

Galvanizing – The Great Protector of Automobiles and Buildings

**International Conference on Galvanizing and
Galvanized Steel in Automobiles, Construction &
Infrastructure**

Mumbai, India; April 23-24, 2015

Kenneth M. de Souza – IZA India

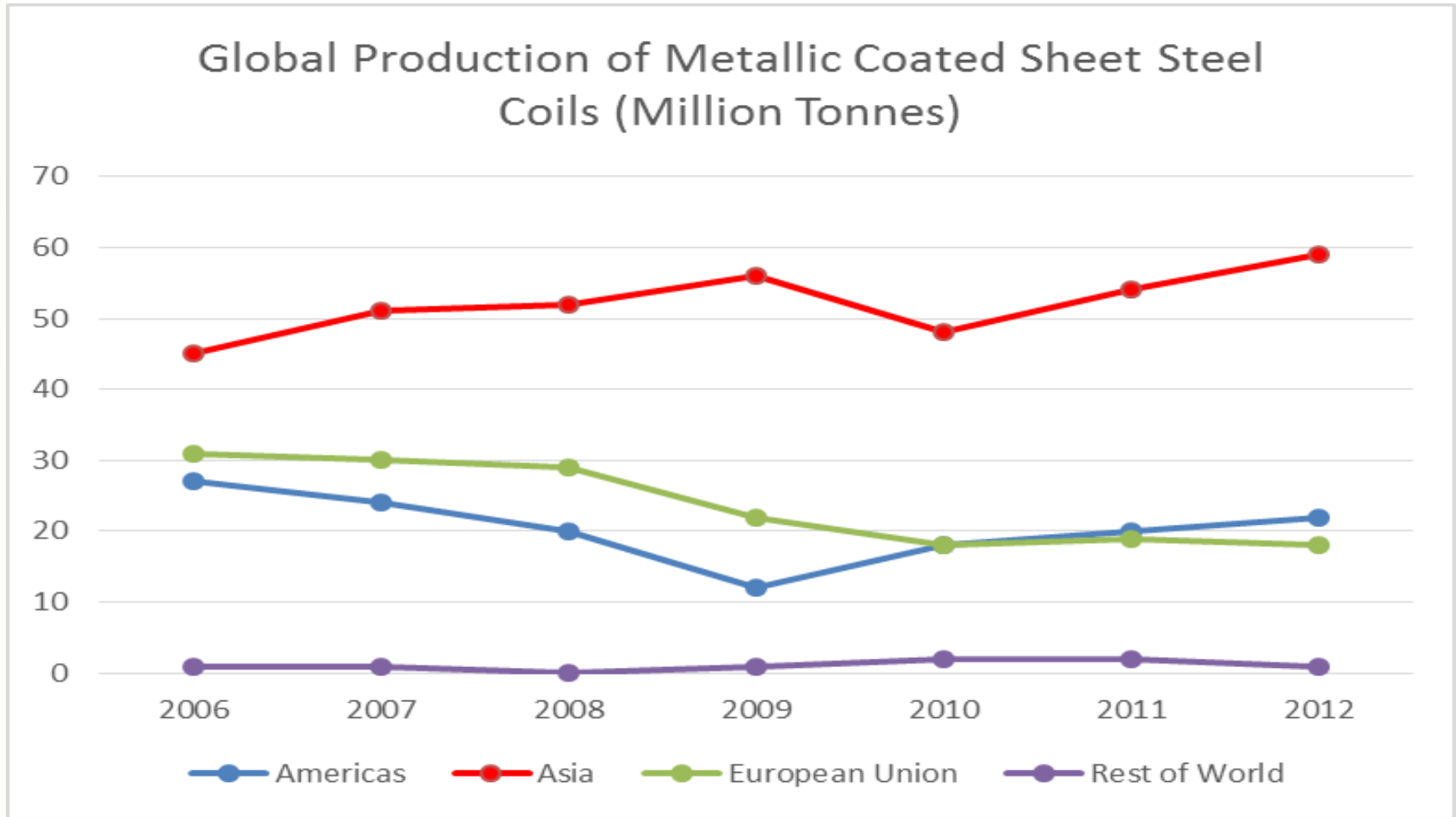


Outline

- **Galvanized Steel Growth by Region**
- *Key Market & Regulatory Drivers*
- *Galvanized Steel Use in Automobiles*
- *Galvanized Steel Use in Buildings*
- *A Look into the Future*



Global Production of Coated Steel



Distribution by End Use (Metallic Coated Sheet)



- **Asia**

- **China:** Auto 15%; Construction 37%; Appliance 20%
- **Japan:** Auto 55%; Construction 16%; Appliance 4%
- **India:** Auto 9%; Construction 26%; Appliance 9%



