



## STEEL BUILDINGS

The Chrysler Building in the New York City is the world's tallest steel supported brick building. Being constructed in May 1930, it was the world's tallest building for 11 months with a height of 319 metres (1047 ft).



## DEVELOPING STEEL QUALITY FOR BETTER ENVIRONMENT

Steel is the most efficient construction material having the highest strength to weight ratio and excellent durability. Extensive research in steel manufacturing technology has generated high quality steels suitable for specific uses. Advanced High-Strength Steels (AHSS) have been developed for vehicle design and about 70% of modern vehicles are fabricated with it resulting into reduction of weight by 12-15%. This new vehicle will deliver CO<sub>2</sub> emissions of less than 100 g per km. If the body structure of all the cars produced in 2010 worldwide were made from AHSS, 178 million mt of CO<sub>2</sub> equivalents would have been avoided.

New generation steel has reduced the weight of tubular steel towers for wind turbines enabling to manufacture them in sections of upto 30 m height that can be installed at site. A typical modern tower of 70 m height weighs only 140 mt. This represents a 50% reduction in weight and a saving of more than 200 mt of CO<sub>2</sub> for each tower compared to its predecessors of just 10 years ago.

Steel is 100% recyclable. Alternatively it can be reused. An estimated 503 million mt of steel scrap were recycled in 2010, preventing emissions of 906 million mt of CO<sub>2</sub>.

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## From Editor's Pen

The financial figures of our economy are asunder with food inflation touching a peak of 15.57% in December '10 and average annual inflation expected to touch 9% (more than double of 3.8% recorded one year ago). It shows that Indian economy has entered the high inflation zone. This is raring to impact the consistent growth trajectory witnessed in last few quarters. In view of all this the hike in key rates by RBI was all but imminent. This was felt necessary in order to check prices while retaining growth momentum. Economists are not upbeat as this move would impact industrial growth. Industrial growth plummeted to 1.6% in December'10. The scenario is aggravated by the world crude rates heading inexorably towards \$100 per barrel. In spite of slow down in world and Chinese steel growth, the Indian story is on song. All the expansions are going ahead with vigor. The race to acquire coal mining has gained impetus with ICVL joining the bandwagon to acquire Riversdale along with five Public sector partners. With mining behemoth NMDC coming up with plans for a second steel plant in Chhattisgarh, the march to meeting the demand of 1 billion ton in Asian sector by 2012 looks a reality. The woes of refractory industry is far over with shooting prices of key raw materials like Magnesite and Bauxite and volatile supply and duties policy of Chinese government is keeping the industry in tenterhooks. Rising fuel costs and power tariff is impacting the margins significantly. Refractory Industry is on a tightrope with thrust on refractory management and outsourcing. In OCL refractory, the growth is steady with Dolomite performance and production showing promise of new markets. Export of CC, Precast and Slide gate is continuing to thrill. Business volumes appear promising.

*Wishing all of you the best of productivity and profitability in 2011.*

SK. BASHIR MOHAMMED

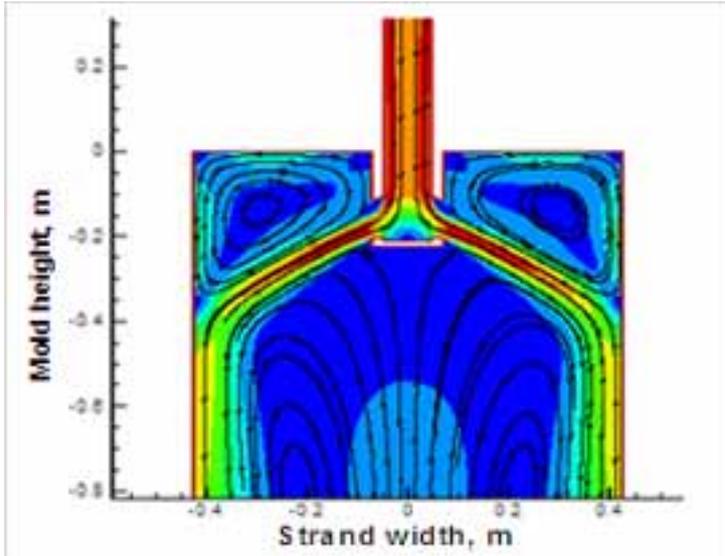
### What's inside



- Global Steel Movements
- Indian Steel Front
- Iran Steel Industry - A Growth Story
- Development of Monoblock



With an eye of futuristic design ANSYS software for mathematical modeling of Computational Fluid Dynamics was inaugurated by Syt R.H. Dalmia on 24th Oct'2010. This software will help to design different flow control refractory products suitable for the operating conditions at different steel plants. And to solve different flow related and inclusion related problems in steel plants through adequate designing of refractories.



