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India up for more Scrap?



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PR TRIPATHI, Former CMD, NMDC, Former President, FIMI and CMD, Minman Consultancy Services



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Although we import almost all of Coking coal requirement, there's a good chance that we can produce the same within our own nation.



Loknath Rath, Director, Geovale Services

One of the largest miner of Bhubaneswar speaking on mining activity and scenario.



Ashwin Shah, Chairman, Krishna Industries

The man who made it in India. Bulb bars by Krishna Industries.

ABBREVIATIONS

APMDC	Andhra Pradesh Mineral Development Corporation
CIL	Coal India Limited
CSR	Corporate Social Responsibility
DMRL	Defence Metallurgical Research Laboratory
DRDO	Defence Research and Development Organisation
DRI	Direct Reduced Iron
FDI	Foreign Direct Investment
FIMI	Federation of Indian Mineral Industries
GDP	Gross Domestic Product
ICICI	International Coal Ventures Private Limited
JSPL	Jindal Steel and Power Limited
KIOCL	Kudremukh Iron Ore Company Ltd.
LCOR	Low Carbon Aluminium KIOCL
MEL	Mineral Enterprises Limited
MMRB	Mineral and Minerals (Development and Regulation)
Mst	Mishra Tona
MRPL	Mangalore Refinery and Petrochemicals Limited
NMDC	National Mineral Development Corporation
NPA	Non Performing Asset
SECL	South Eastern Coalfields Limited

Made in India

India, 5th country in the World to manufacture Bulb Bars!

Steel in India is known for numerous benchmarks for example India is the 4th largest producer in the world; world's largest DRI producer; the discovery of Steel, according to WSA traces back to India and many others. Seems like the Indian Steelmen just can't get a hold of their curious mind, they're bound not to rest. Extending the legacy further, a well reputed entrepreneur based out of Gujarat/Mumbai gifted another breakthrough to the Indian Steelmaking portfolio. With this breakthrough, India becomes 5th country in the world that manufactures Bulb Bars.

The 'Bulb Bar' as they call it, has an interesting catch to its name. A special grade of Flat steel is rolled over with simultaneous special Heat Treatment to get a unique shape that 'Bulbs' out of the structure. The beauty lies in asymmetry that gives these structures a high strength to weight ratio and stability that makes it just the right product for warships. They belong to a special class of structures called 'Stiffners' whose special purpose is to add more stability to projects such as shipbuilding, bridges and others. These Bulb Bars provide stability and they can save weight as compared to other flat structures. There are other benefits such as reduced painting cost, compact shape of bulb provides easy access for welding & painting inspection and the rounded bulb shape provides corrosion resistance, enhances drainage and minimizes dirt & moisture trap.

Then, we at Steel 360 had the Chairman speak. Here are the excerpts.

Q. Please let our readers know the hassles Krishna Industries came across while developing this unique product, Bulb bars.

A. The biggest challenge apart from the Heat Treatment process was to work without any set parameters or industry benchmark.

We had to grind hard and carry out extensive trials and experiments to set all the process parameters. The starting results were not very encouraging, but we stuck on to the task in hand and with support from DRDO, we were able to develop the product of top quality.

Q. Bulb Bar is a very new concept in India, what made you to invest in this product development?

Necessity is the mother of all inventions. India needed to develop DMR 249A Bulb bars for its indigenization program. We were asked to take up the challenge by the Indian Navy and we grabbed the opportunity with both hands. Many companies have attempted to develop this section but none has tasted success.

Q. Is it only Krishna Industries in India who aimed to develop this product? Do you have domestic competitor/s?



ASHWIN SHAH, Chairman, Krishna Industries

A. We were the first to develop these sections in India and we have the entire range of products (19 sizes). Another company in Delhi has recently manufactured smaller sizes of this section.

Q. Will they be used only by Indian Navy? Do you have other clients for the very product?

A. DMR 249A Bulb bars are exclusively used for construction of Naval Ships. Other grade of Bulb bars could be used for Merchant Navy & Commercial Ship applications. Currently, we do not have any customers for this product apart from the Indian Navy.

Q. What all benefit India will derive in terms of information and security, from this breakthrough?

Most importantly after this feat, India is now not dependent on any other country to build its Naval Ships. This also helps to reduce huge foreign exchange outflow. The lead time for import was very high

and sufficient stocks need to be maintained, with indigenization even smaller quantities can be ordered.

Most importantly, we can proudly say it is 'Made in India'.

Q. If it can be shared, let us know what exactly DMR 249A stands for?

A. We are very open about our technology and would like to share the same with other manufacturers which would help to boost the Defense sector in India.

