Why Steel ?

INSTITUTE FOR STEEL DEVELOPMENT & GROWTH

Can you imagine this without steel?

Simple yet elegant

Gold (Handheld) Bridge on Ba Na hill near Danang city, Vietnam.

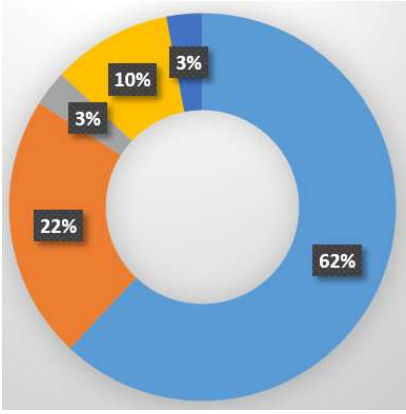
Sleek but robust

Benefits of Steel Framed Structures

Speed of Construction	Lower Project Cost	Aesthetic Appeal	Design Flexibility
High Strength	Ease of Design	Sustainable	Innovative
Modifiable	Efficient	Reliable & Predictable	Readily Available

Major Consumers

- Construction / Infrastructure Sector
- Engineering Industries
- Railways / Roadways
- Automotive
- Packaging and others



Recent advances in steel products

- High Tensile Structural Steels
- Fire Resistant Steels
- Corrosion Resistant Steels
- Coated / Galvanized Products
- Stainless Steels

Availability of various shapes

Parallel flange sections

Cold formed sections

Hollow structural tubes

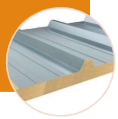
High tensile wire ropes

Blending materials

Steel & Concrete

Steel & Glass

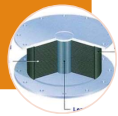
Steel & Rockwool



Blending materials

Steel & Aluminium

Steel & Rubber

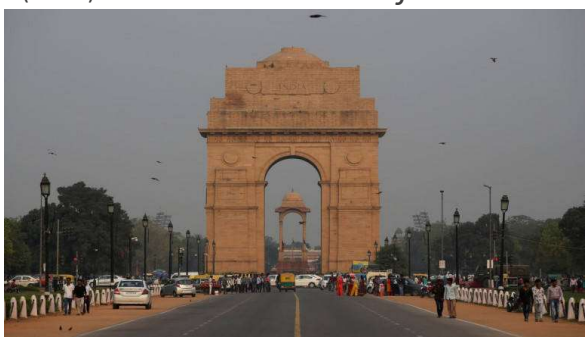


Steel & Gypsum board

Sustainable Development Index

India is ranked at a low 116 of 157 nations with regard to achieving the Sustainable Development Goals, as per the Sustainable Development Goal Index prepared by The Sustainable Development Solutions Network (SDSN) – *A Global Initiative for the United Nations*

It's time for decision makers to consider how their actions will affect future generations.



Goal 11: Sustainable cities and communities

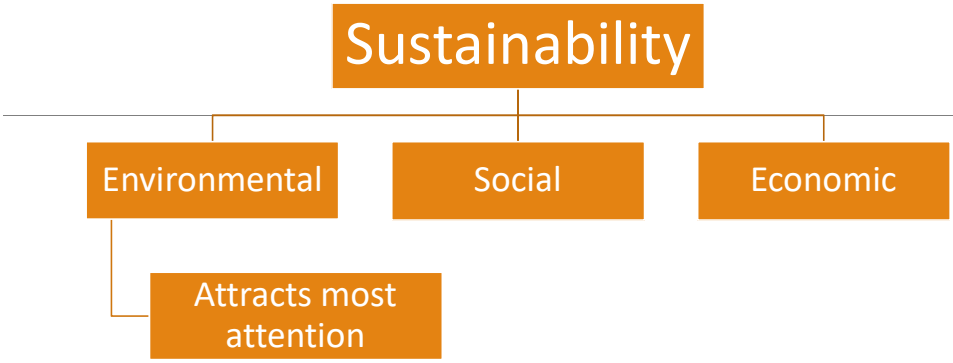
Make cities inclusive, safe, resilient and sustainable

- Transform the way we build and manage our urban spaces
- 100 smart cities
- Ensure safe and affordable housing
- Upgradation of slum settlements
- Investment in public transport
- Creating green buildings

Goal 12: Sustainable Consumption & Production

Ensure sustainable consumption and production patterns

- Reduce carbon footprint by changing the way we produce and consume resources
- Encouraging industries, businesses and consumers to recycle



A truly sustainable structure must reduce economic and social impacts. Steel Constructions offer benefits to all three issues

Building Sector

Commercial and Residential sectors are responsible for about 5.25 % of India's Green House Gas (GHG) emissions in terms of CO_2 equivalent.

