective in Indian steel industry, it is high time that steel companies go in for maximum use of scrap in steel making. Government has also to extend its helping to ensure increased scrap availability from domestic sources and imports. Ministry of Steel has already announced the Steel Scrap Policy to facilitate scrap recycling. Government also needs to take a decision at the earliest to waive the 2.5% customs duty on steel scrap, to promote use of scrap in electric steel making in India particularly, the mini steel sector.
- **Enhanced use of Natural** Gas: Natural gas continues to be the clean and most ideal reducing gas source for production of DRI. There are well established


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technologies (Midrex and HYL-III / Energiron) and several plants are already in operation in India. According to published information it is noted that though the net energy consumption of NG based DRI-EAF steel production is comparable to BF-BOF, it is lower than the NG substituted processes (MXCOL COG-EAF, MXCOL with SES-EAF and BF/Midrex –EAF etc). It is also noted that CO2 emissions from NG based DRI-EAF route are the lowest.

Table- : Energy Consumption and CO2 emission in different process routes.

Process Route	Net Energy Consumption (GJ/tcs)	Net CO2 Emission (t/tcs)
BF-BOF	18.56	1.870
NG Gas Midrex-EAF	**18.54**	**1.269**
MXCOL with COG-EAF	27.51	1.561
MXCOL with SES-EAF	23.05	1.923
BF-Midrex-EAF (1.2:1)	20.66	1.837

Source: Steel Research International: Modelling Midrex based Process Configurationfor Energy and Emission Analysis.

It is thus found that though NG is not a green fuel in the context of carbon neutrality, it has much lesser carbon footprint (approx 30%) as compared to the primary route of stel making. Unfortunately, its adoption in steel sector is very low. Even the existing NG based DRI plants are not operating at full capacity because of short supply of gas. Of late, in light of the growing demand of NG in India, Government is promoting investment in areas relating to import of natural gas and transportation of domestic gas across the country under its flagship Urja Ganga Project But the contentious issue is the price of imported natural gas. Industry claims that unless gas is available at around US$ 6, its use may not be economically viable. Once this issue is resolved, it is hoped that use of NG in steel sector (production of DRI, BF injection as well as heat source) will increase many fold in years to come. And if this happens, it will go a long way in reducing overall Co2 emission from the steel sector.

- Adoption of Coal Gasification based DRI Production: In countries like India, where there is limited availability of coking coal or natural gas and there is huge reserves of non coking coal, coal gasification gas (Syn-gas) based steel production appears to be an attractive optionatleast as a Transition technology in the near future. Syn-gas production is well established and one DRI plant is commissioned also operational in India at Jindal Steel and Power Ltd, Angul. However, there are issues in coal gasification of very high ash non coking coal available in India. Also, there are issues relating to high CO2 emission and cost per tonne of steel produced vis-a-vis other routes. However, if the plants could be combined with CCS/CCUS, there appears a brighter future. Of course, this is subject to development of the CCS/CCUS technology and also its cost.
- **Adoption of HISARNA** Technology: Hisarna is a Smelting Reduction process to produce hot metal from iron ore fines using non coking coal. The process uses 20% less energy and emits 20% less CO2, and if combined with CCS/CCUS- can achieve a reduction in CO2 emission even up to 80%. An additional advantage is elimination

of SOx, NOx and PM and also gives out concentrated CO2 in exit gas which makes CO2 capture much easier.The process has been developed under the ULCOS consortium at plant scale (65000 tpa) at Tata Steel plant, Netherlands. In November 2018, it was announced that a Large-scale Demo Plant is expected to be build soon at Tata Steel Jamshedpur (or Ijmuiden). However, the process seems to getting delayed, may be also due to COVID 19. Nevertheless, it is expected that this technology will come to market soon, may be within next 10 years time which, when combined with cost effective CCS/CCUS, will provide a good respite to the steel sector.

- Hydrogen Reduction Technology: Today, DRI is produced in shaft furnace using NG which supplies H2 and CO gas that actually takes part in reduction reaction. Approximately, 50-55% reaction comes from H2 and the remainder from CO. Globally several technologies are under development to gradually increase proportion to H2 use even upto 100%. Reduction of iron ore by H2 is however an endothermic reaction and hence options such as reverse shift reaction are being explored to address this challenge.

