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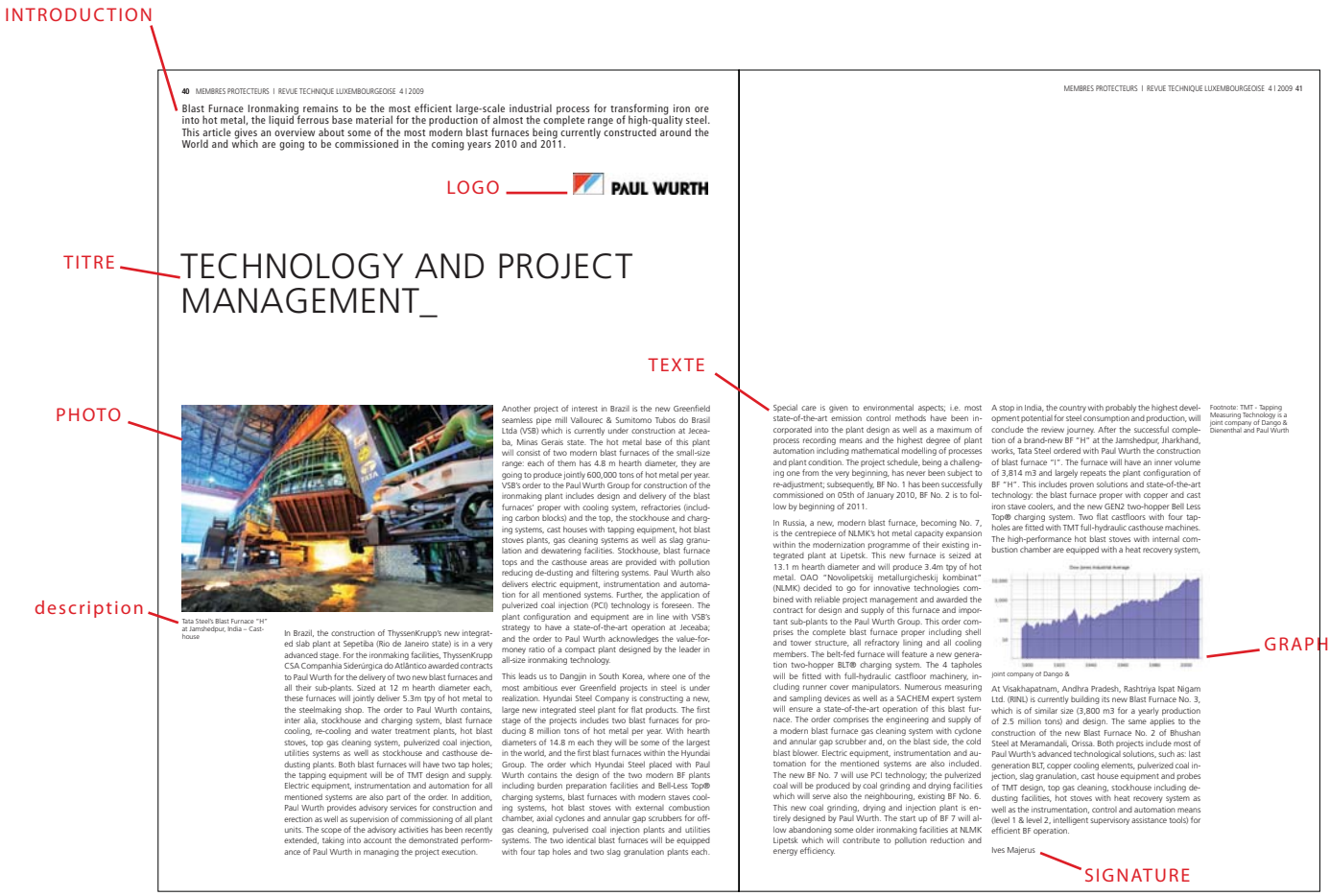

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Blast Furnace Ironmaking remains to be the most efficient large-scale industrial process for transforming iron ore into hot metal, the liquid ferrous base material for the production of almost the complete range of high-quality steel. This article gives an overview about some of the most modern blast furnaces being currently constructed around the World and which are going to be commissioned in the coming years 2010 and 2011.

PAUL WURTH

TECHNOLOGY AND PROJECT MANAGEMENT_

Tata Steel's Blast Furnace "H" at Jamshedpur, India – Cast-house

In Brazil, the construction of ThyssenKrupp's new integrated slab plant at Sepetiba (Rio de Janeiro state) is in a very advanced stage. For the ironmaking facilities, ThyssenKrupp CSA Companhia Siderúrgica do Atlântico awarded contracts to Paul Wurth for the delivery of two new blast furnaces and all their sub-plants. Sized at 12 m hearth diameter each, these furnaces will jointly deliver 5.3m tpy of hot metal to the steelmaking shop. The order to Paul Wurth contains, inter alia, stockhouse and charging system, blast furnace cooling, re-cooling and water treatment plants, hot blast stoves, top gas cleaning system, pulverized coal injection, utilities systems as well as stockhouse and casthouse de-dusting plants. Both blast furnaces will have two tap holes; the tapping equipment will be of TMT design and supply. Electric equipment, instrumentation and automation for all mentioned systems are also part of the order. In addition, Paul Wurth provides advisory services for construction and erection as well as supervision of commissioning of all plant units. The scope of the advisory activities has been recently extended, taking into account the demonstrated performance of Paul Wurth in managing the project execution.