This implies that India's sustainable development targets cannot be met without a fundamental change to the way in which buildings are constructed.

Source: Statistics Related to Climate Change – India 2015, www.mospi.gov.in

Role of Steel

Steel, an inherently sustainable building material, is poised to play a significant role in helping the construction sector achieve its ambitious sustainable goals.

Steel is the most recycled material on the planet, more than all other materials combined*.

** American Iron and Steel Institute*

Role of INSDAG

Working with Government to meet the objectives of its sustainable construction strategy

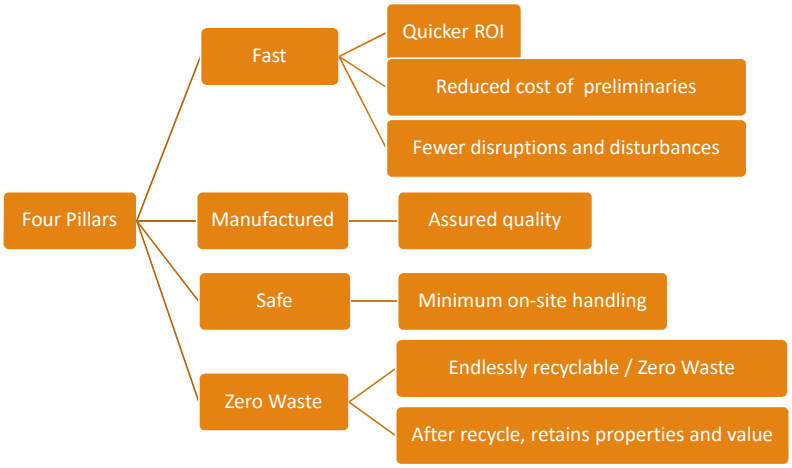
Providing design guidance and information that allows designers to create buildings with reduced life-cycle costs and environmental burdens.

Providing design guidance and information that allows designers to create buildings that can achieve the highest LEEDS / Equivalent ratings.

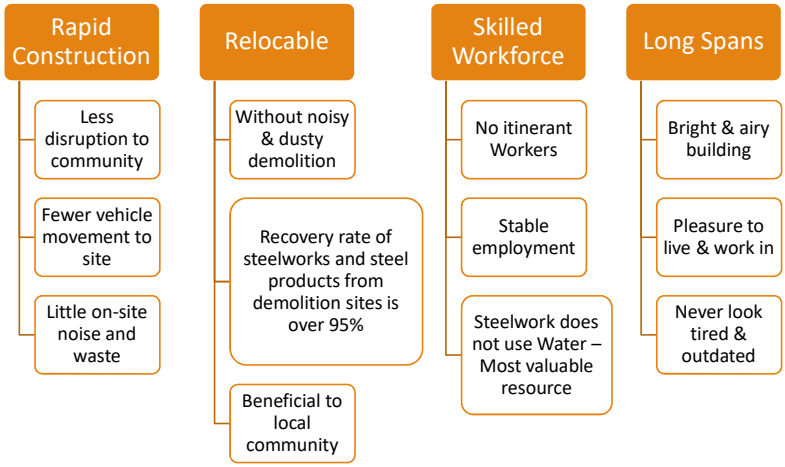
Continuing to disseminate research and development findings to help reduction of carbon footprint.

Providing architects and procurement agencies the opportunity to identify key supply partners that share a commitment to sustainable construction.