Presently, there are two established processes for H2 production namely, Steam Methane Reforming (SMR) and Coal Gasification. However, both the routes are emissions intensive without CCS/CCUS. A third option is water electrolysis which appears to be a promising alternative in years to come, particularly if the availability of cost effective CCS/CCUS picks up. Globally, many companies and groups are engaged in developing H2 as an energy source and also as a reduction in DRI plant. Some of the Global initiatives towards green hydrogen or Green steel are given in the below :

Global initiatives for iron & steel production using green H2

Initiatives	Project highlights
HYBRIT (https://www.sei.org)	● 2016: HYBRIT launched as a JV initiative between steel maker SSAB, Mining Group LKAB and energy Group Vattenfall. ● TENOVA, HYL/ENERGIRON contracted to supply DRI plant /technology . NEL Hydrogen to supply the 4.5 MW electrolyser ● 2018-2024: 15000 tpa Pilot plant phase at a cost of SEK 1.4 billion (SEI Grant: SEK 528 million and balance from Hybrit owners). Likely source of Hydrogen: Electrolysis of water using renewal energy. ● 2025-2035: HYBRIT Demo Plant Construction & Operation phase at an estimated cost of US$ 1 billion. ● Has potential to reduce H2 by over 94% compared with primary routes. Residual CO2 from EAF steel making. ● Electrolyser Size: 400 MW for a 1 MTPA plant ● Economic Viability: Preliminary studies indicate that viable.H2
Hamburg (https://storagearcelormittaluat.Blob.core.windows.net) (DRI Update, July 2020)	● Arcelor Mittal has commissioned Mdrex Technologies to design a experimental/ pilot plant (100,000 tpa) at its Hamburg works, Germany to demonstrate use of H2 in DRI/steel making. ● Initially to be based on grey H2 (using H2 from the off gas of its NG based Midrex plant (0.5 MTPA). ● Conversion to green H2 from renewal energy sources will take place once available in sufficient quantities at economical cost. ● Energy for H2 production to come from wind farms off the

	coast of Northern Germany.
GETH2 (www.chemengonline.com)	• German Energy Company RWE and ThyssenKrupp Steel Europe have signed an agreement to produce H2 by electrolysis of water. • RWE planning to build a 100 MW electrolyser to supply 1.7 TPH of green H2 to be used in one of the BFs of ThyssenKrupp at Duisburg for production by 2022.
SALCOS (https://salcos.salzgitter.ag.com) (https://www.green-industrial-hydrogen.com)	• Salzgitter AG , an integrated steel producer propose to gradually phase out BF-BOF facilities using H2 based DRI –EAF thereby, slashing CO2 emissions upto 95%, • Salzgitter and Tenova signed an MOU to produce low CO2 steel. DRI to be produced in Tenova HYL reactor using renewable H2 from wind energy. • SALCOS linked to GrinHy project promoted by Salzgitter alongwith 5Partersto build a Steam Electrolyser for the energy efficient production of H2. • Salzgitter has awarded a contract to Siemens for the construction of a 2.2 MW Proton Exchange Mmbrane (PEM) Electrolysis plant alongwith 7 wind turbine with a capacity of 30 MW. The H2 plant to commence operation by the end of 2020
SUSTEEL (https://europa.eu) (https://www.voestalpine.com)	• Voestalpine AG proposes steel production based on H2 based DRI-EAF steel making. Iron ore reduction by using Hydrogen Plasma, for which research is ongoing at pilot plant at their Donawitz works. • SUSTEEL Project linked to H2FUTURE project for production of renewable hydrogen. A largescale 6 MW PEM Electrolysis Plant is to be installed and operated at Linz, AustriaSIDERWIN (ArceloeMittal Sustainability Report) • ArcelorMittal together with 11 partners has developed a Electrolytic Cell Prototype in a R&D project which has proved the viability of iron ore electrolysis. • The Group together with 11 Partners engaged in construction of a 3 Metre industrial cell with EU 7 million funding from EU Horizon 2020 to test various types of iron ore in building a this technology together • With access to affordable green electricity, the process to pave the way to zero-emission iron ore reduction.

Conclusion

Steel production in India is expected to largely depend on primary sources (iron ore) which will be supplemented by secondary route. To achieve the Paris Agreement and the Carbon neutrality objectives, the primary steel production will have to gradually shift towards low-emissions energy sources through a combination of use of renewable energy, circular carbon and combined use of fossil fuel with CCS /CCUS. Adoption of low emission Transition Technological options may be considered, if found appropriate. There are challenges in production of green energy sources like H2 and its use in metallurgical operation. Nonetheless, H2 is being looked upon as a energy source and reductant for reducing iron ore in future. India therefore, needs to start working on H2 as early as possible, through R&D and Pilot Plant initiatives, to help commercial production of H2 to ultimately address the problem of CO2 emission and global warming.

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India's steel consumption to fall in FY21, first decline since financial crisis: Moody's

India's Steel Consumption to fall by around 10% and steelmakers' sales volumes to shrink around 6% in the 12 months to March 2021 said Moody's investors service in a report on Wednesday.

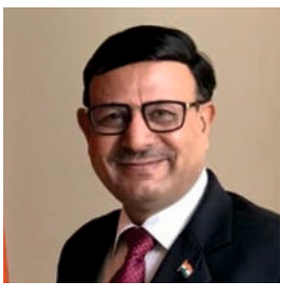
"We assume that economic activity has begun to gradually pick up from July. However, given the possibility for second or third waves of virus infections or deeper economic costs than currently factored in, downside risk to these forecasts are significant," said Moody's report titled Steel - Asia Pacific: Sharp profitability decline on virus-wrought demand destruction keeps outlook negative.