South Korea's POSCO is planning to build its first hot dipped galvanized coil facility in southern China having a capacity of 450,000 mt/year by spending about \$3 billion.

Malaysia's Perwaja Holdings has planned to commission a 2.4 MTPA pelletisation plant in Terengganu state with an investment of \$64.6 million. First phase of 1.2 MTPA will be ready by 2012.

NLMK has installed a new environmentally friendly industrial waste neutralization plant with the capacity to process 1200 mt of waste per annum. The neutralization process combines waste incineration with high-temperature thermal decomposition.

World-wide crude stainless steel production reached 23 million mt in the first nine months of 2010, a 29% increase compared to the same period of 2009, according to the latest report from the International Stainless Steel Forum.

World crude steel production for the 66 countries reporting to the World Steel Association stood at an estimated 116.2 million mt in December 2010, which is a 1.3% increase from the previous month. Full-year production in 2010, at 1395.46 million mt, reflects a 15.2% increase over 2009.

### HOT & HAPPENING :INDIAN STEEL FRONT.....

India is set to emerge as the third-largest consumer of steel in 2011, after China and USA as the steel demand in India is expected to rise by 13.6% in 2011 to be 68 million tones. India has produced 62.8 million mt of the alloy in 2010, and is positioned 3rd in the world after China & Japan. The country's steel producing capacity is likely to touch 120.62 million mt by 2011-12. Based on planned projects, capacity could go up to 293 million mt by 2020. Regional governments have signed 222 MOU for planned capacity of 276 million mt.

POSCO is considering building a 1.8 MTPA plant in Maharashtra, India to manufacture cold-rolled steel sheet for automobiles with an investment of around \$500 million.

SAIL has entered into a joint venture with Kobe Steel for setting up a plant at Bokaro inside the SAIL premises utilizing the sophisticated ITMK-3 technology that produces high grade steel with low quality iron-ore & coal.

SAIL is undertaking a Rs. 70,000 crore expansion project to augment its annual steel-making capacity to about 23 MTPA by 2013 from 14 MTPA at present. SAIL and International Coal Ventures Private Limited have signed a MOU with the Governor of Central Kalimantan, Indonesia for establishment of a mineral processing facility and a steel plant in the province of Central Kalimantan.

JSW Steel has reported the production of 1.54 million mt of crude steel in the third quarter of FY 2011,

### GLOBAL STEEL MOVEMENTS.....

Japan's JFE Steel, Maruichi Steel & Toyota Tsusho will jointly take over the Vietnamese spiral steel pipe unit of South Korea's Jeong. An Steel for about US\$ 16 million. Sumitomo will partner South Korea's Hyosung Corp to make steel cord in China. Japan's crude steel production rose by 8% in October'10 on y-o-y basis to reach 9.51 million tons.

Japan's Nippon Steel Corp and Sumitomo Metal Industries Ltd have planned to merge by Oct 1, 2012, creating the world's second largest steelmaker in terms of crude steel production capacity. It will enhance their domestic bases and competitiveness and jointly explore overseas markets to counter fast-growing Chinese steelmakers and catch up with the world's leader Arcelor Mittal.

representing a 4% sequential growth and growth of 11% as compared to the corresponding period of last fiscal year.

**JSW** has snapped up Ispat Steel for Rs. 2157 crores by buying a controlling 41.29% stakes and the entire deal was finalized in record 8 days. The expansion project at Vijaynagar from 6.8 MTPA to 10 MTPA is expected by Q1 of 2011. By Mar'11, JSW with a capacity of 14 MTPA will be India's largest steel company.

**ESSAR Steel** has commissioned a Blast furnace (1.73 MTPA), Mega DRI module (1.7 MTPA) and steel melt shop (2.5 MTPA) as a part of its 10 MTPA expansion project at Hazira with an investment of Rs. 30,000 crores.

