



## FUTURE STEEL VEHICLE :

World Auto Steel unfolded outcome of a three-year programme to develop fully engineered, steel-intensive designs for electrified vehicles that reduce greenhouse gas emissions over their entire life cycle. The Future Steel Vehicle (FSV) features steel body structure designs that reduce mass by more than 35% over a benchmark vehicle and reduce total life cycle emissions by nearly 70%. All this while meeting a broad list of global crash and durability requirements, enabling five-star safety ratings, while avoiding high-cost penalties for mass reduction. This lead to optimized Advanced High-Strength Steel (AHSS) body structures for four proposed 2015-2020 model-year vehicles: battery electric (BEV) and plug-in hybrid electric (PHEV) A-/ B-Class vehicles; and PHEV and fuel cell (FCEV) C-/D-Class vehicles.



## *From Editor's Pen*

The steel demand in the global market is pulled by the resilience of the steel demand growth rate in the developing economies. World crude steel production for the 64 countries reporting to the World Steel Association was 127 MT in July 2011. This is 11.5% higher than July 2010. The promise reflected in the first half of the year in terms of large scale revival of steel industry led economic growth has dimmed in view of downgrading of US as an investment destination and continued economic woes of European states. Economies in developing countries proved to be more resilient, recovering faster and outperforming the developed economies, in spite of slowdown in China. Apparent steel consumption for SEASI group without China declined in 2009 by 12%, but picked up sharply by 17% in 2010. As per World Steel Association global steel demand rebounded by 13.2% y-o-y basis to 1284 MT and is forecast to grow steadily by 6% y-o-y to reach 1440 MT in 2012. Growth rate in emerging Asia was 6.1% in 2010 and expected to be in the range of 6.5% in 2011 and 2012. Meanwhile steel demand without China registered a growth rate of 12% in 2010 and expected to reach 14% in 2011 and 2012. The domestic scenario looks upbeat but the upward revision of prime lending rates to curb inflation has had its impact on the economy. Though the Indian industrial output shot up to more than 9% in June, it continues to struggle subsequently due to inflationary trends. The refractory industry is prodding ahead trying to find its way in the midst of all, its margin pulled down by surge in major raw material prices. OCL Dolomite bricks is steadily making inroads into steel units with a fair degree of success. Some stalled projects have come alive and has given hope of a revival. Hoping for the best.

**SK. BASHIR MOHAMMED**

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### What's inside ?

- Happenings on the Global Steel Front
- Movements on the Indian Steel front
- OCL in METEC-2011
- Development of Zero Expansion Silica Brick for Hot Repair of Coke Oven

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## STEEL TOPPERS:

Total world production was 1,413.5 MT in 2010, up from 1,230.9 MT in 2009.

In 2010 the five major steel producing countries and members as per World Steel were:

2010		2010	
1. China	626.7 MT	1. Arcelor Mittal	98.2 MT
2. Japan	109.6 MT	2. Baosteel	37.0 MT
3. USA	80.5 MT	3. POSCO	35.4 MT
4. India	68.3 MT	4. Nippon Steel	35.0 MT
5. Russia	66.9 MT	5. JFE	31.1 MT

### Breakthrough: Ladle Shroud

A significant breakthrough in CC refractory from OCL has come in form of Ladle Shroud developed for casting of steel with basic slag. It has lasted for 8 heats in a major overseas steel plant in Asia.

### Peak performance: Precast VAD cover

Al<sub>2</sub>O<sub>3</sub>-Cr<sub>2</sub>O<sub>3</sub> based precast VAD from OCL cover has been performing consistently with continuous uptrend in life. It has reached a peak of 201 heats which is all time best in a leading Indian alloy steel unit.

## HAPPENINGS ON THE GLOBAL STEEL FRONT:

### GREAT! POST TSUNAMI JAPANESE REVIVAL

Japanese crude steel output recovered to 9 MT in May. It was jump of 7.3% as Sumitomo Metals, Kashima works, which was the closest of to the quake zone, came back on line.

### EUROPEAN REVIVAL

Growth in steel production and consumption in Russia will follow the country's GDP and may rise 4-5% annually in 2011-2015, being driven by housing and infrastructure and to some extent by the replacement of old machinery and equipment. Russian integrated steelmakers have a diversified sales structure and not concerned by a volatile Euro-dollar exchange rate or strengthening of the rouble.

Europe's industry body Eurofer forecasts that overall Steel demand in Europe is expected to rise 5.2% this year after a 4.0-4.5% increase in 2010, Apparent steel demand, which includes inventory build-up, is expected to rise 6% percent after a nearly 19% jump in 2010.

**SMS SIEMAG AG**, well known as a global leader in metallurgical plant and machine construction, and generating sales of EUR 2.1 billion in business year 2010, has purchased a majority share in Metix, (Pty) Ltd. of South Africa. Metix will continue to operate as a legally independent company headquartered in Johannesburg, South Africa. Sales at Metix in business year 2010 came to some EUR 40 million.