Indian steel-makers, Tata Steel and JSW Steel will bear the brunt of a projected 10% drop in steel consumption in the country, the first decline since the global financial crisis, the report said.

"Competitive cost of production, use of domestic iron ore that is cheaper than imported ore, and brand strength in India will help Tata Steel and JSW Steel to minimize volume decline and generate above-average profitability".

Moody's rated steelmakers in India include Tata Steel, JSW Steel and Vedanta's Electro Steel.

JSPL's steel export thrust to taper amid Indian market recovery



V R Sharma, MD, JSPL

JSPL is one of India's major steel companies with an overall domestic steel production capacity of 8.6 million mt/year, and among the few private mills in India that did not cut production drastically at the time of the imposition of a country-wide lockdown on March 24. It remains committed to supplying its domestic market given its long-term growth potential, Vidya Ratan Sharma, the steelmaker's managing director, told S&P Global Platts in an exclusive chat this week.

India was a net exporter of finished steel products in the first quarter of fiscal 2020-21 (April-March), selling 3.27 million mt, up 145.3% year on year.

Export strategy

JSPL's total exports stood at 900,000 mt in the second quarter of 2020, spanning markets like Europe, China and Southeast Asia. The company's data showed total exports to the tune of 248,000 mt in April, 401,000 mt in May and 250,000 mt in June.

"We were not a very big player in exports, but ... we discussed with a couple of our trading partners, and we got a good breakthrough from Europe," he said.

Sharma spoke of the "serious problem of steel shortages" in Europe at the start of the regional lockdowns to fight the coronavirus providing an opportunity for JSPL to export a variety of steel products to the region, including plates, beams, wire rods and specialty coils.

The mill thereafter got "another breakthrough" from Saudi Arabia and the UAE given the inactivity of Chinese and South Korean suppliers during the lockdown, and so JSPL "started supplying to them."

Sharma mentioned that this was followed by enquiries for semis from Southeast Asia as Russians, Ukrainians and the Iranian suppliers were hindered by the congestion in the Suez canal, among other things.

Additionally, the availability of small-sized vessels of 30,000 mt, especially to Vietnam, which were already idle, made freight charges competitive for export from India.

Exports to China

"Chinese construction industry was booming, so they were also looking at the right partner, and we were also looking at the right buyer. So it was an understanding as per the convenience of both buyer and seller," he said on JSPL's exports to China.

"The landed cost to the Chinese customer was equivalent to whatever the landed cost they were getting from Russia and Ukraine, and that has helped us," he said, adding freight from India to China at the time stood at $12/mt with voyage time as 7-8 days.

Apart from China, JSPL found export opportunities in Australia, Indonesia, the Philippines and Vietnam, which were capitalized, he said. The mill is likely to continue with exports to China amid a lack of "any instruction or indication" from the government of India against it, even though Indian exports cannot substitute Chinese exports, he added.

JSW Steel cuts output, loses money in quarter ending June 30, 2020

JSW Steel Ltd. says its crude steel output dropped by 30 percent in the quarter ending June 30 compared with output in the same time frame in 2019. The steelmaker also has reported a loss of $1.46 billion Indian rupees ($19.5 million) for the quarter.

The quarter ending June 30 is the first in JSW Steel's 2021 fiscal year. In addition to output being 30.2 percent lower compared with the same quarter in the prior fiscal year, it dropped 25.4 percent compared with the prior quarter as COVID-19 caused economic slowdowns in India and other JSW operating areas.

The company says its 2021 fiscal first quarter was "marked by formidable challenges of disrupted supply chains" and an "unparalleled drop in demand and activity levels" in its home market of India.

Regarding its United States operations, the company notes it has temporarily idled its electric arc furnace (EAF) mill in Ohio and says its plate and pipe mill in Texas lost $11 million in the most recent quarter. The company's mill in Italy also lost 7 million euros ($8.2 million) in the 2021 fiscal year first quarter, according to JSW.

Regarding its outlook, JSW writes in notes accompanying its results, "Economic activities are picking up across the board" in India but adds that localized COVID-19-related lockdowns there remain "a key risk to sustain the pace of recovery."

Operating margins of steel firms to decline by 200 basis points in FY21: Crisil

Operating margins of domestic primary steelmakers' in 2020-21 is expected to decline by 200 basis points to 15% on lower volumes and realisation over 2019-20. However, this would still be much higher than the decadal low of 9% clocked during the previous steel sector slowdown of 2016, rating agency Crisil said on Thursday. "We expect operating margins, which had slid 400 bps last fiscal from a peak of 21% in fiscal 2019, to fall another 200 bps to around 15% this fiscal," said Isha Chaudhary, director, Crisil Research.