Environmental and Economic benefit of Steel



Social benefits of Steel



Innovations

Steelwork is becoming increasingly Pre-Engineered

- Easier and certain pre-planning
- Increased accuracy & reduced liability to errors
- Less site hazards
- Improved Health and safety
- A VITAL Social Sustainable Factor

Innovations

Offsite and Components

- Light gauge Cold-Formed sections
- Hollow Sections
- Steel Floors
- Sandwiched Panels
- Steel Sections with higher Yield Strength (> 410 Mpa)

Increased use of factory-made precision components

Reduced site based adjustments and hazards

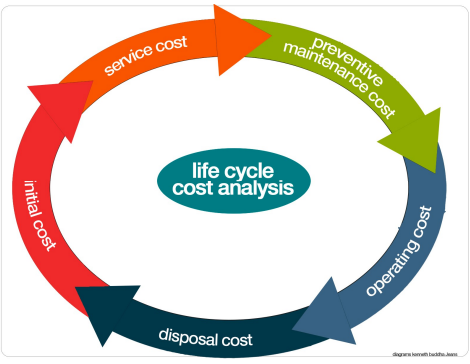
Life Cycle Cost Analysis (LCCA)

Physical infrastructures deteriorate after years of continuous usage and exposure to climate

Annual maintenance and modernization cost is 2%– 20% of CAPEX*

(LCCA) is tool to determine the most cost-effective option among different appropriate & competing alternatives

LCCA for infrastructure assets is mandatory in South Africa and Malaysia



Report on Indian Urban Infrastructure and Services, Ministry of Urban Development, GoI

Real life Case Study

Project : 22 Storeyed (1.2 mn. Sq. ft) Commercial Building, Bangalore

Cost of RCC Construction (in Rs Crores)		*Total*
Construction costs with all materials	133.0	183.0
Rental Costs (incurred due to delayed completion)	39.0	
Weather Impacts	3.0	
Net Carpet Area (due to internal columns)	8.0	
Cost of Steel Construction (in Rs Crores)		
Construction costs with all materials, civil foundations, Miscellaneous	151.0	151.0
Steel construction is 17.5 % lower than RCC construction		

Project commissioned by : JSSL, Mumbai
Data compiled by : JSSL, Mumbai

Benefits of LCCA

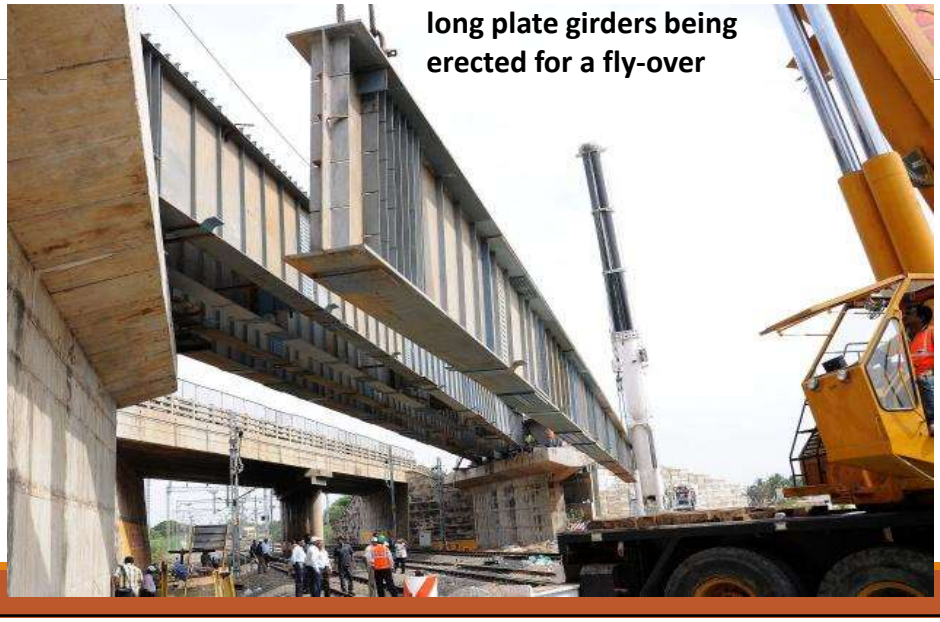
Building Description	Cost Advantage (%)	Remark
G + 3 with strip foundations	8.22	Storey Height – RCC (3.0 m) and Steel (2.85 m)
G + 3 with Pile foundations	7.03	Storey Height – RCC (3.0 m) and Steel (2.85 m)
G + 6 with Pile foundations	10.70	Storey Height – RCC (3.0 m) and Steel (2.85 m)
B + G + 20 with Pile foundations	8.72	Storey Height – RCC (3.15 m) and Steel (3.00 m)
3B + G + 40 with Pile foundations	25.97	Storey Height – RCC (3.5m) and Steel (3.2 m)