The country's biggest iron ore miner **NMDC** inked a pact with Russia's Severstal to set up a 5 MTPA steel plant in Karnataka with an investment of \$5 billion. The joint venture company will have its captive coking coal mining in Russia and iron-ore mining in India. This is in addition to NMDC's 3 MTPA project in Chhattisgarh entailing an investment of about Rs 15,000 crore. The mining behemoth NMDC is also looking forward to a second steel plant in Chhattisgarh with a capacity of 2 million ton at an investment of 10000 Cr.

## ICVL

**ICVL** a joint venture of five public sector units may bid for acquiring Riversdale Mining of Australia. Rio Tinto has already bid for 14.9% stake in it. Other shareholders in Riversdale are Tata Steel (24%) CSN Brazil and US Investment firm Passport Capital, all totaling 51%. Riversdale has reserves of 13 billion tones of coking and non-coking coal reserves in Mozambique.

## NEW SAIL HEIGHTS

**SAIL** has reported record gross sales turnover of Rs. 12,276.81 crore for Q3 ended in December, a growth of 17.5% over the corresponding period last year. SAIL's turnover for the first nine months of FY '11 was Rs. 33,905.40 crore, 9.6% higher than CPLY of FY '10.

**Bhilai Steel Plant** of SAIL has set yet another national benchmark in techno-economics of steel production, with Converter 'C' in its Steel Melting Shop-II recording 12,325 heats in lining life surpassing its own previous national record for top-blown converters of 11,036 heats achieved by Converter 'B'. The total volume of crude steel produced so far by this converter is around 1.49 million mt. The MgO-C bricks that are used for lining this vessel are produced in house at BSP's Refractory Materials Plant-II.

## SAIL IN RAIL PACT

**SAIL** has joined hands with Ircon International for developing rail infrastructure in developing countries. Ircon has expertise in developing surface transport infrastructure and is setting rail infrastructure in Malaysia, Mozambique, Algeria, and Sri Lanka. A MOU has been signed between SAIL Chairman C.S.Verma and Manoj Tiwari MD of Ircon to this effect.

## EVENTS: TECHNOLOGY FORUM

OCL has actively participated in "2nd International Conference on Refractories" held on 23rd-24th Nov'2010 at SNTI Auditorium, Jamshedpur, organized jointly by Tata Steel and Indian Ceramic Society, Jamshedpur Chapter. Several renowned corporates of steel and refractory house along, researchers and academicians from all over the world added to the glitz.

Dr. J.K.Sahu, Mr. R.K.Hota, Mr. P.Basak, Mr. Anupal Sen, Dr. A. Pattanaik & Mr. D. Bardhan represented OCL. Dr. Sahu and Mr. Sen presented technical papers on "Mineralogical & Thermal Properties of Silica Bricks" and "Improvement of Erosion resistance in SEN by incorporating nano materials" respectively.

*Compiled by Sk. Bashir Mohammed & Anupal Sen*



## STEEL PRICE :NORTHWARD

In the face of economic revival, most steel majors have hiked prices to face increasing iron ore and coal prices. Tokyo Steel Manufacturing Co has decided to raise prices of all its steel products by around 10% or \$71-95 per mt to offset the higher cost of scrap. In the latest release by Baosteel, the prices of hot rolled coil, commercial cold rolled coil, electricity steel, wide and heavy plates all increased by \$18-52 per mt.

South Korea's Hyundai Steel decided to raise export prices by \$ 30 per mt for January and February, and is expected to continue as iron ore for the first-quarter imports was expected to cost 7-8 percent more .

## IRAN STEEL INDUSTRY – A GROWTH STORY

After China & India, the next growing steel economy is Iran. Iran is the present Middle East's leading steel producer. Out of 37 steel projects in the Persian Gulf 18 are in Iran. Almost USD 14 billion worth of steel projects are underway. The country has significant iron-ore reserves, estimated at 4.5 billion tons spread across five main locations, considerable quantities of coal, making it the only country in the Gulf with resources required to become self-sufficient in steel. One of Iran's other major advantage is its access to gas. The country sits on the world's 2nd highest natural gas reserves after Russia. Another advantage is its less manpower cost which assumes as new steel making cost factor. Recently, construction of about eight new steel melting shops with total production capacity of 6.4 million tons per year was started in Iran.