Primary steelmakers contribute to 58% of the domestic steel production. India had produced 133 million tonnes finished steel in 2019-20. Crisil said demand for steel is likely to recover during the remaining period of the current fiscal, buoyed by pent-up demand, government spending on rural housing and roads, and growth in lower-margin exports. But that would not make up for the loss in the first quarter of the current loss. "The percentage fall in sales volume on-year is likely to be in high single digit," it said.

Tata Steel to commission first scrap-based plant in Haryana's Rohtak soon

Tata Steel flagged-off the first raw material consignment of ferrous scrap for trials at its steel recycling plant being set-up in Rohtak in Haryana, on Friday last week.

The Scrap Processing Plant of 0.5 Million tonne per annum (mtpa) capacity is scheduled to be commissioned soon. It is the first such facility in India, equipped with state-of–the-art scrap processing equipment such as Shredder, Baler, Material Handler etc.

The BOO partner is M/s Aarti Green Tech Ltd, a subsidiary of M/s M/s Aarti Green Tech Ltd, a subsidiary of M/s Aarti Steel Ltd.

The scrap would be procured from various market segments such as End-of-Life Vehicle scrap, Obsolete Household Scrap, Construction & Demolition scrap, Industrial Scrap etc. This scrap would be processed through mechanised equipment and the high Quality processed scrap would be supplied to Electric Arc Furnaces (EAFs), Induction Furnaces (IFs) & Foundries for downstream steel making, satiating their long-standing dem ..

Steel Recycling Business is a definitive green step by Tata Steel towards sustainable steel production and ecosystem. The steel produced through the recycled route entails lower carbon emissions, lower resource consumption & lower energy utilisation, an official statement said.

Commenting on it, Yogesh Bedi, Chief, Steel Recycling Business, Tata Steel, said:"Steel Recycling through the Electric Arc Furnace (EAF) route is a global trend and going forward it would become imperative for for India's sustainable growth aspirations."

The initiative aims to provide the much-needed raw material fillip to the steel industry by making available Quality Processed Ferrous Scrap, streamlining the currently unorganised scrap supply chain, lowering the dependency on imports.

The National Steel Policy envisages a 300 mtpa steel production in India by FY30 and steel recycling will play a pivotal role in attaining this ambition.

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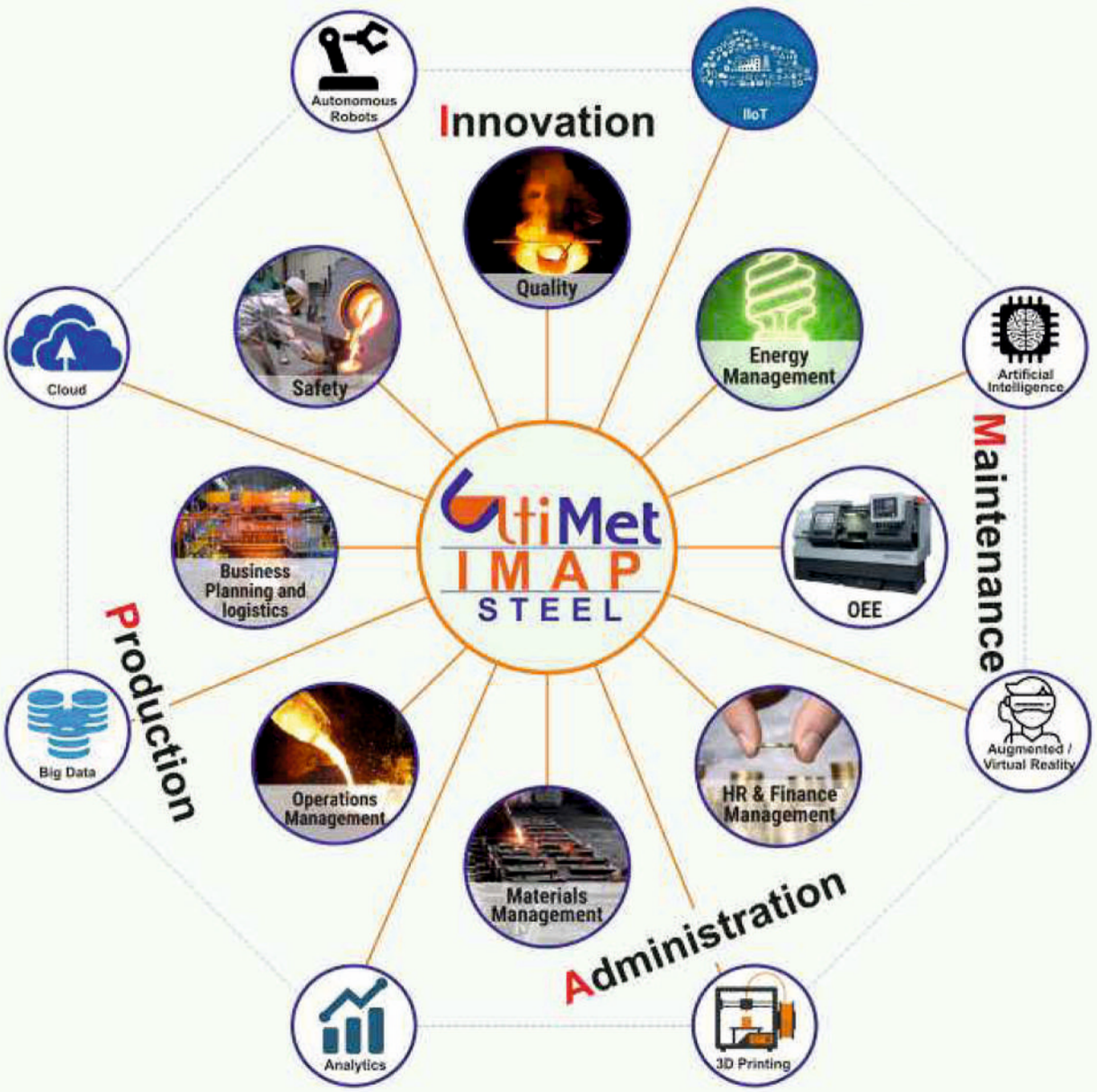