- **Americas**

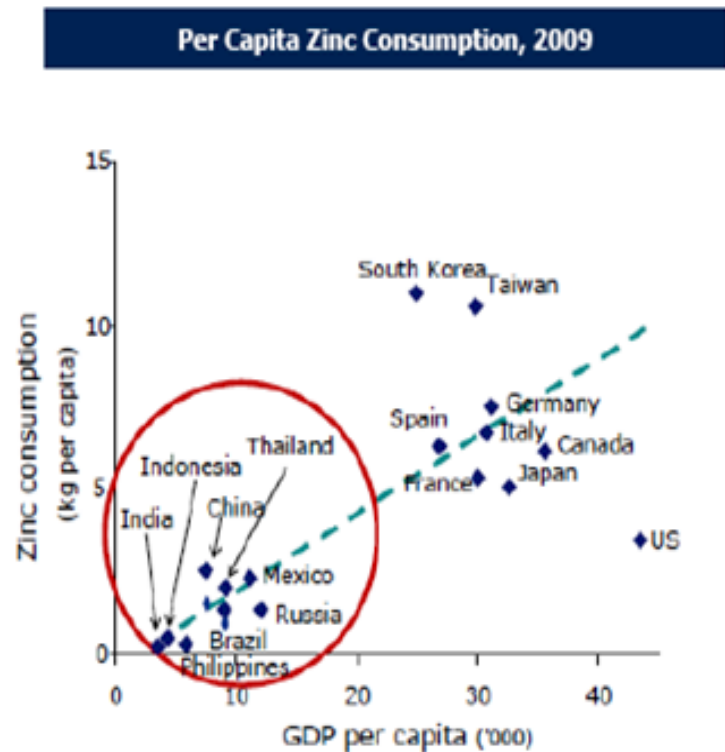
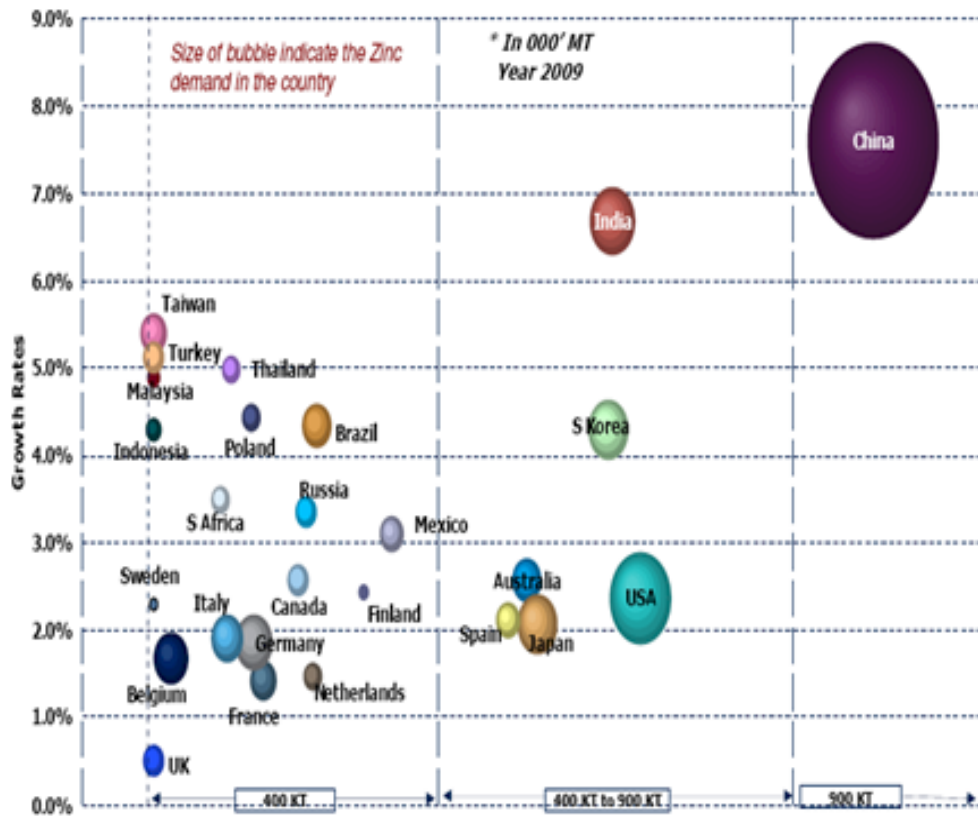
Auto 26%; Construction 40%; Appliance 4%

- **Europe (EU 28)**

*Auto 44%; Construction 24%; Tubes 18%;
Appliance 6%*



Indian Zinc Market



Source: Hindustan Zinc Limited

High Growth, High Demand Market, but almost the lowest per capita Zinc Consumption



Zinc Consumption per Capita

	2013 Zinc Usage 1000 tonnes	2013 Population millions	Zinc Usage annual kg/person
Korea	559	50	11.18
Taiwan	201	23	8.74
Australia	176	23	7.65
China	5748	1365	4.21
EU 28	2000	505	3.96
Japan	498	127	3.92
Turkey	234	76	3.08
USA	935	318	2.94
Thailand	137	64	2.14
Mexico	210	119	1.76
Russia	250	143	1.75
Brazil	276	202	1.37
India	655	1245	0.53
Indonesia	119	247	0.48
Africa	164	1000	0.16
World	12982	7170	1.81



Indian Flat Rolled, Long Products, & Coated Steel Consumption (M Tonnes)

Category	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Flat Rolled Steel	21.11	22.02	21.92	24.52	27.00	34.95	36.30
Long Products	24.73	26.30	27.00	30.48	33.46	33.98	36.63
Coated Steel Production	4.39	4.38	4.58	5.62	5.55	5.90	6.50
Coated Steel * Consumption	2.40	2.62	3.33	4.51	4.68	4.89	5.50
% Coated Steel**	9.4 %	9.9 %	12.6 %	15.0 %	14.4%	14.9%	15.1%

Data source: JPC Indian Steel

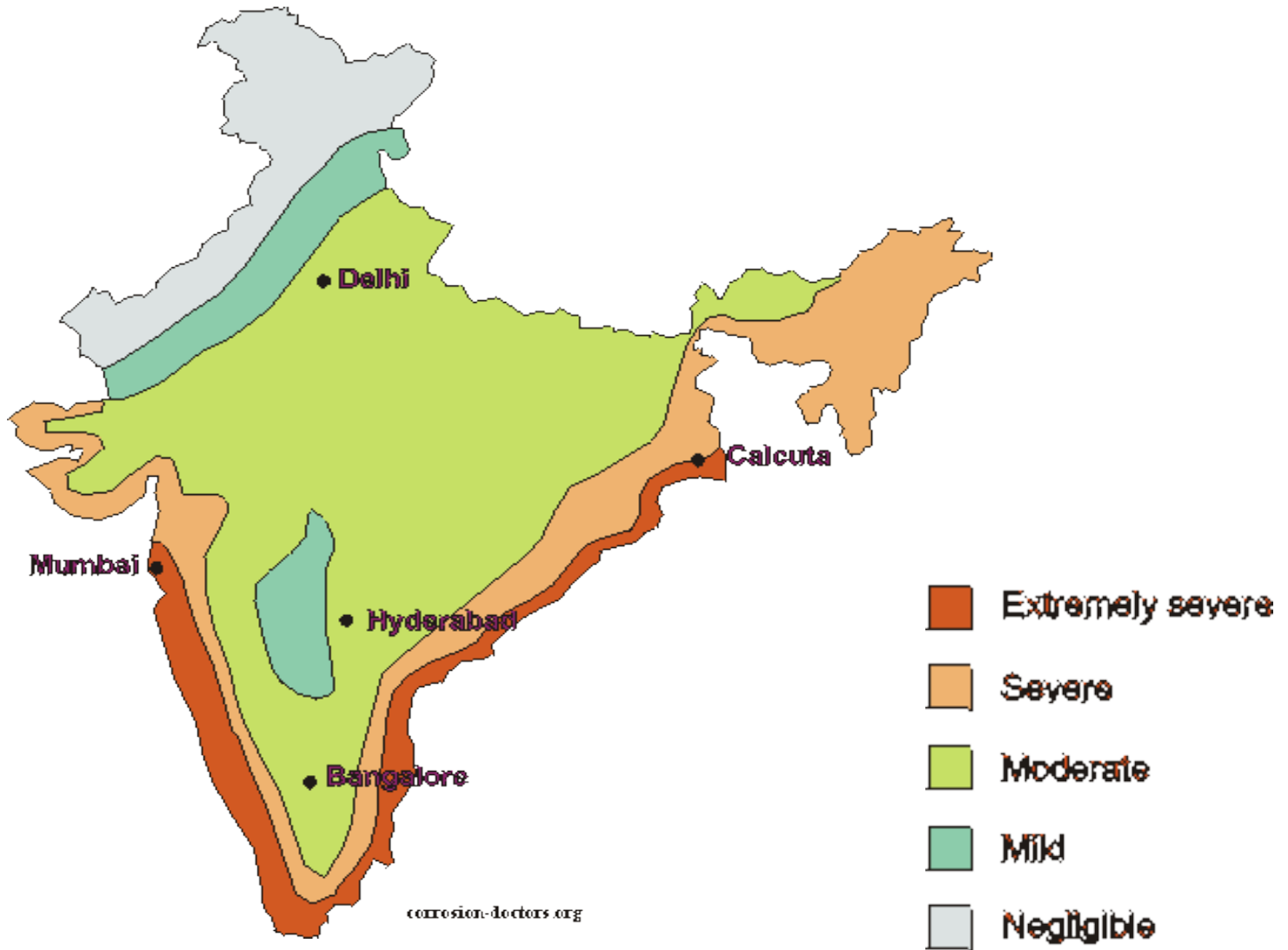
* Consumption = (Production + Imports) - Exports

