From Wood to Stainless Steel – The Saga of Railway Cars in India

With a population of 1.3 Billion and land area of around 3 million sq. km there is no end to the innovation in transport modes in India. Since the first journey in 1853, railways have become one of the most important modes of transportation in the country.

With 16 railway zones and around 58,000 rail cars running, the opportunity for new development in rail cars is immense. With 4 state-owned coach factories and one public-sector coach factory, the entire requirement is planned to be met by introducing advanced production techniques like laser cutting, laser welding, robotic spot welding, automatic painting etc. Out of the total production of above 4500 coaches this year, stainless steel coaches account for 50%. In the last 15 years a new avenue for stainless steel railcars emerged for city-metro lines. With most major cities in the country having travel congestion, metro construction has been moving on the fast-track. There is one public-sector metro-car manufacturing unit and two international players with another one or two in the offing.

Typical LHB Shell, LHB Coach of Rajdhani Express Trains
(Photo: Indian Stainless Steel Development Association)

Unpainted metro-car in Austenitic Stainless Steel
(Photo: Indian Stainless Steel Development Association)

The first use of stainless steel in Indian rail coaches started with toilet-pans and wash-basins, slowly spreading to the corrosion prone areas like trough floors and toilet inlays. From wooden coaches over the time, Indian railways switched over to Swiss – designed carbon steel shells, to copper tensile steels and now to a mix of utility austenitic and ferritic Stainless Steel which is provided a cursory coat of paint.

All major cities in India today are having Metro rail projects running or in various stages of construction across India apart from the expansion of the existing metro lines. The metro cars are in unpainted austenitic stainless steels.
As per available information, railways will be switching over to stainless steel shells totally over the next couple of years. The design of these coaches is provided by Linke Haufman Busch of Germany (LHB).

The LHB design uses austenitic SS for the roof and trough-floor where the chances of corrosion are high. Railways also have plans to go for unpainted austenitic stainless steel shells in the near future.

Chronology of Stainless Steel Usage in Indian Railways	
1965	Toilet pan, wash basin in SS 304
1984, 1985	Trough floor in SS 301
1990	Toilet inlays in SS 304
1990	LHB Coach in SS in DIN 5512 – 1.4003
1995	Internal furnishings in SS 304
1997	IRS M 44/97 specs for wagons
1998	Box N wagon in SS - 44/77
2000	CK-201 specs of SS for coaches
2000	44/97 used for structural in ICF designed coaches
2003	Austenitic SS for metro-cars

Time being the essence of business, design modifications are happening in Indian Railways to achieve higher speeds and haulages. High speed trains with dedicated tracks in business corridors will soon be a reality.
Text and information courtesy of the Indian Stainless Steel Development Association (stainlessindia.org)

More stories on stainless steel in railcars can be found here