**METINVEST HOLDING LLC**, Ukraine's largest steel-maker, plans to increase production by 61% this year after combining assets with competitor Mariupolsky Metallurgical Zavod of Ilyich and modernizing its plants. The steelmaker expects to produce 15 MT of the alloy in 2011.

**BHP BILLITON LTD.**, the world's largest mining company, is studying a 3.7 billion reals (\$2.4 billion) iron-ore project in Brazil as it seeks to expand output of the steelmaking material and gain from higher prices. The project in the south-east of the country may start in 2017 and have initial annual production capacity of 20 million metric tonnes of iron-ore concentrate.

**YUCEL BORU**, Turkish pipe producer will complete its own steel flat production facility in 3 years in Gebze, Kocaeli in Northwestern Turkey. It is expected to have an annual output of 1.5 MT which will replace USD 1.1 billion worth of steel flat imports every year, producing 20% of steel flat products domestically.

**ARCELOR MITTAL**, steel giant, SA is set to make an acquisition of a mining property in the Northern Cape, that will secure 2 to 3 million tons of iron ore a year for the group.

**THE NEW RAJHI STEEL** complex will be set up at Rabigh, Saudi Arabia with a hot briquetted iron plant of capacity of 650,000 tonnes a year and a melt shop of capacity of 2 MT a year.

**IMIDRO** will start 16 new projects in Iran at a cost of \$2 billion related to steel, iron ore, coke and cement industries. Sponge iron production factory of Arfa Steel Company, a new coke-making unit in Zob Ahan Isfahan, and a new concentrates production line in Chador Malou Iron Ore Company are among the projects.

**POSCO** is planning a joint-venture plant in China's northeastern province to meet growing demand from the auto industry of the region. In a deal with Tonghua Iron & Steel Group, Posco will own 60 percent which will produce 0.2 MT of auto steel panels a year.

**HYUNDAI STEEL'S** supply to affiliates Hyundai Motor and Kia Motors is rising more than 50 percent this year on the back of their strong sales growth. It is also developing stronger but lighter steel that can

reduce the weight of the car by 10 percent, with supply to start from 2015. Hyundai expects to supply more than 2 MT of automotive steel to Hyundai and Kia Motor. Starting in 2009, it has since added two blast furnaces with 8 MT capacities for producing high-grade steel for autos, ships and electronics products. It plans to add a third one in 2013. This will reduce its outsourcing from POSCO, Nippon Steel and JFE Steel.

**NIPPON STEEL AND SUMITOMO METAL**, the two Japanese steel giants are merging to create the world's second largest steel company. They are likely to retain long-standing ally Tata Steel, as their lone partner in India. They may compensate the second partner Bhushan Steel, to avoid possible project duplication and competition issues.

## **MOVEMENTS ON THE INDIAN STEEL FRONT:**

The steel-making capacity will surge by 30-MT in the upcoming two years in India as the steel ministry is currently working on a new National Steel Policy. It is focusing robust growth in steel demand and consumption in next five years. Out of the 30 MT, nearly 10 to 15 MT of capacity may be added during the present year itself.

The government recently gave the nod for state-owned MTC to extend its long-term agreements for supply of iron ore to Japanese Steel Mills (JSMs), South Korean steel giant Posco and Chinese steel mills for three years till 2014.

**TATA STEEL AND NIPPON STEEL CORPORATION, JAPAN** signed a joint venture agreement in January to build a facility for automotive cold-rolled steel at Jamshedpur, with Tata's holding of 51% and Nippon 49% stake. The project will cost 2300 crore and will come on stream in 2013.

**ESSAR STEEL** has recorded a robust growth of 35.44 per cent in finished steel production at 1.07 MT during first quarter of 2011-12 from its Indian operations. Essar Steel has started production of two iron making units – a blast furnace with a capacity of 1.73 MT and a DRI unit of 1.74 MT, a Conarc furnace of 2.5 MT, a continuous caster of 1.45 MT and a CSP mill of 3.5 MTPA (first three-strand CSP plant worldwide).

**BHILAI STEEL PLANT** has placed an order with SMS Meer, Germany, for the supply of a new universal rail mill with an annual capacity of 1.2 MT. The mill will enable Bhilai Steel Plant to produce rails up to 130m length for high-speed trains. Rails for goods transport with high weights and rail head-hardened products for special applications can also be produced.

**JSW STEEL** reported the production of 599,000 tonnes of crude steel in July 2011, representing a growth of 15% compared to crude steel production of 520,000 tonnes in July 2010.

**RINL-VSP** sold 3.26 Lac tons of saleable steel during April-May of 2011 registering an impressive growth of 88% over the corresponding period of last year. By- Product sales of 67 Crs was achieved during the period registering a growth of 12 %. The sales turn over for April- May, 2011 1465 Crores shot the growth to 99 % over the corresponding period last year.