**Coated Steel consumption as % of Flat Rolled Consumption

Coated Steel usage in NA is 27%



Corrosion Map of India



Cars of Today and the Past



ZINC *Protects!*

Zinc – the Great Protector

Housing for Generations

Corrosion Performance of Galvanized Steel Framing
in Residential Construction

Roger Wilt



ZINC COATINGS PROTECTING STEEL

- Zinc sacrifices itself to protect the strength and safety of steel in the automobile body or in buildings
- The rate of dissolution of zinc is slow, yet effective, to protect steel for 10+ years in automobiles and much, much longer in construction and infrastructure applications
- Galvanized steel has been used for decades in Europe and North America for autobody panels & buildings
- India recently started using galvanized and galvanneal for autobody panels, but only on cars for export. Now expanding use in some domestic models



Outline

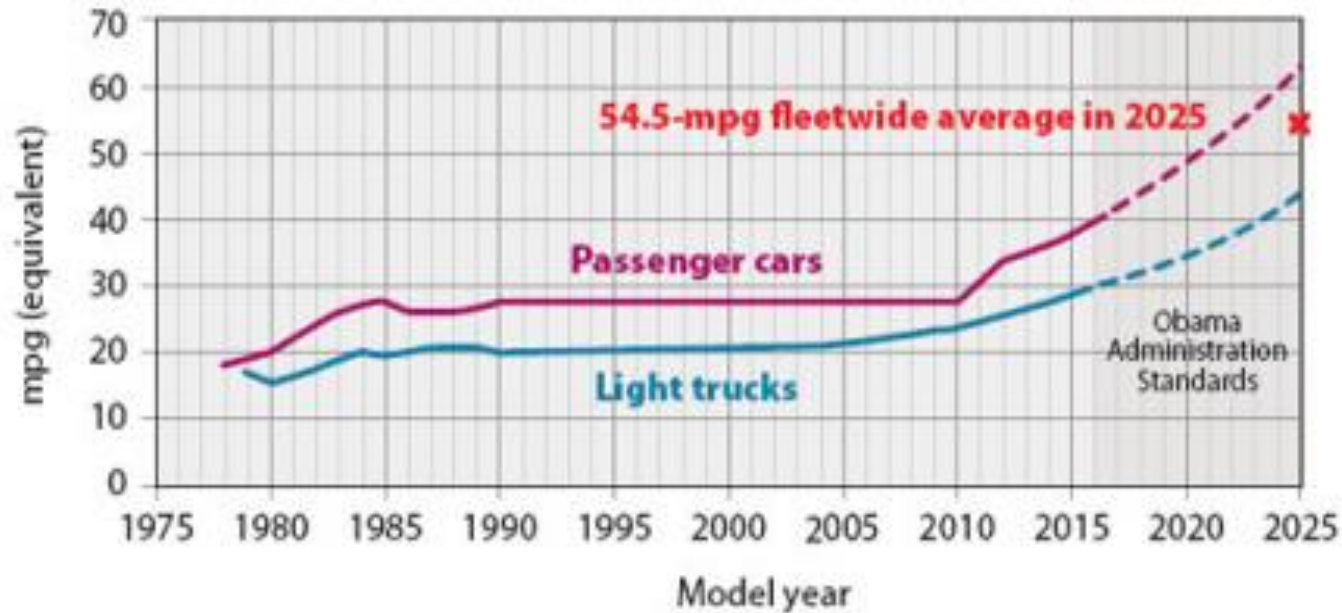
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Major driving force for NA automotive materials

