



YEH HAI INDIA!

According to a study by PriceWaterHouse Coopers on fifteen emerging countries including Brazil, Malaysia, Singapore, Russia, South Korea India will produce 20 percent more Multinational Corporations (MNCs) than China by 2024. In 2009 China produced the largest number of these MNCs. Moreover these will focus into developed market of Europe and US for investment destinations

REUSE OF STEEL – ENERGY EFFICIENT & ENVIRONMENT FRIENDLY

Steel reuse - where end-of-life steel is not re-melted but rather enters a new product use phase. The durability of steel makes its reuse quite relevant. In North America 33% of the straight rail purchased comes from used rail that is disassembled at redevelopment sites. In 2009, around 1.46 million tons of straight rail were put into service, thus over 340,000 tons of straight rail were reused thus eliminating the need of 340,000 tons of new rails which led to saving of 811,600 tons of CO₂ emission.

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From Editor's Pen

rising income levels in India and China is driving domestic steel consumption and the engine of growth has seemingly shifted to the new world dominated by these two. This is evidenced by the double digit growth of top private steel producers Essar & JSW. The market is also fuelled by the jump in growth and demand from the automobile industries whose profits have rocketed to more than 50 percent compared to FY 08-09. Steel demand will continue to rise as strong emphasis has been laid on infrastructure in the Union budget. The government has itself proposed to invest Rs. 1,73,000 crore in 2010-11. This will certainly increase the steel demand in the country which is expected to rise by 10 percent in 2010-11 as compared to the last year. Rise in demand is also reflecting in increased metal prices. As per steel ministry's estimates Steel production is likely to reach 65 million tones in FY 11 compared to 60 million tonne in FY 09-10. The steel consumption last year rose 8.5 percent boosted by demand from power projects, construction companies, and automobile and appliances makers. SAIL is on with an idea for a joint venture with a Japanese company to usher in new technology. Already three leading Japanese players are planning to work with leading private players like TATA Steel, JSW & Bhushan Steel. All these augurs well for the refractory industry, which has lately seen consolidation in its revenues and growth. To meet new demand, the challenge is to scout for new shores as greenfield projects are shaping up. 'Outsourcing' is the buzzword and the industry is actively collaborating within and outside with competent suppliers. With demand going northwards, this area is unfolding new horizons for Indian refractory makers. Our dolomite supplies and performances are picking up and the commissioning of Basic production at China plant has added to our confidence. Slide gates, Purging Plug and Precast production and sales have touched a new high last financial. We look forward to a challenging future. So long.

Sk. Bashir Mohammed

WOW !!!

Direct-bonded Magnesite Chrome bricks supplied to one UK based Nickel & Zinc producer performed upto a record 363 heats. Bricks from renowned competitors faded in comparison as one could muster only 217 heats and bricks from another lasted only 191 heats in the same period.

EFFECTIVE & EFFICIENT: SAVINGS FROM STEEL RECYCLING

Today, the steel industry recycling rate is 83%. The World Steel Association has estimated the steel recycling rate to be 90% by 2050. This will result in an additional 38 million tons of steel being recycled worldwide in a year, which will reduce CO₂ emission by 68 million tons annually. If 450 million tons of hot rolled steel were produced from 100% scrap rather than new materials, the total CO₂ savings would be approximately 811 million tons in one year. Steel recycling accounts for significant raw material and energy savings. Over 1,200 kg of iron ore, 7 kg of coal, and 51 kg of limestone are saved for a tonne of steel scrap used.

STEEL GROWTH BLUES...

Global output as well as steel demand will bounce back to 2008 levels, which was the last high rise before the global recession. BRIC (Brazil, Russia, India & China) countries are expected to account for 60% of the global steel demand in 2010 as compared to 58% in 2009 and 50% in 2008. European steel demand is also expected to increase by 20% in 2010. According to the World Steel Association, China's steel production in 2009 has accounted for 47% of the world steel production and is expected to grow around 10% per year with a double-digit increase in its steel demand.

