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PENNAR ENGINEERED BUILDING SYSTEMS LTD.

An ISO 9001-2008 COMPANY

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COMPOSITE STEEL STRUCTURES

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High Rise Steel Structural Systems

Construction Methods

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Traditionally two competing methods of construction could be observed both connected with special advantages but also disadvantages worth mentioning.

Conventional concrete construction method	Construction in steel	Composite Construction
Option -1	Option -2	
+ Freedom of form and Shapes	+ High ratio between bearing capacity and weight	+ Higher bearing capacity
+ Easy to handle	+ Prefabrication	+ Optimized usage of steel and concrete
+ Thermal resistance	+ High accuracy	+ Higher stiffness
- Time-consuming shuttering	- Low fire resistance	+ Better fire and corrosion resistance
- Sensitive to tensile forces		

* Composite construction provides the most economical solution

Structural Components

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- Composite Columns
- Composite Slab & Secondary beams
- Mechanical, Electrical & Plumbing Integration

Composite Beam Components

- Steel Beam
- Shear Studs
- Metal Deck
- Slab

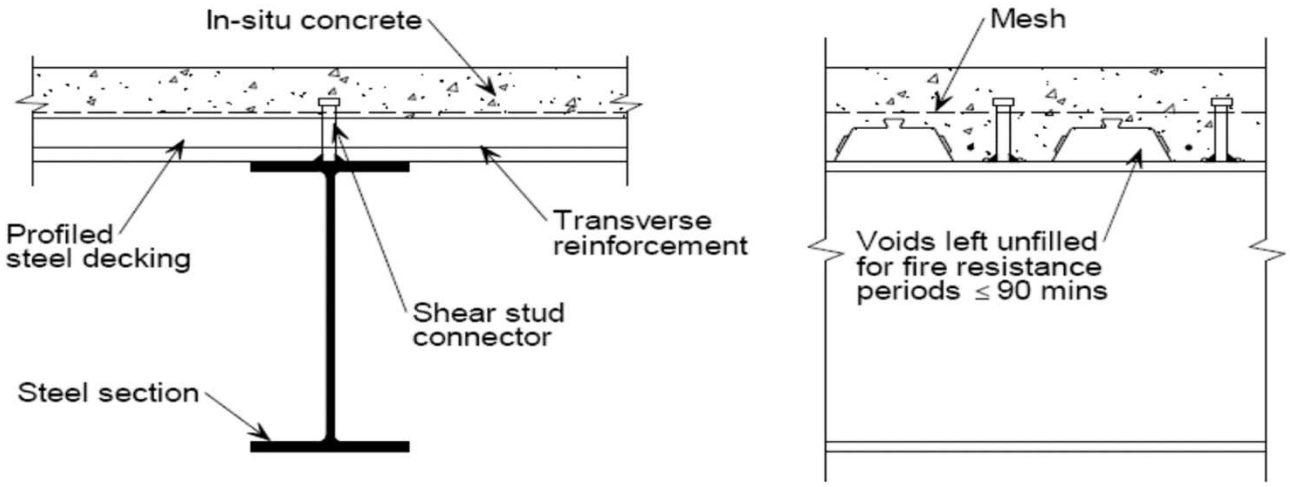
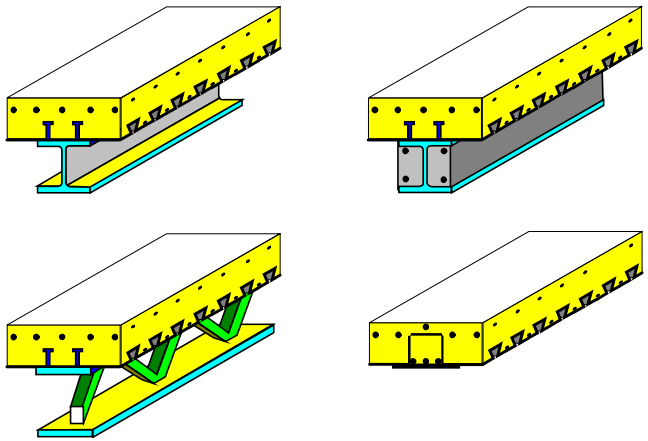