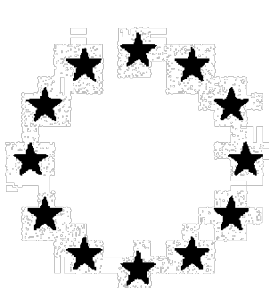
Fuel economy standards

NHTSA CAFE standards

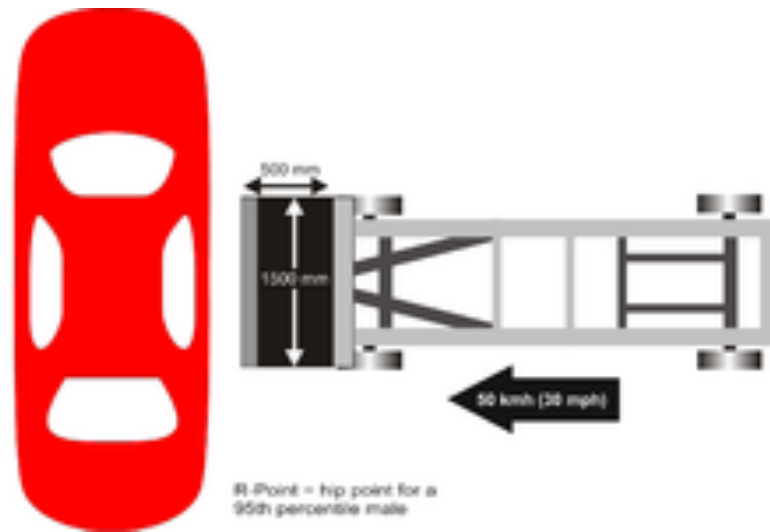


Also, increasing safety standards



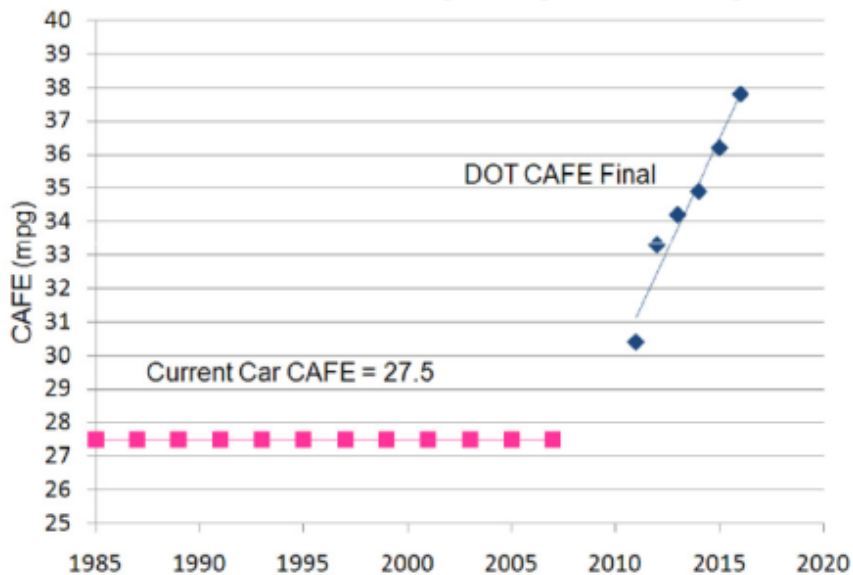


EU Constraints in Vehicle Design



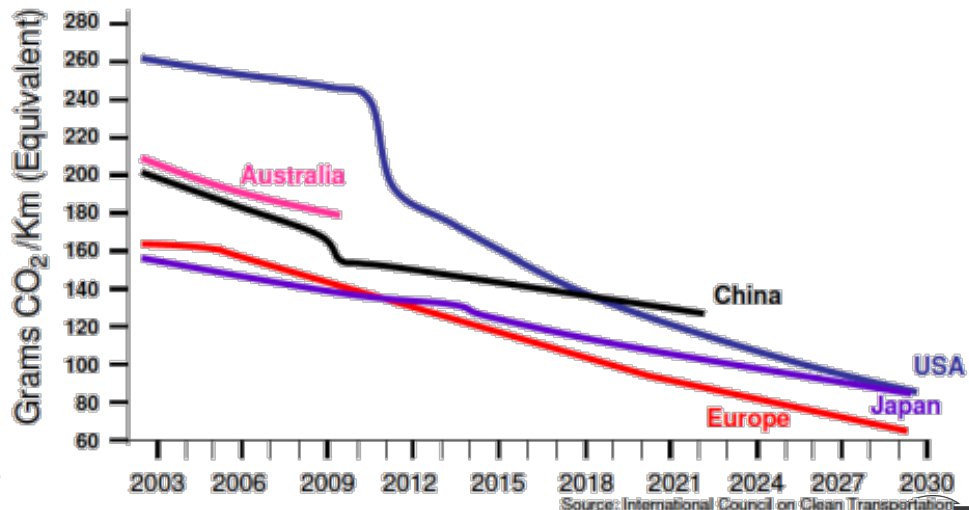
Fuel Economy Regulations

Ref. US Dept of Transportation, NHTSA, April 1, 2010



Safety: Euro NCAP side impact

Automotive CO₂ Emissions Regulation.



Emissions Regulations



Construction Standards & Building Code Development

- **Bureau of Indian Standards (BIS)**

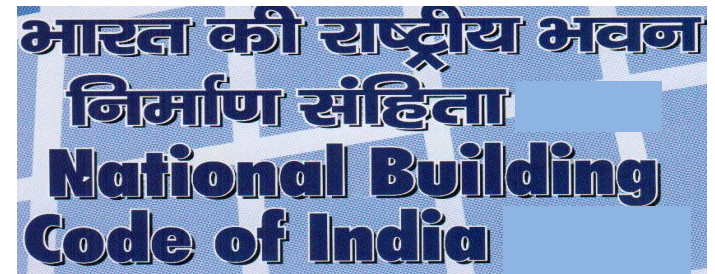
- *IZA India is a Committee member of MTD 4*
- *Rewrote IS-277 Galvanized Standard*
- *Developing new Standards and new metallic coatings for automotive*



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

- **Building & Construction Code**

- *Commercial, Industrial, Institutional buildings*
- *Residential buildings*
- *Fire & Structural Design*



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India's Automotive Position

2nd

Two Wheeler



China
India

2nd

Bus



China
India

3rd

Heavy Truck



China
Japan
India

6th

Car



China
Japan
Germany
S Korea
USA
India

7th

Commercial Veh



USA
China
Thailand
Canada
Japan
Mexico
India

Ranking is for Production Data



Indian Auto Production and Growth History

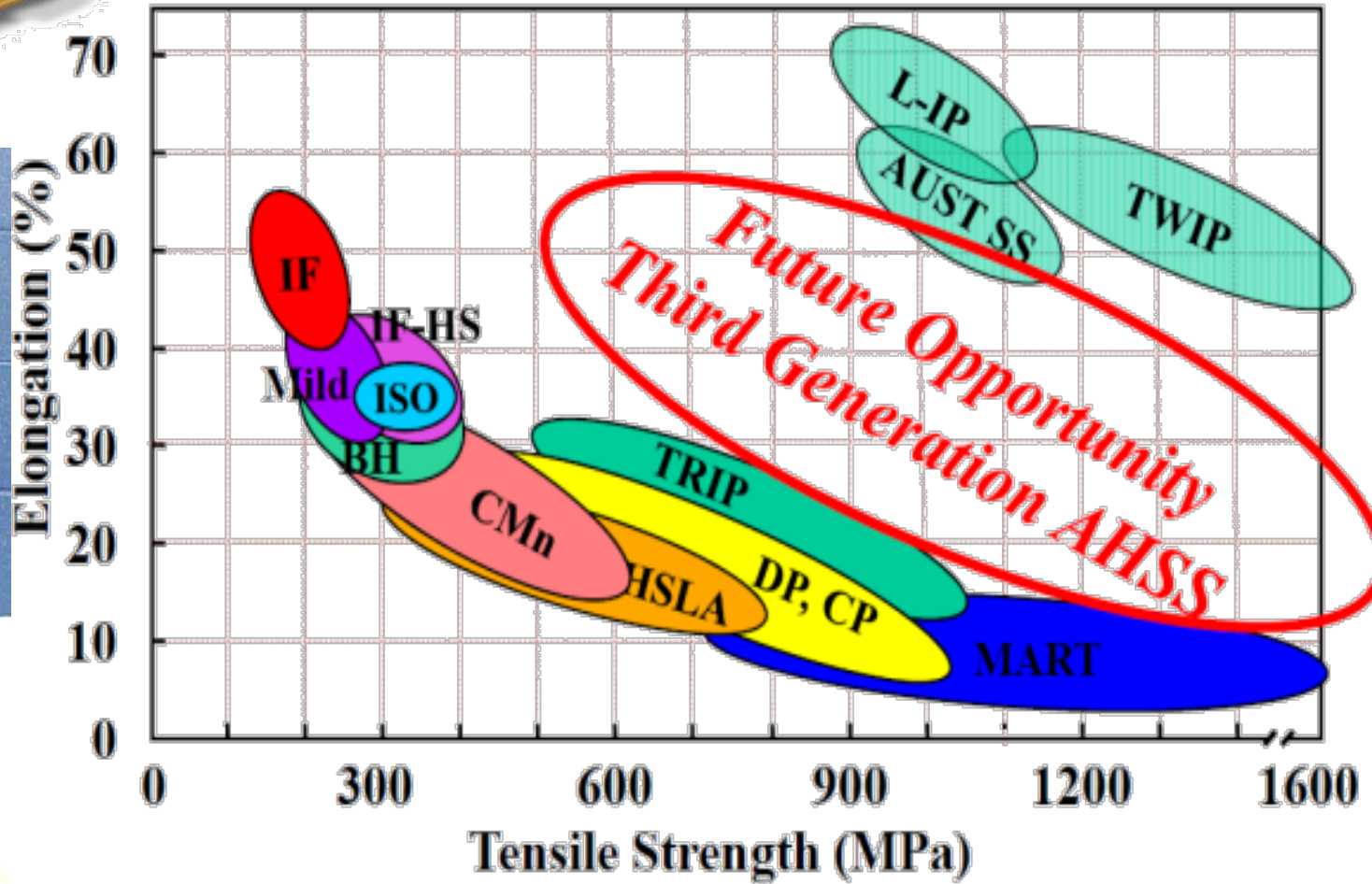
Category	2007-08	2008-09	2009-10	2010-11	2011-12
Passenger Cars	1,777,583	1,838,593	2,357,411	2,982,772	3,123,528
Commercial Vehicles	549,006	416,870	567,556	760,735	911,574
3-Wheelers	500,660	497,020	619,194	799,553	877,711
2-Wheelers	8,026,681	8,419,792	10,512,903	13,349,349	15,453,619
Grand Total	10,853,930	11,172,275	14,057,064	17,892,409	20,366,432