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India's crude steel production at 6.8 MT in June: Steel Ministry

The steel sector in India has started showing signs of improvement and in the month of June the country's crude steel production stood at 6.8 million tonne (MT), according to the Ministry of Steel.

At, 6.8 MT, the production was 17.7 per cent higher over May, 2020, but on a year-on-year basis it was lower by 27.2 per cent over June 2019, the ministry said in an update.

It noted that economic activities, after hitting the nadir in April 2020 due to spread of COVID-19 pandemic and nationwide lockdown, have started showing signs of improvement from May 2020.

"This was reflected in the performance of eight core industries (with a weight of 40.27 per cent in IIP) which as against a decline of 37 per cent in April 2020 registered a decline of 23.4 per cent in the month of May 2020. Similarly the Index of steel production which fell sharply by 83.9 per cent in April 2020 registered a decline of 48.4 per cent in May 2020," the ministry said.

On the output of steel, it said the production has shown a consistent improvement after witnessing a decline in April this fiscal.

The ministry further said the production of finished steel in June 2020 at 5.9 MT, was up 15.6 per cent compared to 5.1 MT in May 2020. However, on year-on-year basis, the output of finished steel in June 2020 was lower by 33.3 per cent.

On month-on-month basis, in June 2020, the retail prices of HRC (hot rolled coil), CRC (cold rolled coil) and rebar increased by 1.43 per cent, 1.69 per cent and 2.17 per cent respectively, due to uptick in various activities because of phased relaxation in lockdown along with an increase in exports during the month.

The government has set a target of scaling up India's crude steel making capacity to 300 million tonne by 2030. The ministry also said while ensuring increase in production of steel and its consumption, it is also necessary to identify and address the challenges the users face in terms of adopting domestic steel products.

Iron and steel export from India rise by more than 100% in June: EEPC India report

Export of iron and steel products witnessed a sharp rise of more than 100% in June, even as export of engineering goods from India registered a decline of 7.24%, said an analysis report by engineering export promotion council of India, on Friday.

“Out of 33 engineering export items ,27 recorded negative year-on-year growth in June, while all the six positive entries related to metals, with iron and steel being on top of the table,” the report said.

A drop in domestic demand, disruption in supply chain and acute shortage of construction labour led several top steelmakers to export more than 50-60% of their sales volume during May-June period.

Iron and steel recorded more than 100% growth in exports during June 2020 with shipments of $1.32 billion against $653.52 million in the same month last year. Non-ferrous metals witnessed a growth of over 30% during the same period.

EEPC India analysis also showed sharp decline in exports of industrial machinery, auto components, air-condition and refrigerators, machine tools and host of other items. The drop in exports value went up to 83% in some cases, like railway transport, it added.

Overall engineering exports in June dropped by 7.24% after a severe drop of 64 % in April amidst near-global lockdown and 24% decline in May, 2020.

India extends BIS registration deadline by three months

The Indian Ministry of Steel today extended the enforcement date of its mandatory quality regime on six products — including ferro-silicon and ferro-nickel — by three months to 23 October, providing relief to alloy importers and consumers.

News of the extension came a day before the previous deadline of 23 July. This is the second time the deadline has been extended this year, as visa and travel restrictions caused by the Covid-19 pandemic have slowed the registration process.

Market participants had expected another extension as importers would have been forced to sell their products elsewhere, and supplies to Indian steel manufacturers would have been disrupted.