Base of Comparison : Conventional RCC construction with brick walls with Steel – Concrete Composite construction with brick walls

Source: INSDAG Study

STEEL IN CROSSING STRUCTURES

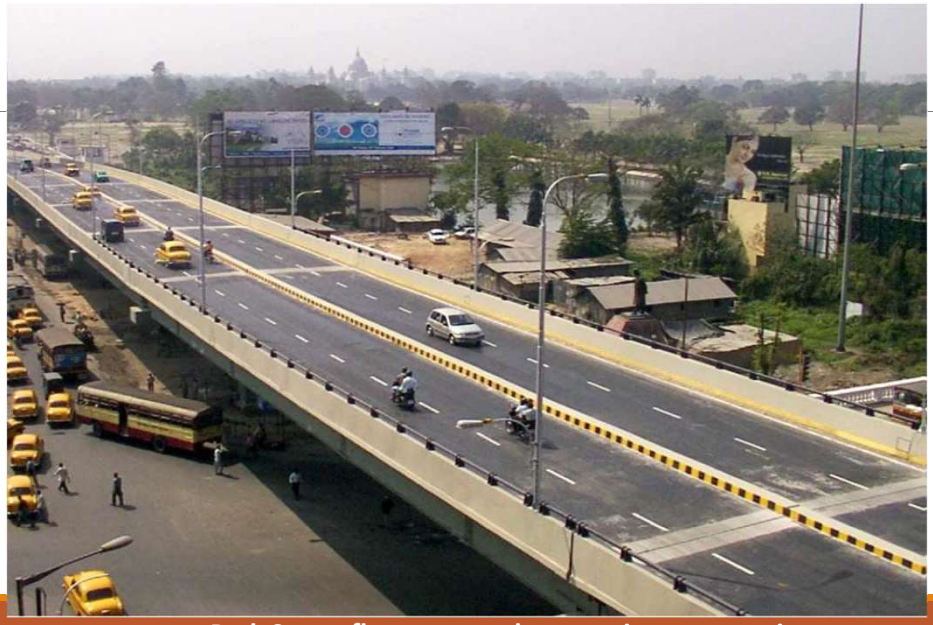
STEEL IN CROSSING STRUCTURES



long plate girders being erected for a fly-over

Courtesy: STUP Consultants

STEEL IN CROSSING STRUCTURES



Courtesy: STUP Consultants

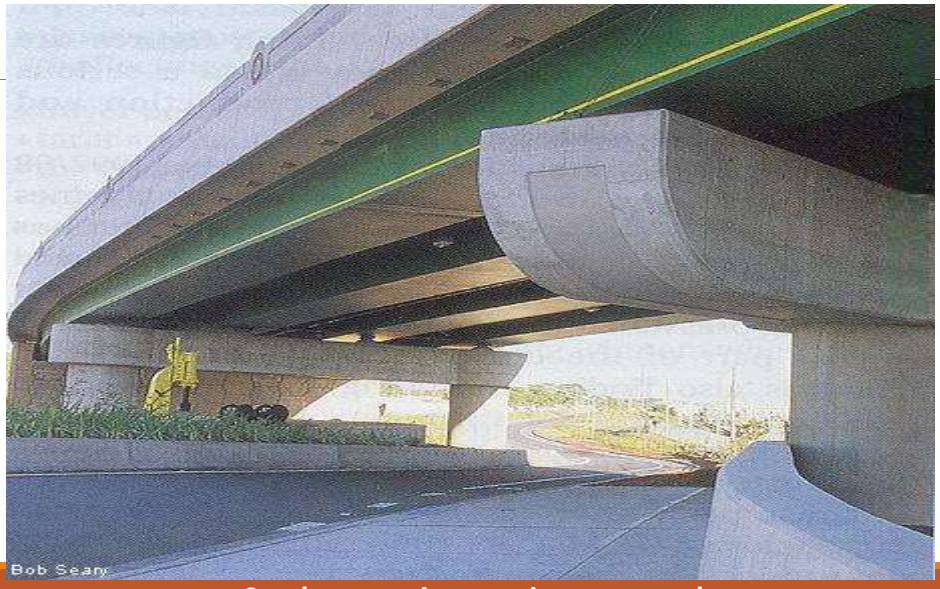
Park Street flyover – steel composite construction