Figure 5.1 *Typical cross-section through a composite beam*



Composite Columns

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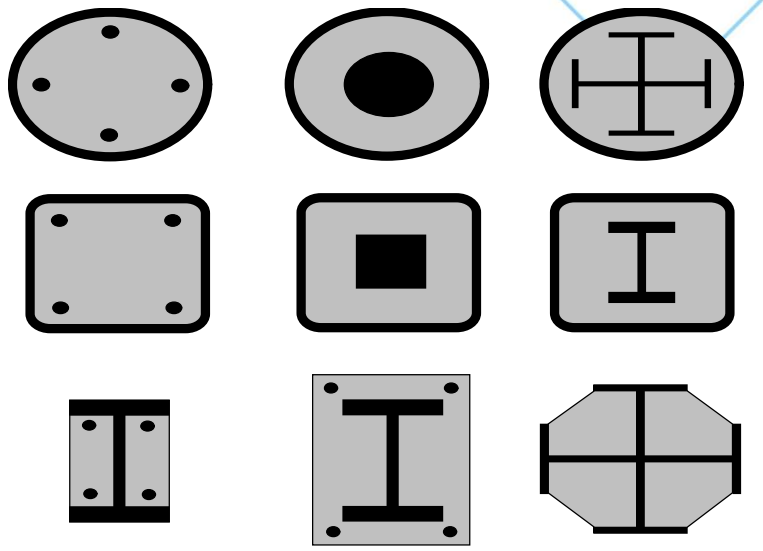
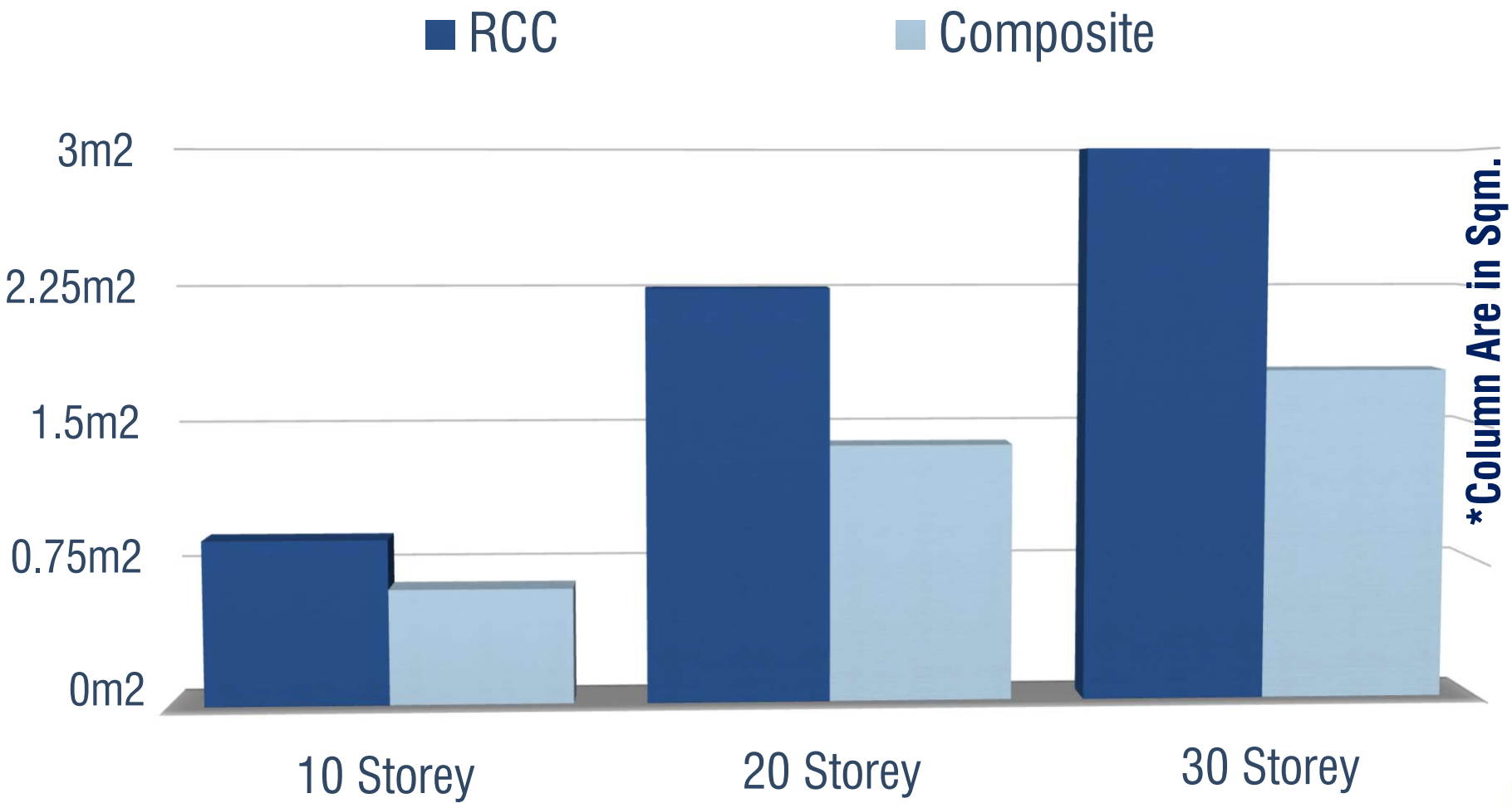
- Yield Strength upto 450Mpa
- Saving in column sizes
- Protection from fire
- Use of Standard size form work
- Minimum steel consumption