Another project of interest in Brazil is the new Greenfield seamless pipe mill Vallourec & Sumitomo Tubos do Brasil Ltda (VSB) which is currently under construction at Jeceaba, Minas Gerais state. The hot metal base of this plant will consist of two modern blast furnaces of the small-size range: each of them has 4.8 m hearth diameter, they are going to produce jointly 600,000 tons of hot metal per year. VSB's order to the Paul Wurth Group for construction of the ironmaking plant includes design and delivery of the blast furnaces' proper with cooling system, refractories (including carbon blocks) and the top, the stockhouse and charging systems, cast houses with tapping equipment, hot blast stoves plants, gas cleaning systems as well as slag granulation and dewatering facilities. Stockhouse, blast furnace tops and the casthouse areas are provided with pollution reducing de-dusting and filtering systems. Paul Wurth also delivers electric equipment, instrumentation and automation for all mentioned systems. Further, the application of pulverized coal injection (PCI) technology is foreseen. The plant configuration and equipment are in line with VSB's strategy to have a state-of-the-art operation at Jeceaba; and the order to Paul Wurth acknowledges the value-for-money ratio of a compact plant designed by the leader in all-size ironmaking technology.

This leads us to Dangjin in South Korea, where one of the most ambitious ever Greenfield projects in steel is under realization. Hyundai Steel Company is constructing a new, large new integrated steel plant for flat products. The first stage of the projects includes two blast furnaces for producing 8 million tons of hot metal per year. With hearth diameters of 14.8 m each they will be some of the largest in the world, and the first blast furnaces within the Hyundai Group. The order which Hyundai Steel placed with Paul Wurth contains the design of the two modern BF plants including burden preparation facilities and Bell-Less Top® charging systems, blast furnaces with modern staves cooling systems, hot blast stoves with external combustion chamber, axial cyclones and annular gap scrubbers for off-gas cleaning, pulverised coal injection plants and utilities systems. The two identical blast furnaces will be equipped with four tap holes and two slag granulation plants each.

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Special care is given to environmental aspects; i.e. most state-of-the-art emission control methods have been incorporated into the plant design as well as a maximum of process recording means and the highest degree of plant automation including mathematical modeling of processes and plant condition. The project schedule, being a challenging one from the very beginning, has never been subject to re-adjustment; subsequently, BF No. 1 has been successfully commissioned on 05th of January 2010, BF No. 2 is to follow by beginning of 2011.

In Russia, a new, modern blast furnace, becoming No. 7, is the centrepiece of NLMK's hot metal capacity expansion within the modernization programme of their existing integrated plant at Lipetsk. This new furnace is seized at 13.1 m hearth diameter and will produce 3.4m tpy of hot metal. OAO "Novolipetskij metallurgicheskij kombinat" (NLMK) decided to go for innovative technologies combined with reliable project management and awarded the contract for design and supply of this furnace and important sub-plants to the Paul Wurth Group. This order comprises the complete blast furnace proper including shell and tower structure, all refractory lining and all cooling members. The belt-fed furnace will feature a new generation two-hopper BLT® charging system. The 4 tapholes will be fitted with full-hydraulic castfloor machinery, including runner cover manipulators. Numerous measuring and sampling devices as well as a SACHEM expert system will ensure a state-of-the-art operation of this blast furnace. The order comprises the engineering and supply of a modern blast furnace gas cleaning system with cyclone and annular gap scrubber and, on the blast side, the cold blast blower. Electric equipment, instrumentation and automation for the mentioned systems are also included. The new BF No. 7 will use PCI technology; the pulverized coal will be produced by coal grinding and drying facilities which will serve also the neighbouring, existing BF No. 6. This new coal grinding, drying and injection plant is entirely designed by Paul Wurth. The start up of BF 7 will allow abandoning some older ironmaking facilities at NLMK Lipetsk which will contribute to pollution reduction and energy efficiency.

A stop in India, the country with probably the highest development potential for steel consumption and production, will conclude the review journey. After the successful completion of a brand-new BF "H" at the Jamshedpur, Jharkhand, works, Tata Steel ordered with Paul Wurth the construction of blast furnace "I". The furnace will have an inner volume of 3,814 m3 and largely repeats the plant configuration of BF "H". This includes proven solutions and state-of-the-art technology: the blast furnace proper with copper and cast iron stave coolers, and the new GEN2 two-hopper Bell Less Top® charging system. Two flat castfloors with four tapholes are fitted with TMT full-hydraulic casthouse machines. The high-performance hot blast stoves with internal combustion chamber are equipped with a heat recovery system,

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joint company of Dango &

Footnote: TMT - Tapping Measuring Technology is a joint company of Dango & Dienenthal and Paul Wurth

At Visakhapatnam, Andhra Pradesh, Rashtriya Ispat Nigam Ltd. (RINL) is currently building its new Blast Furnace No. 3, which is of similar size (3,800 m3 for a yearly production of 2.5 million tons) and design. The same applies to the construction of the new Blast Furnace No. 2 of Bhushan Steel at Meramandali, Orissa. Both projects include most of Paul Wurth's advanced technological solutions, such as: last generation BLT, copper cooling elements, pulverized coal injection, slag granulation, cast house equipment and probes of TMT design, top gas cleaning, stockhouse including de-dusting facilities, hot stoves with heat recovery system as well as the instrumentation, control and automation means (level 1 & level 2, intelligent supervisory assistance tools) for efficient BF operation.

Ives Majerus