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Aluminium & Ship Building Industry

History :

Industrial Aluminium Production started in 1884 with introduction of dry electrolysis process. To get the market for commercially produced metal, some initiatives had taken place and aluminium shipbuilding was one of them.

- Failure rate was higher because of A (Improper alloy with 6% Cu and 4% Nickle B)Rivets were of Steel causing Bi metallic Corrosion C)Service Life was poor in Sea water than inland water
- After the first world war was 1914. In"1922" Washington world conference importance and need to reduce the weight of warship was discussed . The same conference Aluminium in shipbuilding was highlighted. Meanwhile in 1920 aluminium magnesium (Almg) was successfully developed .
- After 1960's use of aluminium started gearing up because of increase in crud oil prices / development in welding technology - Laser Welding ,Friction Stir Welding, TIG Welding , MIG Weldingetc
- Development in accessories like rivets, Clinch Studs, Blind Rivets, Threaded Inserts, Repetition fasteners, Self-piercing Rivets, bi metallic plates etc.

	Steam + Oil Boat	Steam + Oil Boat	French Navy Torpedo Boat	French Navy Torpedo Boat
Year	**1891**	**1894**	**1894**	**1895**
Length	5.5 meter	13 meter	19 meter	58 meter
Beam	5.8 meter	1.8 meter	2.8 meter	----
Draft	0.61 meter	0.61meter	1.45 meter	------
Speed	-----	13 Kms (8 Knots)	-----	52 Kms (32 Knots)

There are 27 shipyards in India . 9 in Govt (Central/ State Govt and Défense) and rest 18 in private sector. The tidal Shift in Shipbuilding activities, from Europe to Asia, has opened up huge opportunities for Indian yards ,both public and private shipbuilders are capitalizing on this. Unprecedented backlogs with overseas shipbuilders in South Korea and Japan are opening up vast opportunities to Indian shipbuilders. Coupled with above Govt of India has also opened up dialogues with shipbuilders for Coast Guard ~ Offshore Petrol Vessels - Fast Petrol vessels - Interceptor boats with Aluminium or Aluminium Steel combinations.

Today shipyards in South Korea , Japan & China are market leaders of the global shipbuilding industry from 1950's to date. The Indian shipbuilding is small by global standards, and Indian shipyards currently accounts for less than 1% of the global order book.

Key Growth factors for Indian Shipbuilding Industry :

Although India occupies small percentage of global shipbuilding market is well positioned forgrowth. As growth in international trade results in increased global and domestic demand for new vessels, Indian shipyards have certain advantage over shipyards in more developed countries. Shipbuilding is labour intensive industry, relatively low labour cost with well - educated English speaking technical workers compare to most other shipbuilding countries. Indian Shipbuilding has better future for coming years.

Government Initiatives For The Shipbuilding Sector

The last policy declared in 2007 to subsidize 30% to shipbuilding for more than 80 feet and other conditions expired in 2012~14 .

"GOI "Government to soon unveil new shipbuilding policy - Economic Times June 15-2017

Mostly this will be in the form of exemption of Customs duty of imported raw material.

Indian Navy procures 80% orders from Indian Shipbuilders and Aluminium has major role to play. This has helped Indian Shipbuilding ongoing.

Current Govt Plan Outlay 2016~17

The Plan outlay of the Ministry of Shipping is INR `3183.14 cr. for the 2016~17 year.

This is for development of Indian Shipping, Ports including Sagarmala Project, Inland Waterways Sector and Shipbuilding Industry.

This includes Internal and Extra Budgetary Resources (IEBR) of `2183.14 cr. Out of GBS of `1000 cr., a provision of `350 cr. has been kept for Inland Waterway Sector and `450 cr. for Sagarmala Project. In Sagarmala, the Ports will be connected with the Hinterland through road and rail.

Aluminium In Shipbuilding Construction

Since 1960 aluminium is firmly

established in many marine applications : High Speed Passenger Ships Boating & Yachting , Work Boat & Surveillance vessels, Fishing Boats, Offshore, Costal Installations Including Marinas ,the superstructures Of all kinds Of Ships are generally made of aluminium.

Advantages

- At equal thickness for structure not subjected to stress, the ratio of masses is equal to the ratioof densities. At equal rigidity the ratio of Young's module is 3, and the ratio of thickness of the sheet will depend upon formula.
- Helps to Increase Speed and Payload

Comparison of the Weights of 110 Metre HSS in Steel & Aluminium (Tons)

	Aluminium Ship	Steel Ship ##
Hull	280	504
Superstructure	70	70
Sub Total	350	574
Insulation	60	40
Paintwork	5	15
Total	415	629
Saving In Weight	214	Approx. 66%

- Aluminium formability and its availability functional semi finish rolled / extruded /casting & forged products, resistance to corrosion in marine environment ,fuel saving , cost effectiveness and recyclability, saving on towing power coupled with increase in speed
- Fire Resistance Of Aluminium, It absorbs heat and decapitates in the environment.
- Composite Metal foam which is 70 % lighter and absorbs 80 % more energy than Steel. It is fire proof, radian- resistant and even bullet proof.

Aluminium Alloys in Marine Applications

5xxx -6xxx & 4xxx series alloys are being used for Specific applications in the process of shipbuilding.

Rolled Products : (Al Mg more than 4%)Under the new standards ASTM B 928 -04 (11) relating to semis intended for marine applications are made from 5059- 5083-5383 and 5456 alloys in H116 and H321 tempers and semis in 5086 in the H116 tempers. These material must pass the test of sensitivity to exfoliation corrosion according to the ASSET ASTM G-66 (12) and inter crystalline corrosion according to the ASTM G-67 test (13)

Extruded Products : AA 6060~ AA 6005 A ~ 082 & 6061(Al,Mg,Si) alloys are predominantly used is depending upon end applications in T4/ T6 temp in profile or tubular forms. AA-5083 ~ AA 5086 used in hull or other areas where there is direct contact with saline water. AA-4xxx series(Al,Si 18) are used in engine parts casting or equipment.

Other special products: Honeycomb Sandwich Panels : Used in internal walls, & curtain wall/ partitions.

Bi Metallic Strip Used at intersection of Steel Hull and superstructure .