Composite Columns Sizes (at base) Comparison for 11mX11m grid.

(Commercial floor loads considered)



Composite Slab

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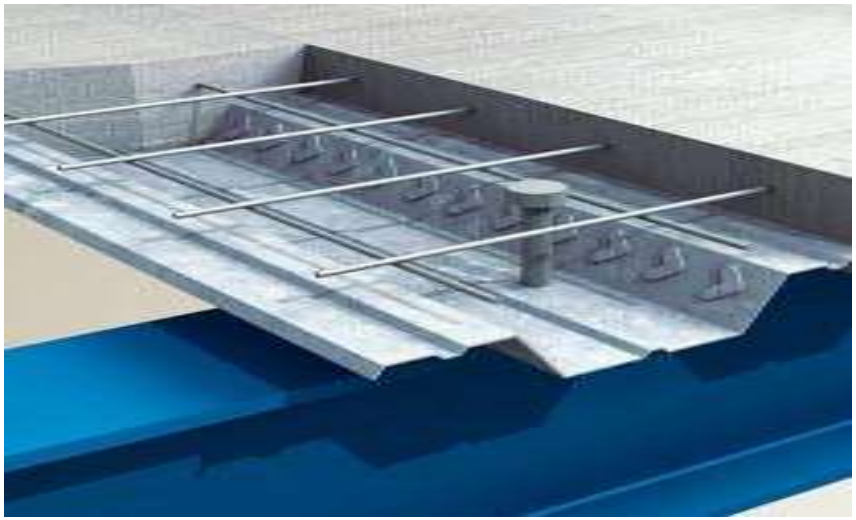
Components – A) Metal Deck , B) Shear Studs, C) Reinforcement, D) Slab



Composite slab Advantages

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- No Formwork required
- Very less dead weight and hence saves on foundation cost
- Multiple slabs can be casted at once
- Composite action controls excessive deflection
- Overall Floor Beam tonnage is reduced