INTERNATIONAL STEEL AFFAIRS.....

- » Japan's largest steelmaker **Nippon Steel Corporation** will invest in iron-ore and coal mines to supply 50% of its raw material needs by buying stakes or developing new mines. This will reduce cost and assure secured supplies of raw materials. They will also invest in buying some shares of Brazilian iron-ore producer, **Namisa**, to increase its iron-ore procurement by more than 40%
- » South Korea's largest steelmaker, **POSCO**, has initiated its \$240 million project in India for manufacturing galvanized steel sheet for automobile industries. This plant will have a capacity of 0.45 million MT per annum and will commence its production by May 2012. POSCO is also eyeing on the \$200 million expansion project in its Vietnam plant to increase the annual capacity from 85,000 MT to 200,000 MT
- » **Southeast Asia** has been declared to be the world's largest net importing steel market, where the expected growth in demand is 9.2% per year. Stainless steel production in this part of the globe will increase by 15% to be 29 million MT in 2010 from 25.2 million MT last year
- » **Taiwanese steel giants** have resumed the construction of **Guang Lian Steel**, a multi-billion-dollar steel plant, in the central province of Quang Ngai. The plant will have a capacity of 3 million MT in the first phase, which is expected to start production in 2013, and 5 million MT in the second phase.
- » **Vietnam's** foray into the iron and steel sector looks very promising. It is the only country in Southeast Asia to register an increase in steel demand, which has jumped by 30% this year

(M)ORE PROSPECTS

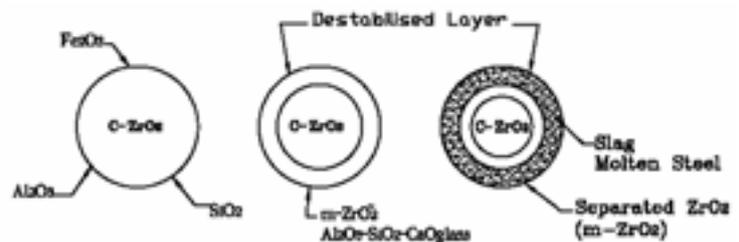
- » **Brazilian miner MMX** has planned to invest \$114 million in 2010 as a part fulfillment of its huge expansion project. MMX has increased its iron ore output by 4% in 2009 and is planning for an expansion to reach 45 million MT output from the existing 5.2 million MT output in the next few years

CORROSION MECHANISM OF ZIRCONIA-GRAPHITE AT THE SLAG BAND OF SEN

Zirconia-graphite (ZG) is the most commonly used material in the slag band of SEN. ZG band gets exposed to the powder line of the mould. Corrosion rate increases due to the formation of low viscosity mould powder slag which penetrates into the refractory ZG body and creates severe condition to disintegrate Zirconia from the matrix.

The most probable mechanism as studied by researchers for the wear of Zirconia grains in operating condition is detailed below

- » Mould powder components penetrates into Zirconia grains
- » Then it separates CaO, present as a stabilizer in partially stabilized Zirconia grains from the peripheral layer (zone) of that grain and destabilizes
- » Wear continues as this destabilized layer disintegrates into particulates and dissolves into slag and molten steel
- » CaO separated from ZrO₂ grains, which is more prone in finer grains, react with SiO₂ and Al₂O₃ in mould powder to form low melting compounds and accelerate the erosion of the matrix



The junction of liquid mould powder and liquid steel is the corrosion area in the slag band of SEN. This junction fluctuates vertically during casting. When liquid steel comes in contact with the ZG layer of SEN, it absorbs carbon from the ZG layer due to low partial pressure of carbon in liquid steel. As a result, innumerable small pores are generated in the ZG layer. When this porous surface comes in contact with the liquid mould powder, it penetrates into those pores and corrodes the exposed zirconia grains as stated above. This phenomenon is repeated until the slag band is cut-off. This has been shown in fig-2.