Data source: Society of Indian Automobile Manufacturers

***Production grew at > 25% p.a
between 2008 & 2012***



Grades of Automotive Steels



Coated Steel Usage on Indian Made Vehicles for Export (2013)

Automobile Type	Market	Skin (Exposed) Panels	Inner (Unexposed) Panels	Underbody Structurals
Fiat India (Chrysler) Motors*	India	60G/60G EG or 45/45GA HD	45/45GA HD (MS6000-44)	45/45GA HD
	Europe	60G/60G HD or EG	60G/60G HD or EG (MS6000-55)	60G/60G HD or EG
Ford Motor Company**	India	60G/60G EG or HD	60G/60G HD	60G/60G HD
	Europe	60G/60G HD	60G/60G HD	60G/60G HD
General Motors Corp.***	India	60G/60G EG	60G/60G HD	60G/60G HD
	Europe	60G/60G EG for 80%; HD for 20% of parts)	60G/60G HD	60G/60G HD
Honda Motors	India	45/45GA HD	45/45GA HD	45/45GA HD (few parts 60/60)
	Europe	45/45GA HD	45/45GA HD	45/45GA HD (few parts 60/60)
Hyundai Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	45/45GA HD	45/45GA HD	45/45GA HD
Mahindra & Mahindra Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	45/45GA HD	45/45GA HD	45/45GA HD
Maruti Suzuki Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	North America	45/45GA HD	45/45GA HD	45/45GA HD
Nissan Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	45/45GA HD	45/45GA HD	45/45GA HD
Tata Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	60G/60G EG	60G/60G HD	60G/60G HD
Toyota Kirloskar Motors	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	45/45GA HD	45/45GA HD	45/45GA HD
Volkswagen India Ltd	India	50G/50G EG	50G/50G HD	50G/50G HD
	Europe	50G/50G EG	50G/50G HD	50G/50G HD
Volkswagen - Audi	India	45/45GA HD	45/45GA HD	45/45GA HD
	Europe	45/45GA HD	45/45GA HD	45/45GA HD
BMW****	India	50G/50G EG & HD	50G/50G HD	50G/50G HD
	Europe	50G/50G EG & HD	50G/50G HD	50G/50G HD

* Fiat (Chrysler) making running change from 45/45GA to 60G/60G for new & revamped models. 95% of BIW will be coated steel

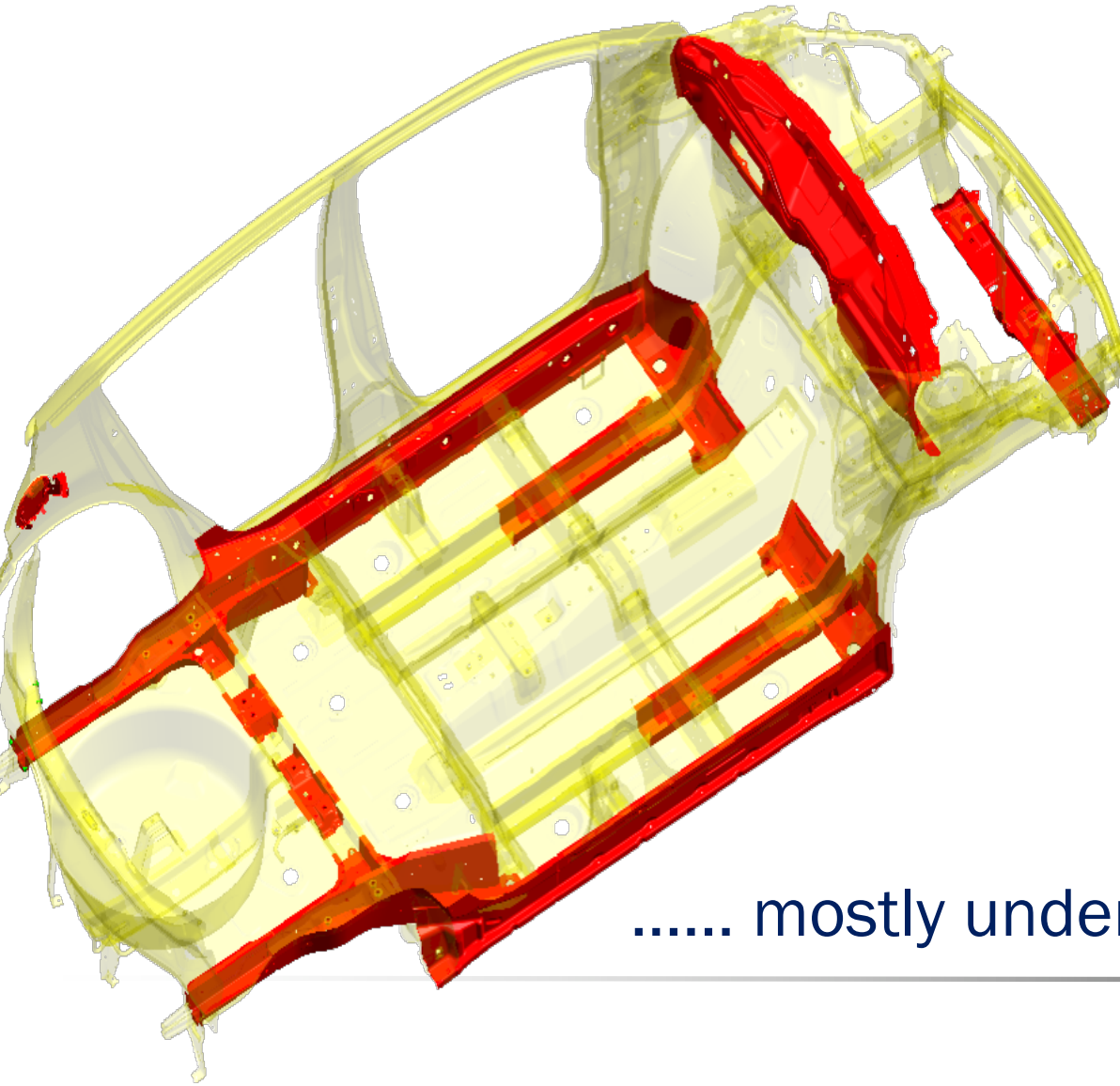
** Ford is making a running change from 60G/60G to 50G/50G for new and existing car platforms. Skin panels are currently 80% EG and 20% HD