MEP Services Integration

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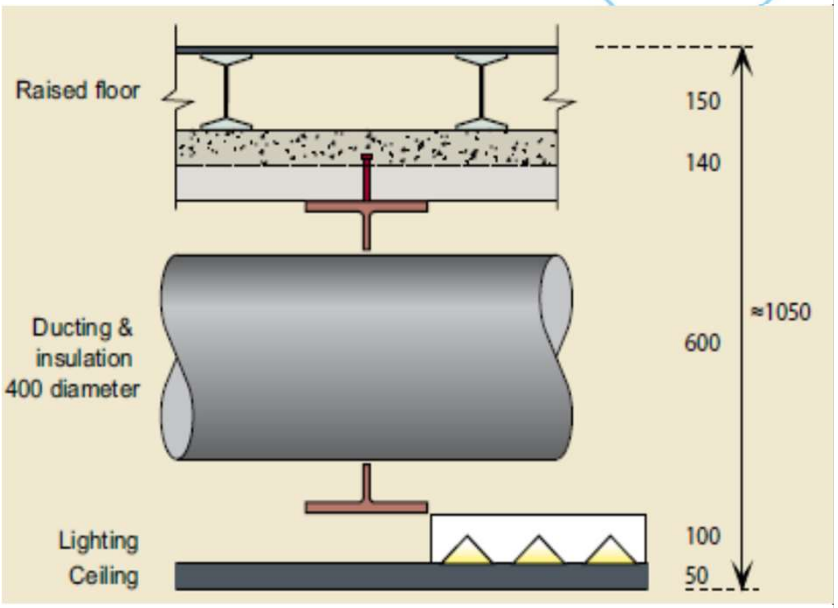

- Slim Deck systems reduce the beam height to an extent that most MEP Provisions can be given underneath the beam
- If spans are too long then castellated beams can be used. An opening of 200mm to 600mm can be maintained in a 900mm deep beam
- If Deeper opening required, open joist systems are recommended

Mother's pet - Center Point School @ Nagpur

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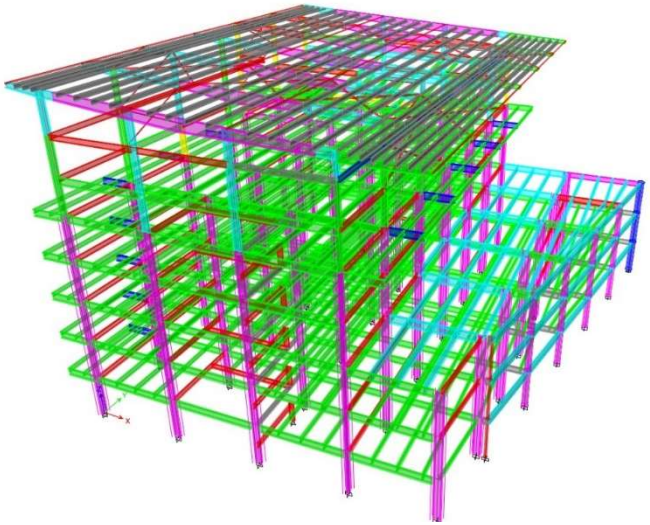