**JSW STEEL** has begun merger talks with Ispat Industries which will give huge tax benefits close to Rs. 2500 crores ( \$5.3 million).JSW owns around 495 stake and is in the process of restructuring it's Rs 7000 crores debt for it to exit Corporate Debt Restructuring(CDR).

**JINDAL STEEL AND POWER LTD (JSPL)** & Rio Tinto have signed an MoU for relocation of the existing Kwinana HISMELT plant from Australia to India at JSPL's existing facility in Angul, Orissa. They are planning to work together to further develop and market the technology.

Compiled by *Bashir Mohammed & Anupal Sen*

## **OCL IN METEC-2011**

OCL has actively participated in METEC-2011 held at Dusseldorf, Germany from 28th Jun'11 to 2nd Jul'11. OCL's exhibition stall at 3B09 was inaugurated by Sri J.N.Tiwari (Executive Director). Mr. A. Sunil Kumar, Mr. P. Basak and Mr. Anupal Sen participated in this annual mega event. Officials of steel makers from all over the world visited OCL stall for technical discussions and extending business relationships.





# DEVELOPMENT OF ZERO EXPANSION SILICA BRICK FOR HOT REPAIR OF COKE OVEN

-S.P.Das, S. Si, B. Prasad, B. Mohammed

## Introduction:

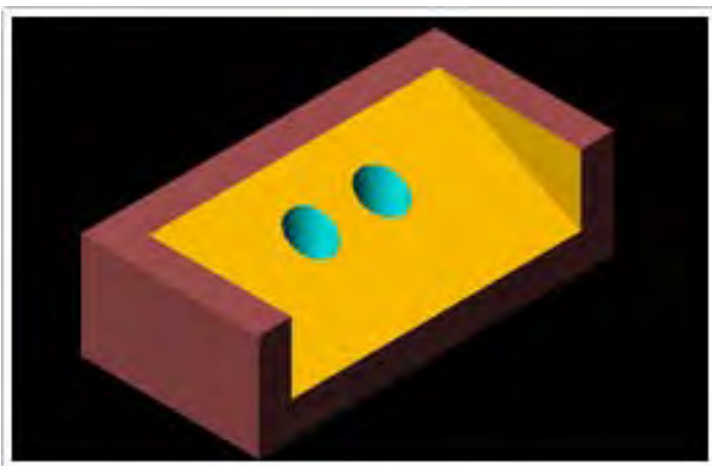
Conventional dense silica bricks having around 19% apparent porosity are extensively used for refractory lining in coke oven wall. However, if any damage occurs in the coke oven battery wall, hot repair of this wall cannot be done with these due to formation of cracks after application. Hence, zero expansion silica bricks have been developed for this purpose.

## Reason for cracks in conventional silica bricks:

Conventional silica brick contains around 95% silica. This is quartzite-based crystalline silica that has been converted mostly into tridymite phase. This crystalline form of silica has high values of Permanent Linear Change (PLC) % and Reversible Thermal Expansion (RTE) % due to phase transformations on heating and cooling successively. Transformation from one phase to another is accompanied with a large volume change which when occurs suddenly due to sudden rise of temperature during hot repair, generates cracks.

## Development:

Precast silica bricks are manufactured from amorphous silica that has very low PLC and RTE. Hence, very low volume expansion occurs when this brick undergoes sudden temperature change during hot repair. Thus, crack formation is prevented.



## Properties:

The typical properties of this developed brick are

Apparent Porosity (%)	110°C/24hr	15 Max
Bulk Density(Gm/cc)		1.80 Min
Cold Crushing Strength (Kg/cm <sup>2</sup> )		450 Min
Cold Crushing Strength (Kg/cm <sup>2</sup> )	1200°C/3hr	500 Min
Linear Change (%)		+/- 0.1 Max
Reversible Thermal Expansion	(%)	0.02 Max
SiO <sub>2</sub>	(%)	90 Min
Fe <sub>2</sub> O <sub>3</sub>	(%)	0.2 Max

## Conclusion:

This developed brick is already in use in the coke oven wall of Bhilai Steel Plant. No cracks have been developed in initial stages of application. Its potential life is under observation.

## DEPHOSPHORIZATION LANCE:

Newly designed dephosphorization lance for a leading integrated plant has performed upto 1246 minutes of rinsing time, which is by far the highest achieved till date. It has surpassed the previous figure of around 1000 minutes treatment time.

## NANO TECHNOLOGY IN SEN!

OCL Sub-entry nozzle (SEN) with nano-zirconia in the slag band has recently been used in the caster of an overseas customers, manufacturing Stainless & Alloy steel having 60 MT ladle and 10 MT tundish. It lasted 4 heats and erosion rate was 1.5 mm/hr as compared to 2.2 mm/hr for conventional SEN with the the product exhibiting potential to last for 2 more heats.

Attached photograph shows used SEN after 4 heats.



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

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