STEEL IN CROSSING STRUCTURES

Courtesy: STUP Consultants

Steel box mandatory span being erected– Lock gate crossing

STEEL IN CROSSING STRUCTURES



Courtesy: STUP Consultants

Steel composite crossing over road

RAILWAY BRIDGES

Pamban Bridge

Connects Pamban island to mainland India

Cantilever Bridge

First Sea Bridge, 1914

Jubilee Bridge (Sampreeti Bridge)

Old Bridge – 1887

New Bridge – 2016

415 m long

Bogibeel Bridge

Road cum Rail Bridge

4.94 km long

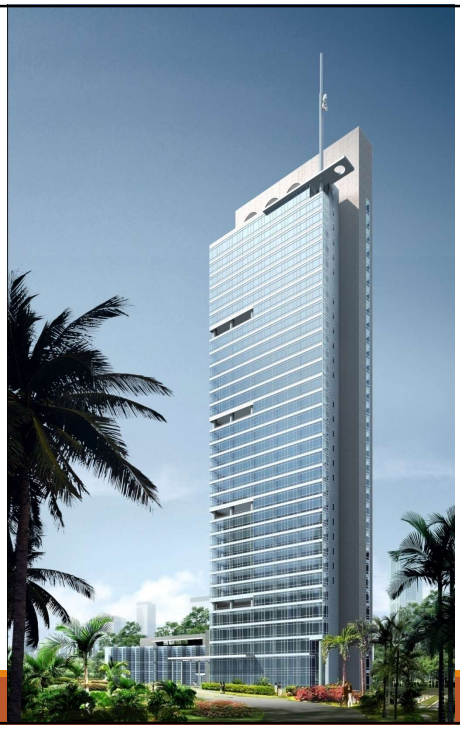
Expected inauguration – End of 2018

STEEL IN BUILDINGS

FOUR SEASONS HOTEL WORLI, MUMBAI

The tallest hotel building in India…

Good example of Composite Construction using structural steel up to service floor