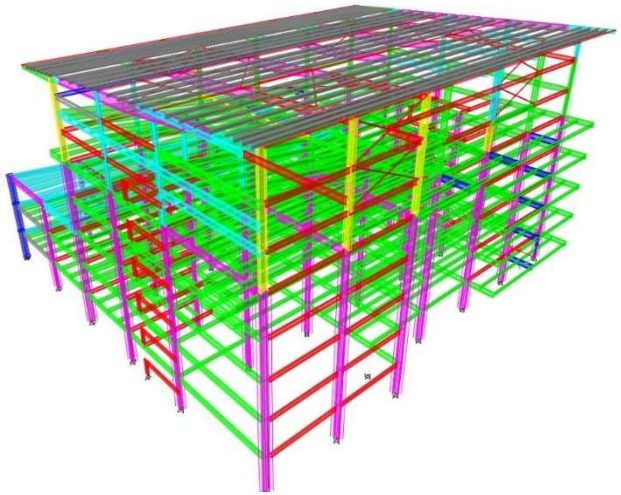

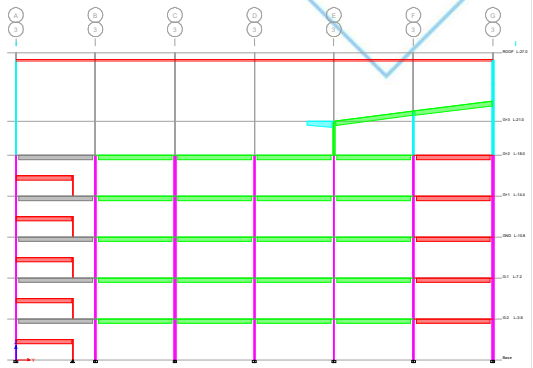

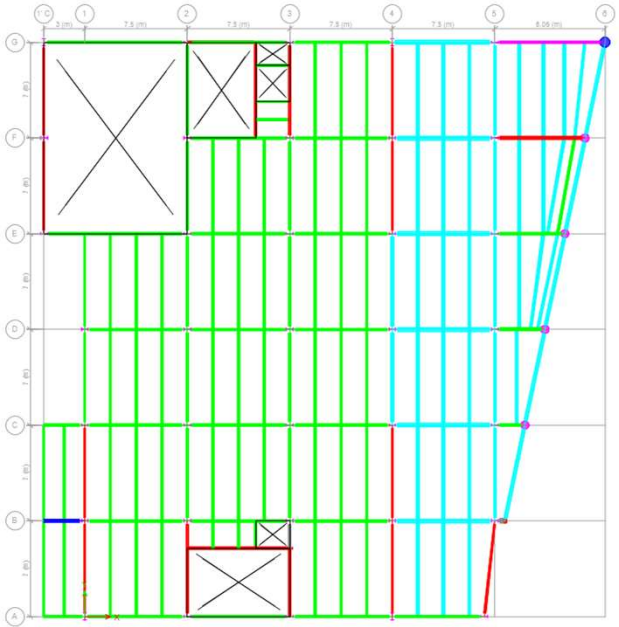

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COLD FORMED STEEL BUILDINGS (LGSF)

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Light Gauge Steel Framed Structures

LIGHT GAUGE STEEL FRAME COMPOSITE HOUSING STRUCTURE PROCESS

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- **Recycling 1000 kg of steel saves 1,200 kg of iron ore, 500 kg of coal, 20 kg of limestone, and the landscape degradation of the quarries to extract them.**

LGSF PROCESSING

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RAW STEEL AT PLANT

COIL ROLLS

GALVANISED/GALVALUME/
BLUESCOPE STEEL COILS

COIL SLITTING

Cold rolled studs and joists are formed in “C” shapes, which provides lateral strength for studs and vertical strength for joists and rafters.

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Framing Fabrication

Transport & Erection

Mesh-crete Wall Cladding

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Roof with Concrete Slab

Roof with Profile Sheeting

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Residential House

Farm House

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TRANSPORTABLE MODULAR CONTAINERS

TEMPORARY HEALTH CAMPS

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MODULAR BUILDINGS

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MODULAR TOILETS

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EWS Houses at Thiruvallur

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1000 HOUSES EACH 380 Sft FOR SRI RAMANUJA MISSION TRUST

Why LGSF Construction?

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- Monolithic construction system (air-tight) – therefore no thermal bridges.
- Higher Flexibility due to material unification (same material for inside and outside walls, ceilings, floor).
- Non-Combustible Construction System.
- Very high Green Building rating for fire, thermal and acoustic properties.
- High Earthquake Protection (structurally rigid when bound to internal steel frame).
- Light and easy to handle – no special equipment (heavy cranes, machinery) needed on-site.
- Economical than alternative “eco” building systems, minimizes handing and installation
- Lesser time, manpower and related costs.
- Minimizes wastage and less life cycle cost.