Products notified in India's steel and steel products quality order cannot be produced, sold, traded, imported and stocked unless they bear the Bureau of Indian Standards (BIS) mark. Domestic products manufacturers have to obtain BIS certification, while foreign suppliers must obtain BIS registration.

The Indian steel ministry recently added ferro-silicon with an Si content of more than 55pc for compulsory certification. Over the past three years, India has imported almost 200,000 t/yr of such material, mainly from Bhutan, China and Malaysia. Between April 2019 and March 2020, India imported 185,790t of ferro-silicon, down from 188,195t a year earlier. Shipments from Bhutan increased by 21.5pc to 125,367t over the same period, whereas Chinese imports dropped by 1.3pc to 24,965t from last year, official data show. Domestic ferro-silicon production stood at 90,000t in 2015-16, 2016-17 and 2017-18.

Waste to Wealth

The best way to treat waste is not to produce it at all; but in case it is produced then it should be treated in a way that it can be converted to wealth.

Waste that is not treated and reused is dumped in the open causing pollution for the community and attracting penalties for the company.

The best way to treat waste is thus to recover the reusable from it and find uses for those which cannot be reused in the production cycle. Such words are easier said than to convert into plans of action.

Three sets of technologies are thus attached to the management of waste. One set recovers the valuable from the waste to recycle in production such as iron oxide from slag or dolochar or waste heat from furnaces and coke ovens.

The second pertains to finding use for waste products such as slag, sludge, bottom ash and so on. The third set of technologies pertain to the disposal of waste that can neither be recycled nor used and must be dumped; carbon sequestration.

In India, technology seems to be the main problem but across the world, waste management technologies are usually very well laid out. The problem there is to network the end users into a long term and dependable buying contract.

Dr Susmita Dasgupta

JCE, Economic Research Unit
Joint Plant Committee

Waste is a product, which if must be used in a system of modern industrial application must have a regular supply; unfortunately for waste products, there can be no regular production.

The irregularity of the arising of the waste, and the gradual decline in its production with improvements in technology makes the supply of waste

tentative and rather contingent.

The uncertainty in its production makes it difficult for waste to develop a market and hence to be converted into wealth. Even if there are buyers who would want to use waste for their reuse, using waste becomes a problem due to erratic supply.

Also, waste is no more than 10% of the total production of the main product and investing in technologies for this minor percentage sometimes becomes a burden for the companies.

Investments are needed to retrieve the waste; investments are needed to set up elaborate laboratory facilities to treat waste, investments are needed to find use for waste in many other applications such as bricks, road making and so on and investments are needed to market the waste.

The above then add up to enormous investments which firms may not like to do. Besides, there is no guarantee that the end users will prefer to use the waste product as a substitute for the regular product; there is little guarantee that steel slag granules will be used in place of stone aggregates given that the former being heavier costs more in transportation.

Also, cement can be produced in large scale, such economics of large scale may not adhere for slag, which is a retrieved product and costs cannot be matched. Therefore, waste to wealth is a difficult proposition and not an easy one; it is far less a matter of technology but of hard economics.

What is the way out for waste to wealth? I propose that we need an aggregator in terms of an investor who can collect waste and centrally process the same.

The centralizing of waste is especially importantaspect of its recovery and channelizing the same to a diverse set of end users. Also, a centralized waste management company is likely to also bring in investments on board which will absolve the individual companies of investments which is looked upon by them as a wasteful expenditure.

The centralizing aggregator is an investor, supplier of technology as well as a marketing agent for waste products. Such an institution will go a long way in helping the case of waste to wealth.

Middle-East Steel demand hoping on revival of Infrastructural projects

Sundeep Rao
Director - **Sohar Steel**

B S Shetty
General Manager - **Commercial**
Al Ghurair Iron & Steel LLC

A. N. Venkat
CEO, **Al Jazeera Steel**

Manikantan Ganesan
Manager- **Product Management, Marketing & Strategy, Emirates Steel**

D. A. Chandekar
Editor & CEO - **Steelworld**

Steelworld Magazine has always strived hard to analyse the Post Covid-19 pandemic situation impact on the Middle East regional economy and its further impact on steel demand in the region.

To analyse the Covid-19 pandemic situation, combined with the timing of the oil price collapse, Steelworld Mahazine organied 3rd series of Webinar on Steel "The Way Forward for Steel Sector in Middle East Region which was concluded on 22nd June 2020.

As we are aware of that Middle East steel demand heavily depends on the largest infrastructure spend as a 6.9 per cent of the proportion of its GDP. During the pandemic situation, Middle East Region quickly imposed measures to curb the spread of the virus, the construction and steelmaking industries were categorized as essential and were not subject to closures, but operations needed to be scaled down.

