



## GREEN CARS

Indian Government is looking at the multi-crore incentive package to green cars which includes higher subsidy, tax sops and a revolving fund upto 6000 crore to boost the production and development of hybrid and electric Cars. To boost this they have already imposed higher tax on diesel cars. Domestic car markets grew by 4.5 percent in 2011 compared to 30 percent in 2010.

## INDIAN STEEL: MISSION 2020

Steel consumption in India is seen rising to about 130 million tons in 2020 from 67 million tons now with growing income and urbanization. Similarly the output is expected to touch 150 million tons in 2020 and about 80 million tons in 2012. India produced 66.8 million tons in 2010 and was the 5th largest products as per World Steel Association. The construction sector accounting for about 50 percent of galvanized steel consumption will be the main growth driver. India's total coated steel output which is used in corrosion resistant environments is expected to rise to more than 6 million tons in 2013

## OCL IN BUSINESS PROMOTION FORUM

OCL has actively participated by installing a business stall at MSME International Trade Fair 2012 on "Steel & Mines" jointly organized by NSIC (National Small Industries Corporation Ltd.) & Government of Odisha in association with RCCI & All Industries Association of Odisha, held from 18th Jan to 22nd Jan'2012 at Sector-13 Exhibition Ground, Rourkela, Odisha.

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## *From Editor's Pen*

After the upward revision of country's short term foreign currency rating, the investment mood looks upbeat in India. But the woes of European countries, downgraded by Standard & Poor, continue, and the global economic growth and its impact on developing economies is in doldrums. However India's growth scenario is good as IIP has moved forward in November to 5.9 percent after slump in July to October. Industrial growth is recorded at 6% revved up by 6.6 % growth in manufacturing and 11 % in durables year on year basis. After a slump of few months the sharp rise in FDI inflow, 56% in Nov, is likely to boost confidence. Dipping of inflation and check on rate hike by RBI are positive signs towards a growth of 7-8 percent in next fiscal. This has received a boost by a better than expected performance of banks in third quarter. In steel sector, the world crude steel production for the 64 countries stood at an estimated 115.51 million tons for November 2011, 6.8% lower than the 123.98 million tons reported for October 2011 and 1.1% higher compared to November 2010. The refractory industry is moving along ahead with a mixed bag of project and maintenance requirement. The raw material pricing and supply continues to worry. However the positive trend are in projects taking concrete shape, refractory installation activity picking up and new facility nearing completion in some upcoming steel projects. Looking forward to a growth filled 2012.

Wishing you and your business a promising and fulfilling New Year 2012.

**SK. BASHIR MOHAMMED**

### What's inside ?

- Indian Steel : Mission 2020
- Clean Drive to Fell Steel Demand in China
- On the Global Steel Front
- Development of Higher Life Ladle Shroud (18 Heats) for Longer Sequence Casting

## CLEAN DRIVE TO FELL STEEL DEMAND IN CHINA

China's demand for steel is expected to dive by around 40 percent by 2050, as mentioned by a government climate adviser. A leading environment policy analyst mentioned that many heavy industrial products, including steel are reaching their peak and will be used less under future clean energy programs. He told that steel is expected to decline from a peak of 610 million tons in 2020 to 360 million tons by 2050 along with a fall in the need for other products including glass, aluminum and cement. A burgeoning clean energy movement has an ambitious five-year plan to reduce energy intensity by 16 percent and carbon intensity by 17 percent by 2015. Some 12.5 million hectares of farmland is also expected to be transformed into forest by the same deadline.

## MORE MORE MORE.....IRON ORE!

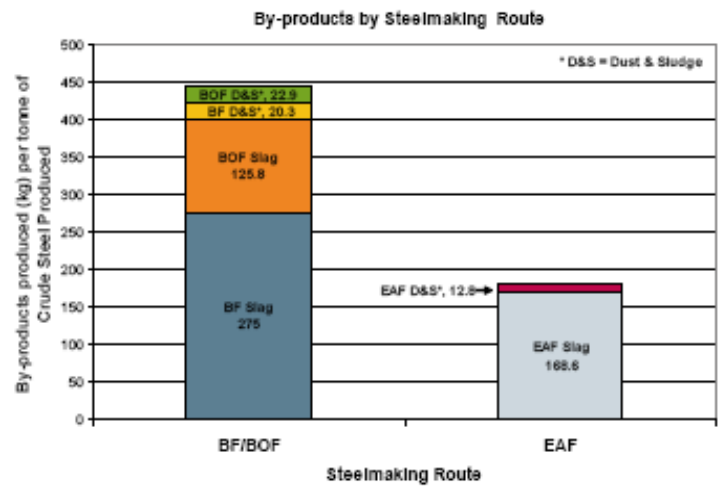
Rio Tinto has projected that at least 100 million tons of additional iron ore supply is required in each for the next eight years to meet growing needs. At this rate, global iron ore production would almost double over the period, based on industry trade data with expansions underway by major miners. This is due to staggering increase in demand in China, India, Indonesia, Vietnam and African and South American nations, fuelled by industrialization and urbanization. Emerging markets comprise 75 percent of global iron ore demand and 90 percent of that is from China. To keep pace Rio Tinto is planning to reach higher output by 2015. AngloAmerican is going to nearly double iron ore output to 80 million tons by 2014 by using its new mines in Brazil and South Africa. BHP Billiton and Fortescue Metals Group also have massive expansion plans with BHP'S \$7.4 billion expansion of its Western Australia operations. This could raise its capacity to over 220 million tons per year from early 2014.