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PRE ENGINEERED BUILDINGS

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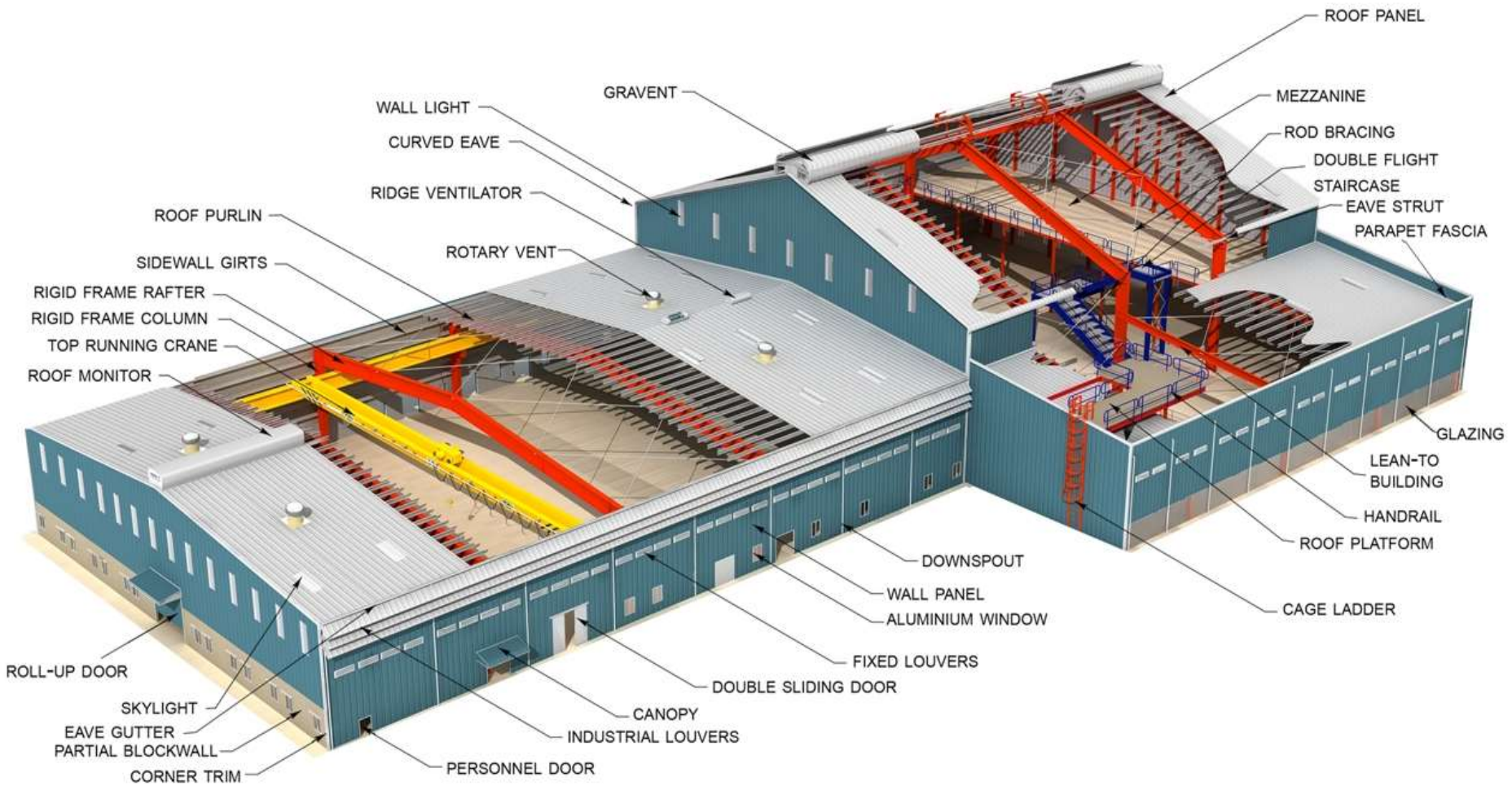
INTRODUCTION - PRE ENGINEERED BUILDING



ADVANTAGES OF PEB

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- Ability to span long distance
- Faster occupancy
- Cost efficiency
- Flexibility of expansion
- Earthquake & Hurricane resistant
- Single-source responsibility
- Factory controlled Quality
- Low maintenance

MANUFACTURING FACILITY

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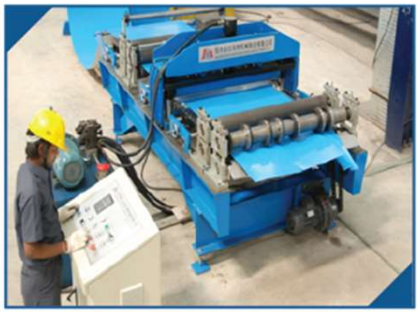





State-of-the-art manufacturing facility with a production capacity of 90,000 MT per annum

ENGINERING TEAM

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More than 150 Experienced Engineers in Design & Detailing Team

Design Department :

- Design Head : 1
- Design Checkers : 12
- Sr. Designers : 16
- Design Engineers : 35

Detailing Department :