Apart from Carbon dissolution from ZG layer in low carbon steel, some authors have suggested the corrosion mechanism of ZG in steel in a different way. They have reported the formation of ZrC in the ZG layer at low partial pressure of carbon. This ZrC is easily corroded by the penetrating steel and liquid mould powder and the rate of corrosion is further enhanced.

INDIAN STEEL TRENDS.....

Indian Steel Companies on Song

The leading private steel makers have tasted growth in sales volume in February'10 as compared to this month in the last year. Ispat Industries has reported growth of 70% than last year. JSW has produced 5.42 million MT of crude steel in Feb'10, - 61% higher than the same period last year. Maintaining the same route, ESSAR Steel has posted 10% growth in turnover. SAIL has undertaken a Rs. 70,000 crore expansion project which will increase its annual production capacity from existing 13 million MT to 23 million MT by 2012 in the first phase and to 26 million MT by 2014 in the second phase. SAIL is also looking forward to technological tie-up with a Japanese partner to make higher value products. Foreign investors are foraying into Indian turf with a new vigor. Nippon Steel has planned to invest \$388 million in collaboration with Tata Steel for manufacturing auto-grade steel by Mar'10. JFE holdings of Japan will co-operate with JSW Steel in Mumbai from Nov'10. Sumitomo Metals may buy shares of Bhushan Steel's proposed plant in eastern India.

- » JSPL has entered into 3 agreements with Australian miner Rockland Richfield spanning across three countries-India, Australia and China. In India they will build a facility to produce house bricks from coal waste. In Australia they will work on two coking coal blocks at Queensland Bowen Basin. JSPL is also keen in developing two mines in Australia in which Richland already hold 60% and 100% stake. They will shortly make draft development plan for the mines for submitting to the Australian Authority
- » JSW- the 3.7 billion steel major has picked 10% in Kolkata based IT firm Descon by scooping 10% stake held by DPSC. This will be deployed for IT support of its upcoming steel and power project in Bengal. They have further plans to pick up 49 percent in it. JSW has a presence in IT through group company JSoft Solutions which finds support to the group

DOLOMITE REFRACTORIES FROM OCL INDIA : A NEW BEGINNING

OCL has introduced dolomite refractories in its basic product range. High purity dolomite from the captive mines is used for the manufacturing. Dolomite bricks with different MgO content having special characteristics are produced for different operating conditions. Bricks upto 800 mm length with close size tolerances are manufactured. Bricks are treated with special organic material to give high shelf life. Dolomite monolithics including ramming mass and jointing mass are also manufactured by OCL.

The special characteristics of OCL dolomite bricks are as follows:

- » Bricks do not transfer oxygen to steel bath
- » There is no carbon pick up as the bricks do not contain carbon
- » High corrosion resistance to secondary refining slag

- » High hot abrasion resistance to metal
- » Easy to build up protective slag coating on refractory lining

The raw dolomite from the captive mines has CaO & MgO content more than 98% and impurity content ($Al_2O_3+Fe_2O_3+SiO_2$) less than 2%. Hence, this variety can be considered as highly pure in compared to standard sources of dolomite and is devoid of any associated of low melting phases. When this raw dolomite is sintered at optimum temperature and soaking time, high degree of sintering is achieved with optimum crystal growth and much less silicate distribution in the matrix.



OCL sintered dolomite with less silicate

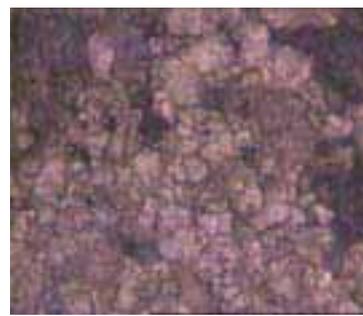


Standard sintered dolomite with moderate silicates

This raw dolomite has an average crystal size of 150 micron as compared to 60 micron for standard dolomite, which accounts for improved corrosion resistance. Its grain BD is also as high as 3.19 gm/cc.