Courtesy: STERLING Engineering, Mumbai

THE ITC GRAND MARATHA SHERATON HOTEL, SAHAR, MUMBAI

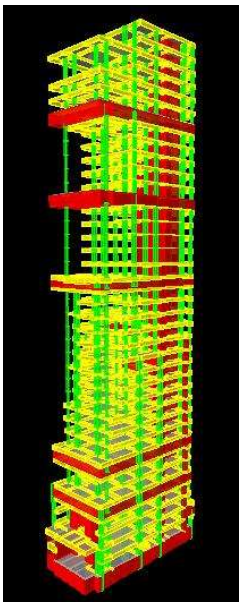
Courtesy: STERLING Engineering, Mumbai

ITC GRAND CENTRAL, LOWER PAREL, MUMBAI

Courtesy: STERLING Engineering, Mumbai

J K HOUSE, BREACH CANDY, MUMBAI

COMPOSITE COLUMNS USED TO ACHIEVE MINIMUM CROSS-SECTION AT LOWER FLOORS

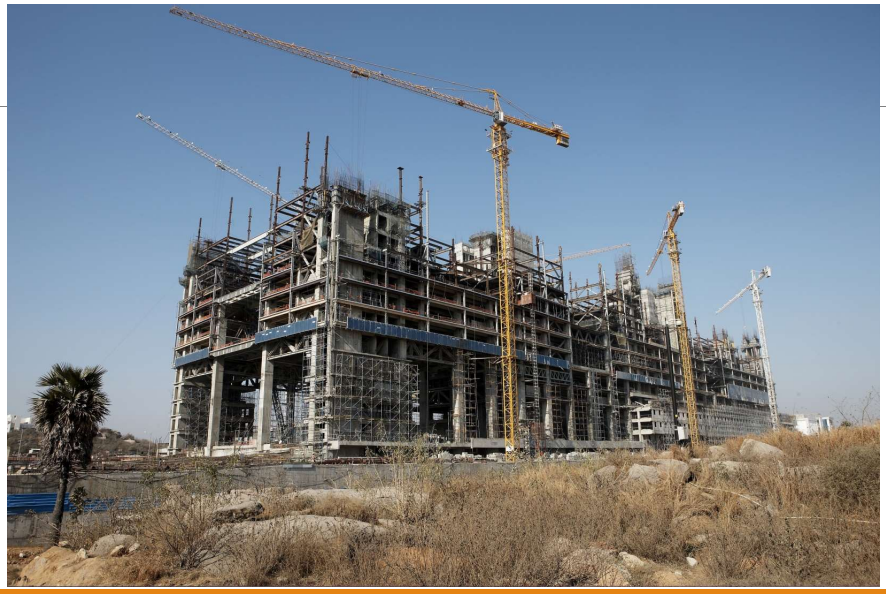


Courtesy: STERLING Engineering, Mumbai

THE ICICI HEADQUARTERS, Bandra Kurla Complex, Mumbai

Courtesy: STERLING Engineering, Mumbai

THE ICICI REGIONAL HEADQUARTERS, Hyderabad

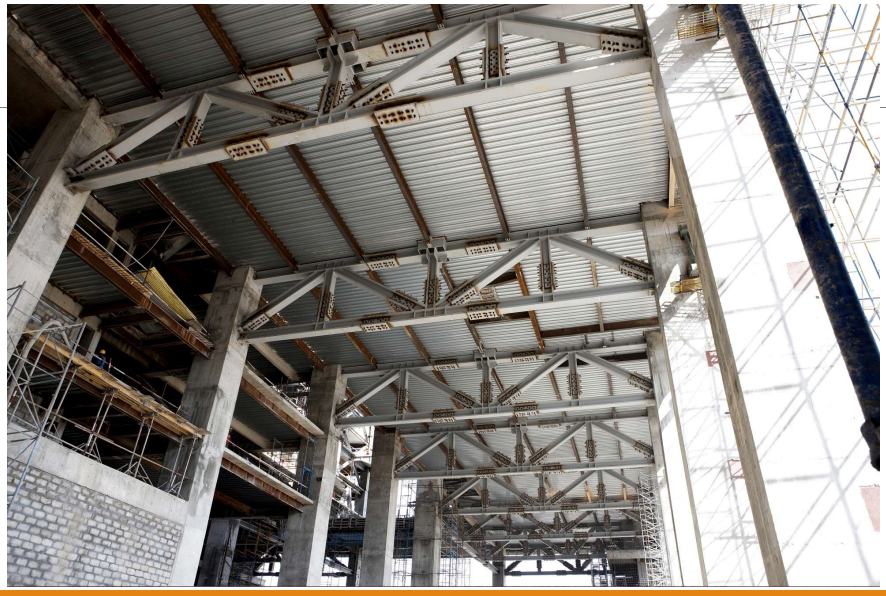


Courtesy: STERLING Engineering, Mumbai

THE ICICI REGIONAL HEADQUARTERS, Hyderabad

Inside view

Steel girder with deck sheets



Courtesy: STERLING Engineering, Mumbai

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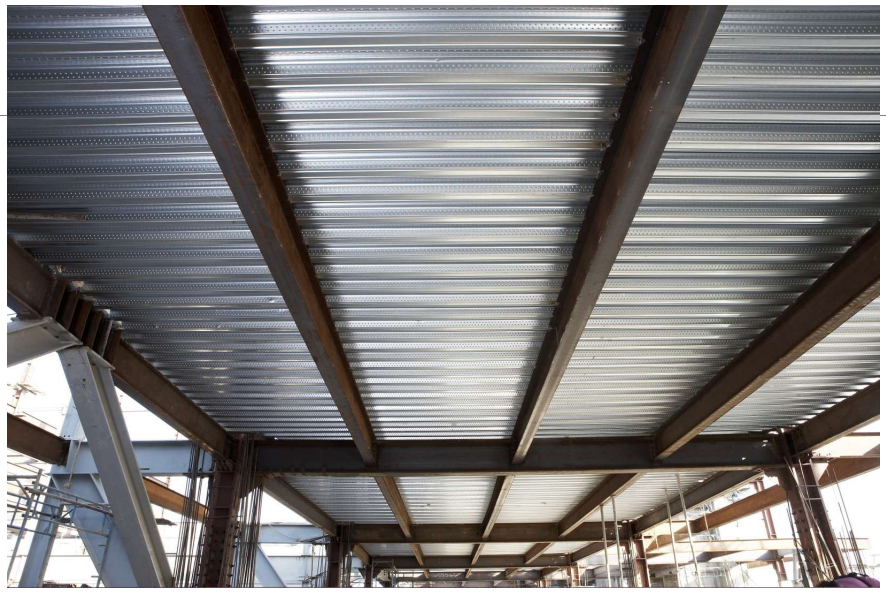
Steel Sheet Decking