- Detailing Chief : 1
- Sr. Detailing Checker : 15
- Detailing Checkers : 18
- Sr. Detailers : 30
- Detailers : 39

Engineering Co-Ordinator :

- Executive : 1

3D- Max studio :

- Executive : 1

ENGINEERING CODES & SOFTWARE

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SOFTWARE

- Metal building Software – MBS, USA
- Staad Pro V8i - US Code and IS Code – Bentley corporation, USA
- Auto CAD – Autodesk Inc. USA
- Estimation Software – In-house developed
- 3D Max Studio - Autodesk Inc., USA
- X-Steel (Tekla structure) – Trimble , Finland

CODES

- American
- Euro
- British
- Indian

APPLICATIONS

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FACTORY

SHOWROOM

STADIUM

WAREHOUSE

AIRCRAFT HANGAR

MULTI-STOREY

APPLICATIONS

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COLD FORM STRUCTURE

RACKING SYSTEM

COLD STORAGE

OFFICE BUILDING

SOLAR STRUCTURES

THE GROWTH STORY OF PEBS PENNAR

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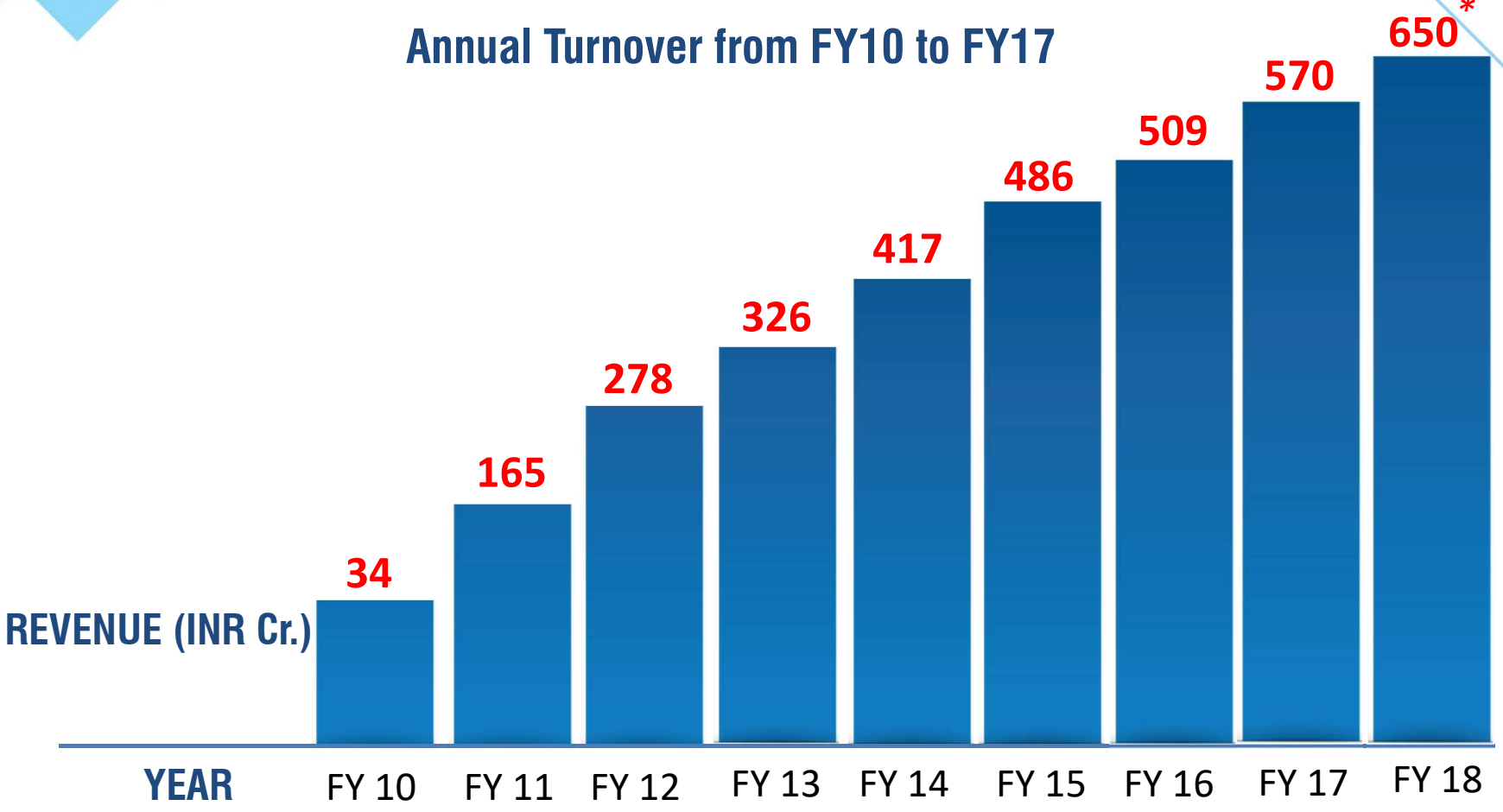
Annual Turnover from FY10 to FY17