Middle World is has conventionally the most growing region in the world as far as the steel and infrastructure concern. Till last year, it was growing steadily and thereafter in March 2020, we had Covid-19 pandemic situation which has disrupted the supply-demand chain all over the world including the Middle East region. Now, steel manufacturers are trying their best to come back to normalcy after the disruption of Covid-19 pandemic situation.

Mr.Dnyanesh Chandekar, CEO & Editor, Steelworld Magazine welcomed all the Eminent speakers and delegates at 3rd series of Webinar. Recently concluded Steelworld 3rd Webinar Series has exclusively highlighted the most challenging issues especially after the covid-19 pandemic situation and its solution to way forward.

Steelworld 3rd Webinar focusing on Middle East Steel sector session witnessed with Eminent speakers from Middle East Region Steel Manufacturing Sector Mr.Sundeep Rao, Director Sohar Steel, Mr. Manikantan Ganesan, Mgr - Production, Marketing & Strategy, Emirates Steel, AbuDhabi, Mr. Shetty, Algurain Iron & Steel LLC, flat steel manufacturer, A N Vekat, CEO, Alzazira Steel, Prominent Mfg of Pipe, Bar etc presented their views.

Mr. Saundeep Rao, Director, Sohar Steel which is the large scale rolling mills manufacturer presented the post 2008 crisis situation but due to higher oil prices, Middle East region managed to survive from the crisis.

Mr. Rao highlighted two issues during his presentation which includes Covid-19 Pandemic issues and secondly he has highlighted the underlying structural issues of dropping of home prices coupled with oil prices led the pressure on steel prices for the last two year due to surplus stocks.

He also highlighted the most concerns only four big infrastructure projects are operational which has resulted into the substantial drops in Demand for Steel

and concern none of the new projects has been started. Unless, we see the big pick up or new projects within the next three or four months is going be very tough for the steel demand pickup for the steel factories to managed the operational cost.

While explaining the flat steel long manufacturing concerns, Mr. B S Shetty, GM - Commercial, Al Ghurair Iron & Steel, the largest manufacturer of galvanized sheets, coil etc who is exporting more than 150 countries highlighted the Middle-East region was expected 2 per cent growth earlier but due to Covid-19 situation is impacting it to substantial drop of 5 per cent in a overall situation.

Among the rebar manufacturer, Mr. Manikantan Ganesan, Manager - Production, Marketing & Strategy, Emirates Steel who are the largest steel manufacturer in the middle-east region presented his views on demand perspective of rebar picked up since 2015 after the expo. 2019 onward rebar demand started steadily dropping but we saw2020 first quarter saw in line with corresponding year of 2019. He also emphersized more on Covid-19 by end of March, April, May.

Mr.Manikantan Emirates Steel highlighted the ongoing liquidity issues, Post Covid-19 pandemic situation alongwith social distancing norms has lowered the construction activities which has badly impacted the steel demand in the Middle East Region. Going forward, we need to come out of lower demand and recovery scenario and expecting the restarting of big projects in the oil industry.

Mr. A N Venkat, CEO, Al Jazeera Steel which is the pioneer in Pipe and Bar manufacturing company in Oman with public listed companies highlighted that short-term forecast in 15 per cent contraction demand in Middle-East and Oman and such contraction will be closed to 30 per cent. Also highlighted proper price for the steel demand, secured credit with LCs in time and liquidity has become the big issues. Secondly, GCC is not the international determinant of the EIW Pipe Industry especially our volumes have come down and local mills have started which led the tough competition in the recent two years and on top of that Covid-19 pandemic situation has really impacted the market.

He concluded his remark more concerns about liquidity, unfair competition, excess capacity with Covid-19 situation suffered the steel commodity industry and we are unable the control the prices. He also highlighted the Indian market is opening for pipe requirement which is closed source for Middle-East region. He has concludes with his success mantra for the survival in the fittest is to Just in Time , whomsoever is able to control the cost and just in time to keep your EBITA neutral.

While responding to the demand pick-up expectation, all the eminent speaker said that in the short term highlighted that unless new project operationalize, banks are reluctant to fund for such new projects funding allocation which will delayed the normalcy and revival speed with not before at least next three months.

While analyzing the Construction activity in GCC region the number of projects announced In the first quarter of 2019, the average project cost was $222 million, but this dropped by almost $100 million a year later.

With the announcement from the UAE that all projects would be suspended until further notice, it is unlikely more will be announced from this country in the second quarter and this number is likely to fall further.

A significant number of projects for 2020 were already completed in the first quarter and it is thought that the majority of procurement for megaproject Expo 2020 has already been carried out.