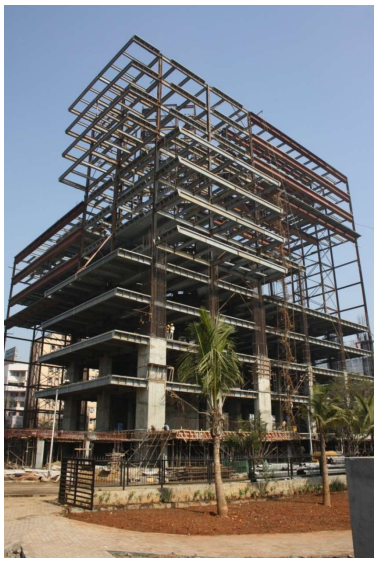


Courtesy: STERLING Engineering, Mumbai

MMRDA HEADQUARTERS, MUMBAI

Each box shaped wing comprises of 3 floors and 1 terrace floor

Two plate girders span 22.5m



Courtesy: STERLING Engineering, Mumbai

MMRDA HEADQUARTERS, MUMBAI

Courtesy: STERLING Engineering, Mumbai

SUNSHINE TOWER

DADAR, MUMBAI

The tallest commercial,

Steel-framed building in India

Column free office space

Measuring 21m x 16m

Courtesy: STERLING Engineering, Mumbai

SUNSHINE TOWERS, MUMBAI

OFFICE BUILDING

- ✓**COMPOSITE CONSTRUCTION**
- ✓**HEIGHT (APPROX) 165 MTS**
- ✓**SQUARE COLUMNS ALONG PERIPHERY – 500mm x 500mm SPECIALLY IMPORTED FROM JAPAN, SUPPLIED BY CORUS**

Courtesy: STERLING Engineering, Mumbai

SUNSHINE TOWER, MUMBAI

Courtesy: STERLING Engineering, Mumbai

STEEL IN RURAL HOUSING

LOW COST HOUSE FOR RURAL POPULATION IN INDIA

INSDAG developed an innovative design and construction methodology of low cost house for poor rural population in India following Architectural guidelines of GOI under PMAY-G

Construction Cost Rs. 800/- per Sq. Ft.

INSDAG has applied for its patent

Prototype installed at NIRD, Hyderabad

Steel Intensive Model Rural House

Photo of Rural House at Talegaon

Steel Intensive Model Rural House

Model House at Burdwan, WB

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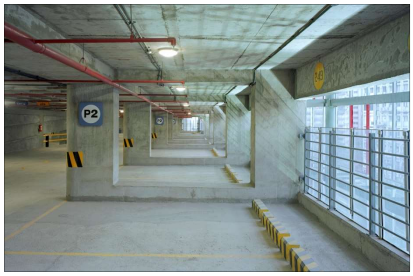
STEEL IN CAR PARKS

CROSS ROADS 2, NARIMAN POINT, MUMBAI



Multi-level car park floor

Courtesy: STERLING Engineering, Mumbai

STEEL IN PUJA PANDALS

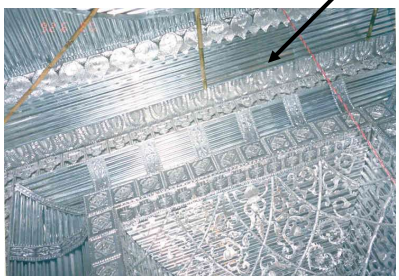
Freedom of Expression with STEEL

Behala Natun Dal, Durga Puja 2018

STEEL IN PUJA PANDALS

Ahiritola Puja Pandal Kolkata

IN INTERNAL DECORATION



THANK YOU

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