*** GM uses 36G/36G EG for roof panels on luxury models only; Cold Rolled steel is otherwise used for roof panels

****BMW use 50G/50G HD and EG for outer panels & 50G/50G HD for inners & structurals. (Models produced: X3-125,000; X5-107,000; X6-46,000; Steel supplied through Drive & Gestamp



Galvanneal Steel Parts in Indian Made Cars Sold Domestically



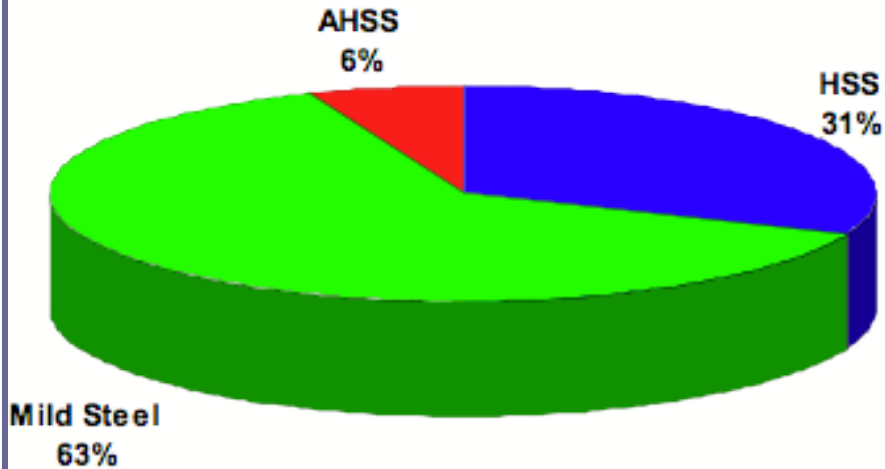
1. Cross members
2. Reinforcements
3. Fuel Filler

..... mostly underbody components

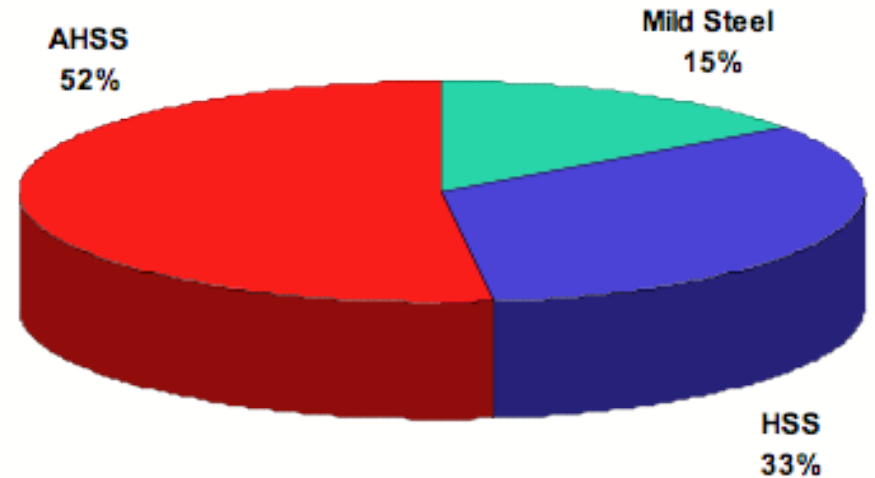
HSS/AHSS Automotive Application Trends

Projected Growth (ASTI estimate)