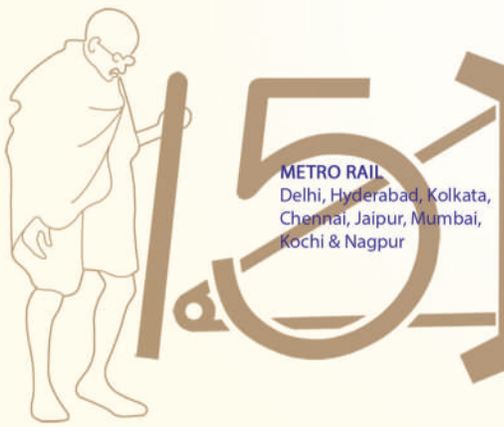
More importantly, the steel demand was very high during the country's construction boom, consumption exceeded production levels but in March 2020 a dramatic drop in export and import activity is a warning sign for mills that are finding that their production levels now exceed total domestic demand.

RINL-Vizag Steel...
Strengthening the New India

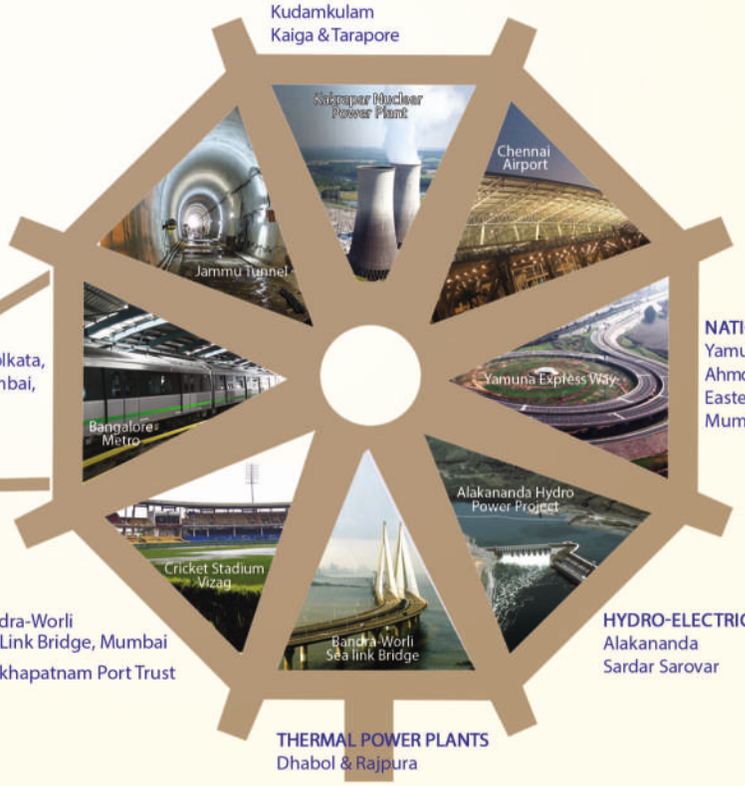
राष्ट्रीय इस्पात निगम लिमिटेड
RASHTRIYA ISPAT NIGAM LIMITED
VIZAG STEEL
Pride of Steel

आपके सपनों को साकार करने की एकमात्र कड़ी - आर आई एन एल के उत्पाद

हर एक काम देश के नाम



15 YEARS OF CELEBRATING THE MAHATMA



NUCLEAR POWER PLANTS
Kudamkulam
Kaiga & Tarapore

METRO RAIL
Delhi, Hyderabad, Kolkata, Chennai, Jaipur, Mumbai, Kochi & Nagpur

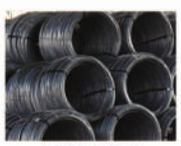
NATIONAL HIGHWAYS
Yamuna Expressway
Ahmd-Vadodara Expressway
Eastern Freight Corridor
Mumbai-Pune Express way

- Bandra-Worli Sea Link Bridge, Mumbai
- Visakhapatnam Port Trust

HYDRO-ELECTRIC POWER PROJECTS
Alakananda
Sardar Sarovar

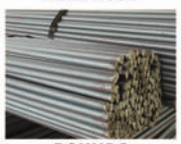
THERMAL POWER PLANTS
Dhabol & Rajpura

उत्पाद श्रेणियाँ व उपयोग
PRODUCT MIX & APPLICATIONS



WIRE RODS

5.5mm - 20mm
Wire drawing, Bright bars, Fasteners etc.



ROUNDS

16 - 95mm	20-45mm both Straight & Coil form 45-95mm straight length
Fasteners, Forging, Re-rolling, Railways, Construction	

'VIZAG TMT' REBARS

8mm - 36mm
Construction - Reinforcement

BILLETS / BLOOMS

65mm, 77mm, 90 mm / 150mm, 200mm
Bright bars, Forging, Re-rolling, General Engineering purposes

'VIZAG UKKU' STRUCTURALS

Angles	75 x 75 x 6 - 110 x 110 x 10mm
Channels	100 x 50 - 200 x 75mm
Beams	125 x 70 - 150 x 75mm
Flats	80 x 12 - 100 x 20mm
Construction, Fabrication, Auto Leaf Springs	

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(भारत सरकार का उद्यम)
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