## CHINA STEEL GROWTH TREND!

According to a new estimate from CIS, China's crude steel output could reach as high as 710 million tons an increase of 11.6% year-on-year, which is higher than the prediction of 660-670million tons. The figure was 670 million tons in 2010.

## RECOVERY OF STEEL INDUSTRY BY-PRODUCTS

The main by-products produced during iron and crude steel production are slags (90%), gases, dusts and sludges. On average the production of 1 tonne of steel results in 200 kg (EAF) to 400 kg (BF/BOF) of by-products.



The recovery and use of steel industry by-products has contributed to a material efficiency rate of 97% worldwide and is targeted to 100% efficiency or zero-waste generation by 2015. Recovered by-products can be recycled during the steelmaking process and sold for use in other industries, mostly in cement. Using slag prevents it going to landfill as waste, saves energy and natural resources, and significantly reduces CO2 emissions in cement production.

More than 400 million tonnes of iron and steel slag is produced each year. Slags are a mixture of SiO<sub>2</sub>, CaO, MgO, Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>. There are three main types of BF slags, categorised by how they are cooled – air-cooled, granulated, and pelletised.

According to the Slag Cement Association, replacing Portland cement with slag cement in concrete can save up to 59% of the embodied CO2 emissions and 42% of the embodied energy required to manufacture concrete and its constituent materials.

BOF & EAF slags have diverse chemical properties and are used internally in the steelmaking furnace or sinter plant, while approximately 50% of the recovered slag is used externally in construction applications, primarily roads.

## ON INDIAN STEEL FRONT

Indian producers plan to boost output of coated steel to boost exports to developed countries mainly EU and USA. The export dipped from 65% to 45% after 2008 crisis. JSW leads in production of galvanized steel with a 1.4 million ton capacity. At present no Indian producers have the capacity to supply very high value coated coil in demand by the appliance and automotive industries. JSW hopes to break into these higher-value markets and will soon commission a new line for this for appliances.

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**JSW Steel** has ordered another new continuous slab caster from Siemens VAI Metals Technologies for its steelworks in Bellary, India. It will have an annual capacity of 1.4 million tons and is expected to be commissioned in mid-2013.

**Essar Steel** has commissioned a 0.87 million module at Hazira, as a part of the ongoing Rs 17000 Cr expansion from 4-6 million ton to 10 million ton. The non-coking coal technology has been built with lower investment and operating costs than that of blast furnace. This combined will become the largest single location flat steel facility when complete.

**SAIL and Kobe Steel, Ltd.** have agreed to establish a joint venture company for a detailed feasibility study for a commercial ITmk3® iron-making plant in India. The plant, to come up at SAIL's Alloy Steels Plant in Durgapur, West Bengal, would have the capacity to produce 500,000 tons of iron nuggets per year.

**Tata Steel** celebrated this week the completion of 100 years of production for its A-F Blast Furnace at the company's plant in Jamshedpur. The plant is to reach an annual capacity of 10 million tons in a few months when it commissions its 'I' Blast Furnace.

**RINL and BHEL** will soon sign an agreement to form a joint venture for a high-end seamless tube mill at Vizag, at Rs 2,000 crore investments. The mill will have 0.4 million tons per annum seamless tube installed capacity.

**JSW Steel** signed a joint venture agreement with Japanese Marubeni-Itochu Steel Inc (MISI) to set up a steel processing centre at an investment of Rs 122-crore in northern part of the country. The first phase of the project is expected to go on stream in FY'13 with an initial installed capacity of 180,000 ton per annum.

## **ON THE GLOBAL STEEL FRONT**

**ThyssenKrupp's US** \$6.5 BILLION slab mill in Rio de Janeiro de Janeiro is expected to add annual steel output by 67% to reach 5 million tons by 2012. It is a joint venture with mining giant Vale. It reached 3 million tons recently and increasing the output in spite of slowdown in the US and Europe and global uncertainty.

**Vietnam** was estimated to export around 1.87 million ton of steel and this year, a 44.5 percent increase from 2010.

**Jindal Group** is keen to expand its operations into Thailand as part of its effort to trap rising demand for value-added steel. The company is willing to put up plant of 2.5-3 million ton per year if some spare gas is made available by Thai government as fuel to fire the plant.

**Vale**, the world's largest iron ore producer from Brazil, will set a pellet plant in Malaysia after its \$1.3 billion maritime terminal in Teluk Rubiah is completed by June 2014. It is also planning to develop the mega distribution centre here at US \$ 5 billion to cater Asia-Pacific clients. Also enhance the centre's handling capacity from 60 million ton to 200 million ton per year. This will enable to bring ore from Brazil to Asia at more competitive prices. Vale is already producing 300 million ton of iron ore annually, with most of it exported to Asia.