OCL dolomite with 150 micron crystal size



Standard dolomite with 60 micron crystal size

The salient features of OCL dolomite bricks are:

- » Manufactured from high Purity Dolomite clinker
- » High temperature fired
- » Exhibit uniform physical, chemical and thermal properties
- » Bricks are impregnated with organic material to protect from hydration

The typical properties of OCL dolomite bricks vis-avis standard ones are given in the following table, where it is observed that the OCL bricks have superior properties.

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Properties	Standard Dolomite	OCL Dolomite	Standard Dolomite	OCL Dolomite
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Chemical Properties:

CaO %	32.83	31.66	55.86	54.33
MgO %	63.89	64.82	40.76	42.43
SiO ₂ %	0.88	0.71	1.19	1.15
Al ₂ O ₃ %	0.81	0.73	0.88	0.65

Physical Properties:

AP %	13.8	11.2	13.6	10.2
BD g/cc	2.91	2.93	2.85	2.92
CCS kg/cm ²	441	650	450	722
Rotary drum wear index	100	95	130	120
Hydration Resistance index	100	130	75	90

These bricks have wide application in the working lining of AOD converter and secondary refining ladles. As the bricks are prone to hydration, care is taken for their packing. Shrink wrapping with internal double layer packing and seaworthy packs are provided for shipment in containers. Shelf life of these bricks is 6 months under shed in packed condition.

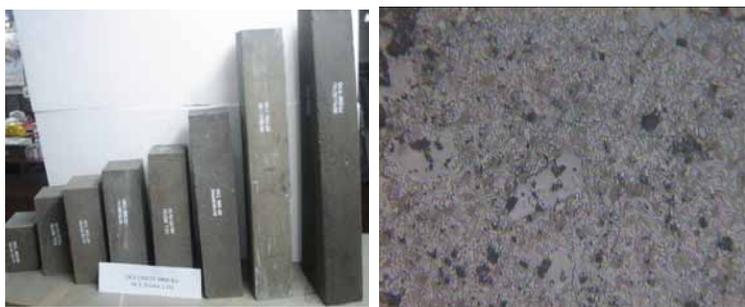
These bricks are being supplied for AOD & Ladles of Alloy Steel Plant, Vaishnavi Ispat and Garodia Special Steel. In Vaishnavi Ispat, 43 heats life has been achieved.

OCL REFRACTORY IN TECHNOLOGY FORUM !

Progress of OCL technology and products made its present felt in IREFCON-2010, at Kolkata from 4th-6th February. IREFCON happens to be the biggest refractory conference held in India every two years. The papers presented and published by

- » OCL and TATA STEEL jointly on Development of Ladle shroud for Longer Sequence Casting
- » OCL on Development of Flow Modifier to Improve Performance of Tundish and Wear Resistant Castable for External Monolithic lining of RH Snorkel
- » OCL and Ceramic Engineering Department of NIT, Rourkela on Effect of Indigenous High Alumina Cement on Thermo-mechanical Properties of the Commercial Ultra Low Cement Castables
- » DISIR, our R&D wing on Influence of Nano TiO₂ addition on the properties of Direct bonded Mag-Chrome bricks and Effect of Residual Quartz and Rate of Heating/Cooling on the residual change of Silica bricks for use in crown of Glass Melting Furnace
- » DISIR and OCL jointly on Development of Magnesia Alumina Zirconia bricks for Lime Kiln

OCL team was represented by a large team from technology and marketing lead by Sri J.N. Tiwari. Technology heads comprising Dr. N. Sahoo, Dr. U. Sengupta, Sri B. Prasad, Sri Bashir Mohammed, Dr. N.K. Mishra and Sri J.P. Agarwal. Dr. B.K. Panda and Sri B.B. Sahu represented DISIR.



OCL dolomite bricks

Microstructure of OCL dolomite bricks



WHAT'S THAT?

IRON ORE PORTAL OreTeam.com a portal providing market intelligence & analysis on iron ore markets in India & other countries was launched this month. It offers an Iron Ore Price Index & an Ore Team Tracker.

Your comments and suggestions may please be sent to bmohammed@ocl.in

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