2006 – Automotive steel Breakdown



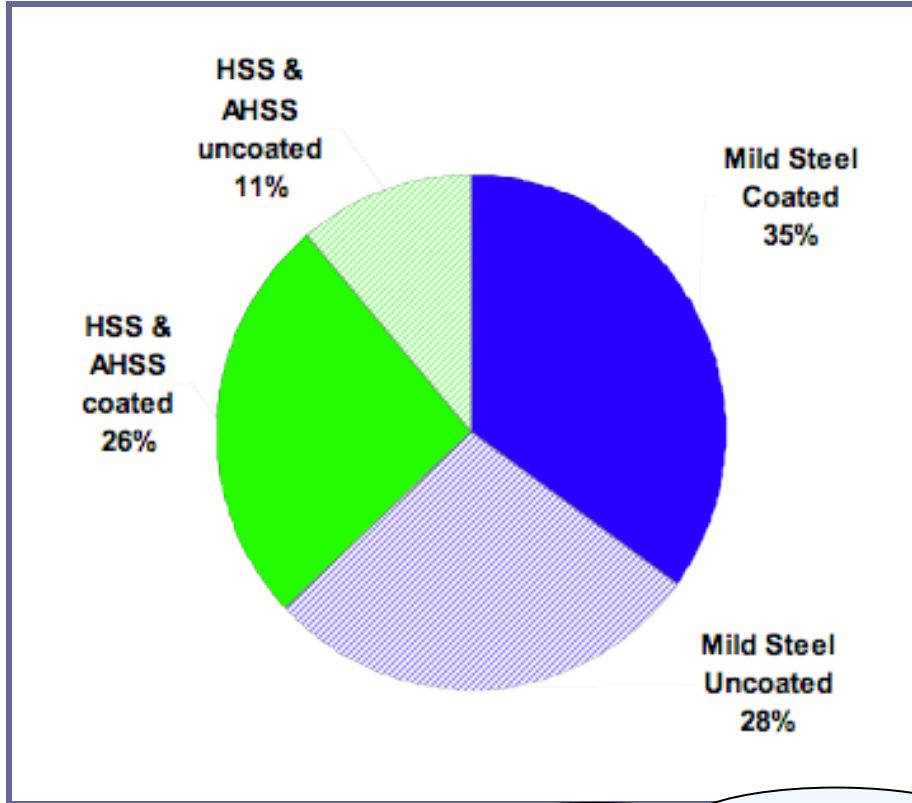
2016 – Automotive steel Breakdown



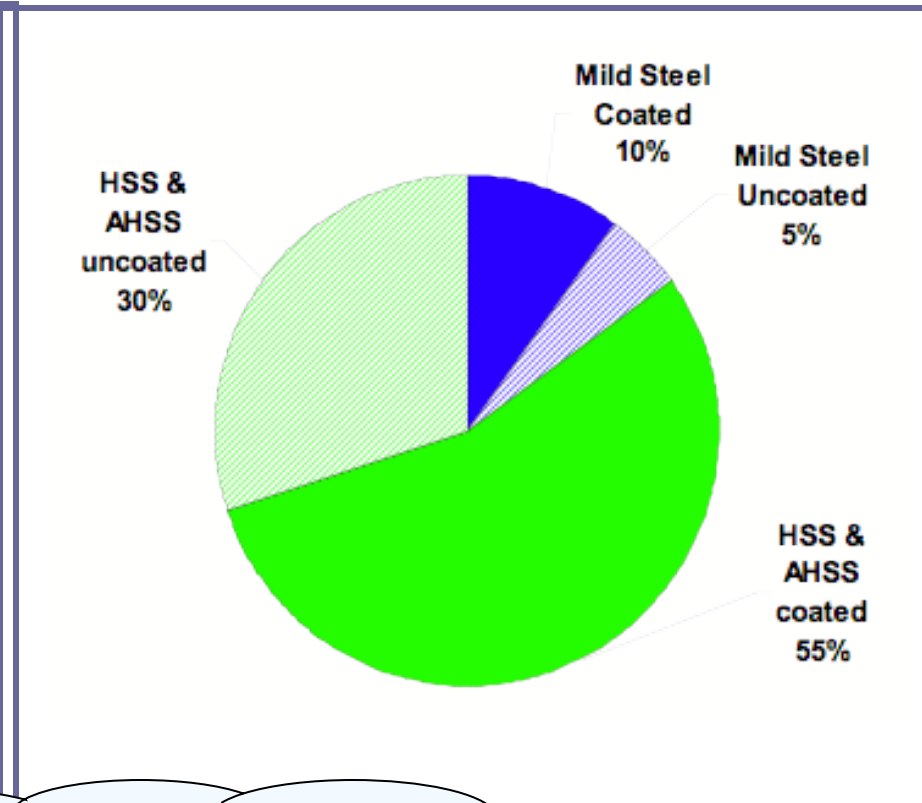
North American HSS/AHSS Automotive Material Trends

Breakdown by coated versus uncoated

2006



2016



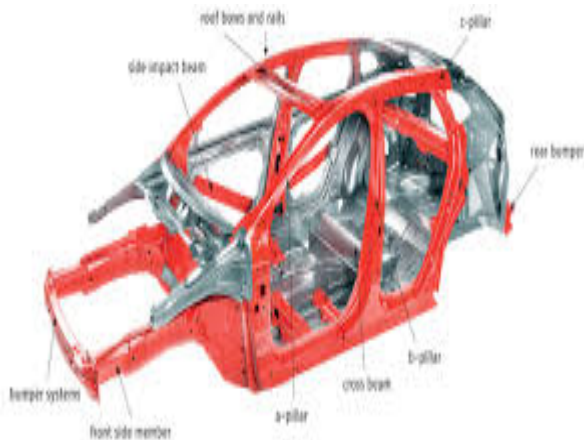
Most of coated HSS/AHSS will be made on a CGL





The Good News is

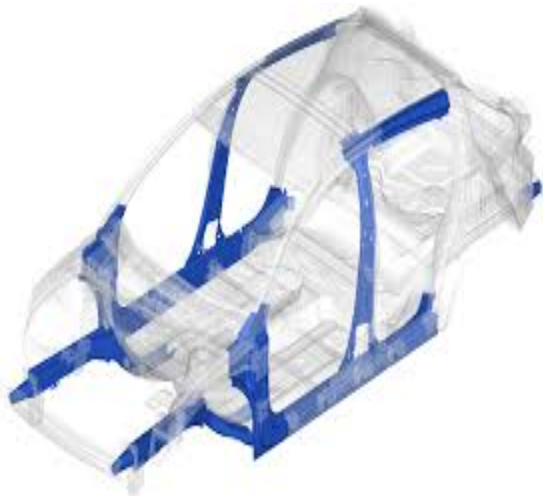
- *The Indian automotive market potential is huge*
- *Production capacity was growing at 25% annually*
- *Exports of Indian made vehicles is 35% and growing*
- *India is expected to become a global centre for the design of world class small cars*
- *A new BIS Specification for Automotive coated steels is nearing completion*



The Bad News is



- *The Quality requirements for skin panels are NOT widely available locally*
- *The supply base for auto exposed quality is limited and is of concern in the short term*
- *Steel industry has to invest in new CGL's capable of making new generation zinc coated AHSS*
- *Indian car buyers of domestic made vehicles are receiving less durable vehicles than export models (or imported vehicles) because of limited coated steel usage*



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Indian Sheet Steel Building Group (ISSBG)



ISSBG



- Created in June 2013
- Membership made up of steel mills, building product roll formers, PEMB companies, consulting engineers
- Mission is to increase use of galvanized sheet steel in construction
- IZA India acts as the Secretariat



ISSBG Focus

- National Building Codes & Standards development
- Research to develop engineering data for new products and applications
- Develop technical fact sheets and provide technical support to architects, engineers, code officials and building inspectors
- Technical market development, case studies, and trade show promotion



Corrosion Testing Program

- Need for fresh performance data on hot dip zinc and zinc-alloy coated steel in India
- Samples prepared and exposed at 5 locations across India in 2013. 1 year data compiled
- Statistical results ($W = kT^N$) within next 3 years
- All stakeholders support this exposure testing program





Five Product Areas

- Steel Building Products (roofing, cladding, decking)
- Lightweight Steel Cladding (agricultural)
- Pre Eng Metal Buildings (PEMB) < 3 storey buildings
- Lightweight Steel Framing



ISSBG Publications

Technical Notes on:

- *Fire & Acoustic Performance*
- *Materials in Contact with Galvanized*
- *Enhanced Paint Systems*
- *White Rust Prevention*
- *and many more*



ISSBG

Indian Sheet Steel Building Group

STEEL BUILDING SYSTEMS

www.zinc.org.in/issbg

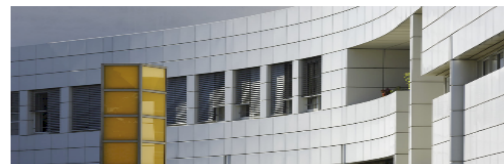
CONSTRUCTION MADE EASY WITH SBS

Steel Building Systems (SBS) are custom engineered by a manufacturer and shipped to local erectors for the construction of large or small buildings.

