

Indian Welding Industry on the march

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In the last few years considerable developments have taken place in the Indian welding industry. New processes have been introduced, new welding techniques developed and types of welded fabrications turned out which were never made in the country before. Fabrications in new alloys have been tackled by welding.

For the first time in the country, a huge and sophisticated Coke Pusher Machine, 8.46 m wide, 24.8 m long and 9.65 m high and weighing 151.40 tonnes was manufactured by the Heavy Machine Building Plant, Ranchi, for the Bhilai Steel Plant. HMBP also manufactured six ball mills, each weighing 70 tonnes for pulverising coal for the thermal power station at Bokaro. Each mill can crush 16 tonnes of coal per hour. Both these fabrications involved welding to the maximum extent.

HMBP are also engaged in the hardfacing of blast furnace bells and hoppers. The steel bells are cast in the Foundry Forge Plant and contain 0.30% carbon. For hardfacing the bell, it is preheated to 200°C by oxy-acetylene blowpipes. A buffer layer is first laid with a low-hydrogen medium high tensile electrode and further two layers are deposited with a hardfacing electrode. The hard deposit has the following chemistry :

C—2.5-3.4% ; Mn—0.5-1.5% ; Si—2.8-4.2% ;
Cr—25-31% ; Ni—3-5% ; S & P—0.04% max each

The Tata Iron and Steel Company Limited have introduced three weldable steels of special interest to the welding industry. The Manganese-Vanadium high-strength weldable alloy steel is an aluminium-silicon killed steel and has a minimum yield strength of 45 kgf/mm² and minimum tensile strength of 60 kgf/mm². Its chemistry is : 0.22% max C, 1.80% max. Mn, 0.18% max V, 0.040% max S & P each, 0.15-0.35% Si. It is finding application in sugar machinery plant and earth-moving equipment though, needless to say, its applications can be limitless. The Manganese-Vanadium-Nitrogen high strength weldable alloy steel is semi-killed

and supplied in the form of plates. It is control-rolled and does not require and should not be subjected to normalising treatment. Its yield strength is 45 kgf/mm² min. and tensile strength is 58 kgf/mm² min. Its chemistry is : 0.16% max C, 1.60% max Mn, 0.15% max V, 0.050% max S & P each, 0.015% max N. This steel is being used in dumper bodies. TISCO have pointed out that use of these high yield steels in place of mild steel can effect a saving of approx. 25-40%. TISCO have also introduced a steel called TISCERAL for wear-resistant applications such as the fabrication of chutes and coke oven guides. This steel has an yield strength of 60 kgf/mm² min. and a tensile strength of 75 kgf/mm² min. Its chemistry is : 0.22% max C, 1.40% max Mn, 0.40-0.60% Cr, 0.25-0.35% Si, 0.15% max V. This steel can be gas cut and welded. But it should not be cold bent.

Appreciable economies in welding have been achieved by Tata Engineering & Locomotive Co. Ltd., Jamshedpur, in the production of P & H Excavators by the use of manipulators. They have four 10-ton, one 5-ton, and four 3000-lbs manipulators in constant use. Telco have decided to produce two more 10-ton machines in their own shop to cope with their expansion programme.

Beas-Sutlej Link Project have started welding penstocks made from quenched-and-tempered high tensile steel conforming to ASTM A-517 using electrodes of AWS E-11018 Classification in their Slapper Workshops. Plate thickness varies from 28 to 32 mm. This is the first time in the country that such heavy sections of this grade of steel are being welded.

The technique of achieving a root pass with consistent root penetration in a small diameter pipe by using a permanent metal backing insert which is fused into the root by an argonarc torch is finding increasing use in the country. Mazagaon Docks use it in the welding of pipes in mild steel, low alloy steels and stainless steels. Gujarat Fertilizers also employ it in alloy piping. Fabricators of chemical plant like Larsen & Toubro use it in critical pipe applications.