# DEVELOPMENT OF MONOBLOCK STOPPER FOR BATCH TYPE CASTING MS & SS GRADE

– A. Sen, B. Prasad, Dr. N. Sahoo

## Introduction

The mini steel units are extensively practicing the batch type casting where 1 heat to 1+1 heat sequence is casted in a single tundish. This leads to re-use of MBS to extract more number of heats using less number of MBS and thereby improving the life of MBS. MBS tip is cleaned manually after each heat and the tip profile is shaped by rubbing with emery paper to make it ready for use in the next heat. The life of the MBS terminates when the tip profile cannot be shaped further and the inside hole gets exposed. Though the mode of cleaning and profile making is very important for getting higher life of MBS, but the rate of erosion of MBS tip during casting also plays a vital role in this context. Hence, the prime development objective is to improve the erosion resistance of the MBS tip in the casting steel grade.

## Erosion Mechanism

In mini steel units, where batch casting is practiced, the steel grades casted are mostly MS & SS. SS grade generally contains high Mn (upto 10%) which reacts with silica complex Mn-silicates and thereby erodes the MBS tip.

MS grade has high oxygen ppm that oxidizes the carbon of MBS tip and the texture becomes loose with high porosity resulting into easy penetration of steel and subsequent erosion. Oxygen ppm is more when casting is done directly after melting in Induction furnace without undergoing through LF processing. Carbon in MBS tip can also get oxidized during preheating of SEN. Sometimes, MBS tip gets broken during chipping due to low strength.

## Development for improving erosion resistance

Suitable composition has been developed that can provide excellent corrosion and erosion resistance in MS & SS grades. This composition has no free silica that can react with Mn present in SS grade. To prevent oxidation of carbon, a special non-oxide anti-oxidant has been incorporated in suitable proportion in the composition. This material not only improves the oxidation resistance of MBS tip but also improves the abrasion resistance which prevents physical erosion of refractory grains by the flowing steel during casting. This composition also contains a composite of zirconia & corundum which improves the tensile strength of MBS tip.

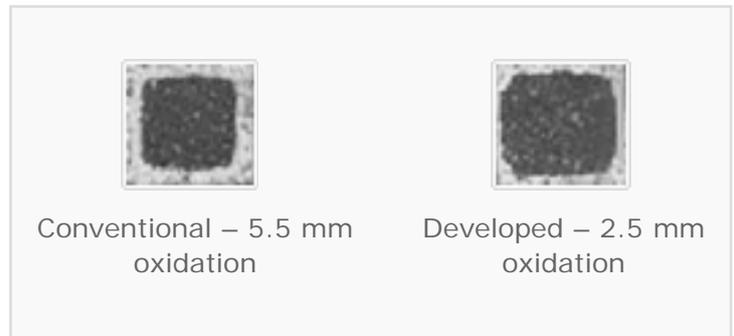
This prevents breakage of tip. Metallic anti-oxidants are provided to improve the oxidation resistance of MBS tip.

Suitably developed coating glaze is applied on the MBS tip for protecting carbon from oxidation during preheating. Generally, Carbon starts oxidation above 400 °C. In mini steel ptip gets exposed to 600-800 °C for a prolonged time. This glaze melts at 600 °C and forms an impervious coating on the MBS tip and thus prevents penetration of oxygen.

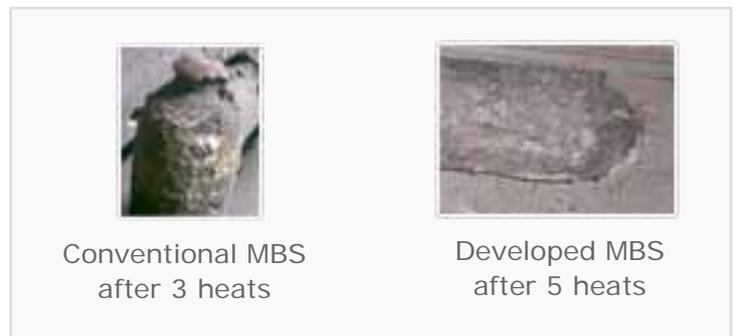
The corrosion index data in rotary drum test clearly indicates that the developed composition has better erosion resistance .



Oxidation resistance test at 1200 °C for 2 hours shows that the oxidation resistance has improved drastically.



The developed MBS has been tried in some mini steel plants. Life has improved from 3-4 heats to 6-7.



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

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