**Severstal of Russia** has agreed to form a joint venture with NMDC Ltd in India to invest \$3.1bn to build a steel plant in Karnataka.

**POSCO** claim to have developed and will soon begin mass production, the world's first environment-friendly Bismuth based, lead-free cutting steel.

**NLMK** has successfully cast the first slabs on its newly revamped one million ton/year vertical continuous casting machine (CCM-3) at Novolipetsk, the company's main production site in Lipetsk. It has also put a new 300-ton converter into operation at Lipetsk.

**Arcelor Mittal Kryvyi Rih** has set a new record in its Converter No. 6 at PJSC, implementing 4475 steel castings and lasting for almost one year without relining.

**Severstal**, Russia's second largest steelmaker will invest about \$1.5bn to \$2bn/y to raise output and mine more raw materials. Coking-coal volumes will rise to 17.9Mt from 7.3Mt, helping increase steel output by 19.6Mt.

**Algeria and Qatar** are planning to build a 5 million ton/y steel mill in the industrial zone in Gigel province in Algeria.

**Iran Alloy Steel Company, Yazd, Iran** will increase its capacity by almost 80% to 360,000 ton per year in the next 6 months.

# DEVELOPMENT OF HIGHER LIFE LADLE SHROUD (18 HEATS) FOR LONGER SEQUENCE CASTING

-Anupal Sen, B. Prasad, Dr. J.K. Sahu, J.N. Tiwari

## Introduction

The main mode of failure of ladle shroud (LS) that prevents it from getting higher life is the erosion at the immersed part of LS inside the tundish. The tundish covering compound may be rice husk ash which is acidic or lime rich compounds that are basic in nature. Sometimes, basic slag also comes from the ladle and floats at the level of tundish. These compounds and slags are collectively called as tundish slag and it is responsible for the outside erosion of LS. The flowing steel inside the bore of LS is responsible for the inside erosion of LS.

## Erosion Mechanism

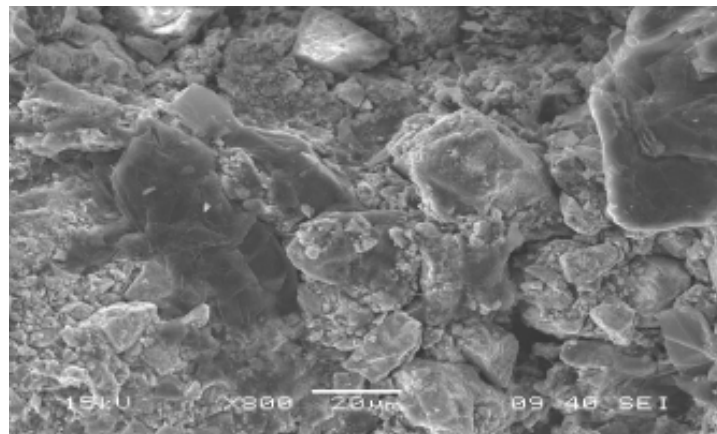
Alumina-C is commonly used as the material for the immersed part of LS. But, lime present in the tundish slag leaches out alumina and cause high erosion at the outer surface of LS. From the inside part, carbon gets dissolved into the flowing steel and the structure is loosened and eroded by flowing steel.



## Development

A special material is designed for the outer portion of LS at the immersed part, that has less reaction potential with lime than alumina-C. Moreover, it has better erosion resistance than alumina due to its interlocking microstructure (shown in photo) with less pore size and number of pores. For the inside part of LS, alumina-C is used with less carbon and more alumina to improve abrasion resistance & prevent carbon dissolution in flowing steel. But, thermal spalling resistance of LS is very important.

This is taken care of by optimizing the amount of carbon and thickness of the special material at the immersed part of LS.



## Service Trial

The developed LS has been tried at an integrated steel plant with 160 MT ladle capacity, casting low C steel & using rice husk & calcium aluminate as tundish slag, where 15 heats life has been achieved. The initial thickness of 32 mm at the immersed part has been reduced to 12 mm after 15 hours of casting. Hence, the erosion rate is 1.3 mm/hr in thickness which is very low. This LS has a potential for casting upto 18 heats under these conditions.

## PEAK PERFORMANCE

### BASIC BRICKS

OCL Al<sub>2</sub>O<sub>3</sub>-MgO-C combined with Mag-Carbon reached 115 heats in steel ladle at LD2, Tata Steel, surpassing its previous best of 111 heats.

Likewise OCL Dolomite bricks reached 45 heats in December'11, in its first ever campaign in AOD Converter at Salem Steel Plant.

### DeS LANCE

OCL Desulphurisation Lance lasted 1993 minutes at SMS I, JSW, Bellary, the highest life in entire 2011.

Your comments and suggestions may please be sent to [bmohammed@ocl.in](mailto:bmohammed@ocl.in)

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