Tribune Edition Delhi 19.08.2013 Page 12

SAIL achieves tech breakthrough in warship steel

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KOCHI, AUGUST 18

The launch of the first indigenous aircraft carrier, INS Vikrant, is not only a milestone in the nation's ship-building capability, but also a significant technological achievement for the steel industry. The Steel Authority of India (SAIL) has, for the first time, developed special high-grade warship steel for indigenous projects.

The indigenous warship steel, though more expensive than the regular products forged by SAIL, comes at a fraction of a cost of imported substitutes. Besides the achievement of self-reliance in the field of specialised steel, it will also help save precious foreign exchange.

According to SAIL chairman CS Verma, the company supplied 26,000 tonnes of this high-grade steel to Cochin Shipyard Limited for the fabrication of the carrier. At the same time, SAIL also supplied the same grade of steel for the construction of four corvettes being built by Garden Reach Shipbuilders, Kolkata.

"Developing our own high-grade steel was critical to the success of the project," said Alok Sahay, SAIL's General Manager, Defence Marketing, said. "The DMR 249 family of steel, which has five variants for different applications, has been developed indigenously specially for naval ships. The equivalent grades were earlier 100 per cent imported by the Indian Navy," he added.

Naval ships need steel plates with high strength, high formability and high weldability coupled with very good low-temperature properties so that the steel does not fail in sub-zero temperatures and corrosion resistance.

Imparting high strength to these naval plates increases the strength-to-weight ratio so that thinner, yet stronger plates can be used for construction for minimising the weight of the ships. SAIL claims that its warship steel would retain its effectiveness in temperatures as low as minus 60°C.

"The 'unsinkable' Titanic sank after colliding with an iceberg as its steel plates developed cracks after the impact. These plates -- produced in the first decade of the 20th century -- had poor low-temperature properties and became brittle in sub-zero temperatures. Hence, retention of adequate toughness even at very low temperatures is an important attribute for naval steel plates," Sahay said.

As far as aircraft carriers are concerned, apart from the steel plates required for making the hull, there are special requirements for making the top deck from where the aircraft take off and land. Landing operations of aircraft impart high impact to the deck. The construction of the top deck needs plates with extra strength which can absorb the impact when aircraft take off and land.

SAIL's achievement has ensured the availability of plates when refits will be needed for any vessel. This had become a bottleneck earlier when steel plates and ships were sourced from Russia, Italy and other countries as at times, steel from these countries with required specifications did not come and refits would be held up.