DMR 249A, the first three letters correspond to Defense Metallurgical Research Laboratory, Hyderabad, a division of DRDO.

The last four alphanumeric is a specification number/steel number given by the Research Lab (DMRL).

Q. What points would you like to highlight, that lead Krishna Industries to bag an award from the honorable Prime Minister at DRDO Bhawan?

Our sincere and no-nonsense attitude to achieve and ensure the job in hand reaches its destination was the only goal. Patriotism is a huge motivator, especially when you know that you've got a chance to contribute towards the country's defense forces.

When we started the work on this project, the award was not the goal, but to develop and successfully supply the product to Indian Navy was the only goal. We are thankful to DMRL and DRDO for recognizing our efforts and presenting us the award. The icing on the cake was to receive the award from our honorable Prime Minister. On hearing his Independence Day speech and his call for "make in India" we felt we had risen to the occasion and have done the very little that we can do for

our country India.

Q. Are we yet to see more innovative initiations in the near future? What are the future plans of the company?

A. Yes, innovators are always hungry we have already started working on other steels for various Defenses applications. We also plan to ramp up our current facility from 2,000 MT to 4,000 MT pa and plan to use Solar Energy as the source of fuel. This is to answer the PM's call for 'Zero Defect, Zero Effect'.



Ashwin Shah accepting award from the Prime Minister in presence of the Finance Minister & Minister of Defense and others.



The Indian Navy's Vikramc ship constructed from Steel made in India

In order to know the product in greater technical depth, we interviewed the company's spokesperson, *Ankur Shah, Chief Engineer & MD, Krishna Industries.*

Q. What are Bulb bars? Why are they called so?

A. Bulb bars or Bulb flats are steel sections used in warship building, unlike normal angles or channels those are used for support, Bulb bars are unequal sections with a bulb on one side and a flat portion on the other, hence the name Bulb bars.

Q. Can you elaborate further on 'unique shape of Bulb bars' and how that yields very high strength to weight ratio?

A. This being an unequal section and owing to its unique shape (Bulb on one side) its radius of gyration is optimum, hence adding to the strength of the section. The modulus of gyration is very well balanced in case of Bulb bars. Hence, even with thinner sections the same strength/stiffening can be achieved. If a 10,000 kg structure is to be supported using regular stiffeners like Flat steel or Angles, the total weight of the stiffeners would be around 2,000 kg. Whereas, if the same support for the same structure is made using Bulb bars, the structure would weigh only 650 kg.

It has very high resistance to Buckling. The shape is also very easy to fabricate and has a high corrosion resistance.

Q. What unique advantages Bulb bars offer to a warship?

A. This shape has very good strength to weight ratio due to which it supports the structure and less steel is used, which eventually reduces the weight of ship without compromising the strength. If the weight of ship is reduced, the naval vessels can carry more ammunition, equipment & storage on the ship.

Apart from the shape of the Section,

the chemical composition is very special which gives it the high tensile and high toughness property. These sections are tested at -60OC for its mechanical properties. In short if Titanic was made from this material, the ship would not have sunk.

Q. How old is this technology? Which other countries manufacture Bulb bars?

A. The technology could be from around 1980s (exact invention year not known). Apart from India, only Russia makes this or equivalent grade of Bulb bars.

Q. What is the raw material for manufacturing Bulb bars?

A. The raw material for Bulb Bars is DMR 249A Steel plates procured from SAIL. The chemical composition is very well balanced as it is a micro alloy steel with low carbon and has special metals like Niobium, Titanium, Nickel & others, which gives it high resistance to corrosion.

Q. Does manufacturing of these bars require special set up?

A. Yes, it requires a very special setup and we have dedicated facility to take

care of this. In order to impart high tensile and high toughness properties, very special Heat Treatment i.e. thermal shocks are given on these steel sections.

Q. "The biggest challenge during manufacturing was to Heat Treat these sections", can you elaborate what challenges Mr. Shah is speaking of?

A. These are 10 meter long bars and the Heat Treatment process laid down is such that after heating at very high temperatures of close to 1,000OC, it needs to be water quenched in less than a minute, then again tempering it to close to 700OC followed by water quenching again in less than a minute. To synchronize the entire process in such short time was the biggest challenge. With support from DRDO, we were able to overcome all these challenges and offer top quality product.

Q. Are these Bars fit only to be used for Warships or can they have other applications?

A. The Bulb bars are used for merchant ships also; but DMR 249A Grade Bulb bars are used only for Naval steel applications. ■



A lot of Bulb bars. Notice the unique shape of the 500mm legged at 100 mm.