These systems allow engineers, builders, or architects to control and manipulate the shape, size, and configuration of structures. SBS can work singly or in combination with other systems, and conveniently allow for future expansions.

In general, SBS can accommodate a variety of occupancies and feature structural steel framing members, sheet steel cladding components, and other building materials.

FAST, ECONOMICAL CONSTRUCTION



International Zinc Association



Sustainability Information

Technical Fact Sheets on:

- *Recycled Content*
- *Embodied Energy*
- *Steel & GHG Emissions*
- *Cool Roofing and Cladding*



The screenshot displays the website for the International Zinc Association India. The header includes the logo "Zinc essential for life" and the text "international zinc association India". A search bar is located in the top right corner. The navigation menu contains the following items: Home, IZA India, Crops, Health, Technical Uses, Sustainability, Zinc Basics, Publications, and Zinc is ... Below the navigation menu is a large image of a modern industrial building with a dark green facade and a white base, surrounded by greenery. Below the image, the text "Indian Sheet Steel Building Group" is displayed. At the bottom of the page, the text "INDIAN SHEET STEEL BUILDING GROUP (ISSBG) – INDIA'S PREMIER RESOURCE ON SHEET STEEL" is visible. The logo of the International Zinc Association is also present in the bottom right corner.

ISSBG Website

www.zinc.org.in/issbg



international zinc association India

Home

IZA India ▾

Crops

Health

Technical Uses ▾

Sustainability ▾

Zinc Basics ▾

Publications

Zinc is ... ▾



Indian Sheet Steel Building Group

INDIAN SHEET STEEL BUILDING GROUP (ISSBG) – INDIA'S PREMIER RESOURCE ON SHEET STEEL

The INDIAN SHEET STEEL BUILDING GROUP (ISSBG) is part of the International Zinc Association India, an industry association with its registered office in New Delhi. The ISSBG was officially launched in June 2013 to bring together steel manufacturers, fabricators of building products, and engineering professionals





ISSBG Technical Library

Technical Library

One-Stop Support Materials Resource



FACT SHEETS

[Pre-Engineered Buildings](#)

[Materials in Contact with Galvanized Coated Steel Sheet](#)

[Reflectivity of Pre-finished Steel Sheet](#)

[Steel Clad Building vs. Fabric Covered Structures](#)

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India's Automobile Future...

- India is poised to become the major global hub for the design and production of small cars
- Limited availability of domestic exposed quality zinc coated steel is restricting India's conversion to coated steel
- Indian made vehicles built for export are using extensive amounts of zinc coated steel. However, the quality and durability of Indian made vehicles sold domestically are **INFERIOR** to those exported **that needs to change!**

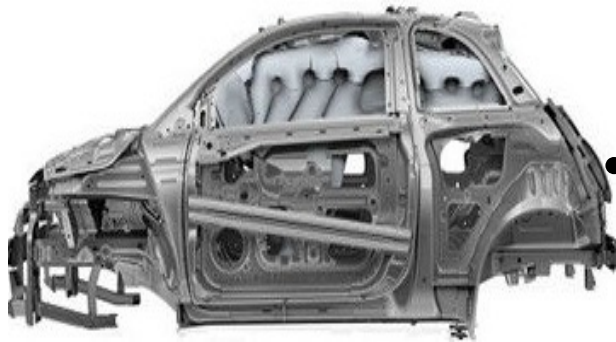


When Change Happens ...

Anticipated Business Results



- *Over 1 million tonnes of exposed skin panel galvanneal and galvanized steel will be required to meet expected demand from Indian auto manufacturers*
- *An additional 1.3 million tonnes of coated steel will be required for unexposed and structural components*
- *Imports of high cost product from Asia Pacific and Europe will be displaced*



India's Future in Construction

Anticipated Business Results



- *Increased shipments of zinc coated steel for building construction and infrastructure*
- *Upto 5 Million Tonnes per annum of new zinc coated steel shipments to Construction and Infrastructure possible*



ZINC
ZINC

Thank You

Namasté



First High Volume Production Al-Body vehicle: Ford F150



700,000 Ford F series pickups sold in 2013 (more than combined Camry and Accord sedan sales).

40% of USA truck market.



This is a huge leap for Ford



- Requires 11 week shutdown on main assembly line in Dearborn, already a 2 month delay, November 2014 start
- 600 lb of Al replaces 1000 lb of steel
- Substituted Al will cost \$800 more than the steel it replaces, plus \$1B to convert production lines
- Cited as a main reason why Ford's 2014 earnings forecast to be \$7B instead of \$8B



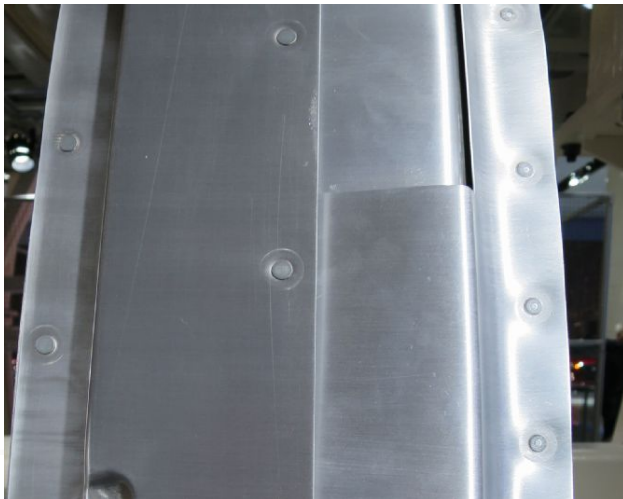
F150 Aluminum conversions from galvanized steel



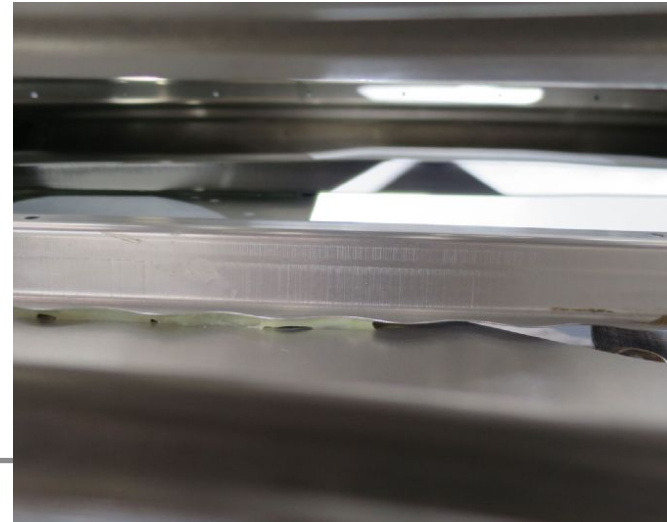
Roof Rail



A Pillar



B Pillar



Door Interior