Procured orders worth over Rs. 3,500 Cr. from the date of inception

** Projected Revenue*

AWARDS

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Construction Week India Awards 2013
Infrastructure Company of the Year

Construction Week India Awards 2013
PEB Contractor of the Year

IEI Industry Excellence Awards 2013
Excellence Award

INSDAG National Award 2014
Certificate of Commendation

VC Circle Award 2015
Manufacturing Company of the Year

CIDC Vishwakarma Award 2015
Best professionally managed company
Best PEB Building of the Year

Dun & Bradstreet Infra Award 2016
Industrial Building

TV5 Business Leader Award 2015
Infrastructure Category(Medium)

IEI Industry Excellence Awards 2015
Excellence Award

CIDC Vishwakarma Award 2016
Best Professionally Managed Company

ACCE(I) Bhagawati Award
Outstanding Design of Industrial Plant

Construction World-Top Challenger Award
Top Challenger

Construction Week India Awards 2016
PEB Project of the Year-Runner Up

IEI Industry Excellence Awards 2016
Excellence Award

CIDC Vishwakarma Award 2017
Best Professionally Managed Company

IEI Industry Excellence Award 2017
Excellence Award

OUR CREDENTIALS

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CERTIFICATE

TÜV NORD

Management system as per
ISO 9001 : 2008

In accordance with TÜV INDIA procedures, it is hereby certified that

PENNAR ENGINEERED BUILDING SYSTEMS LTD.
CORPORATE OFFICE : 9th Floor (West Wing),
DHFLVC Silicon Towers, Kondapur, Hyderabad - 500 084
WORKS : Survey. No.144 & 145, Chandapur Village,
Sadasivpet Mandal, Medak District, Hyderabad - 500 084
Andhra Pradesh, India

pebs pennar

applies a quality management system in line with the above standard for the following scope

Design, Manufacture, Supply & Erection of Pre-Engineered Building Systems

Certificate Registration No. QM 06 00151
Audit Report No. Q 3358/2010

Valid until 21.12.2016
Valid from 22.12.2013
Initial Certification 22.12.2010

Certification Body
at TÜV INDIA PVT. LTD.

Issue 09.12.2013
Place : Mumbai

This certification was conducted in accordance with the TÜV INDIA auditing and certification procedures and is subject to regular surveillance audits.

TUV India Pvt. Ltd., 801, Raheja Plaza - 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuvindia.co.in

TÜV NABCB QM 002

CII

Indian Green Building Council (IGBC)

hereby certifies that

PEBS Pennar
Sadasivapet, Hyderabad

has successfully achieved the Green Building Standards required for the following level of certification under the IGBC Green Factory Building Rating System

IGBC Green Factory Building Gold
October 2010

Pradeep Bhargava
Chairman, IGBC Green Factory Building Rating System

Dr Prem C Jain
Chairman, IGBC

Jamshyd N Godrej
Chairman, CII-Godrej GBC

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

DOUBLE-LOK STANDING SEAM ROOF SYSTEMS AS CLASS 1 PANEL ROOFS

Prepared for:

Pennar Engineered Building Systems Ltd.,
9th Floor, West Wing, DHFLVC Silicon Towers
Kondapur, Hyderabad - 500 084 India

FM Approvals Class: 4471

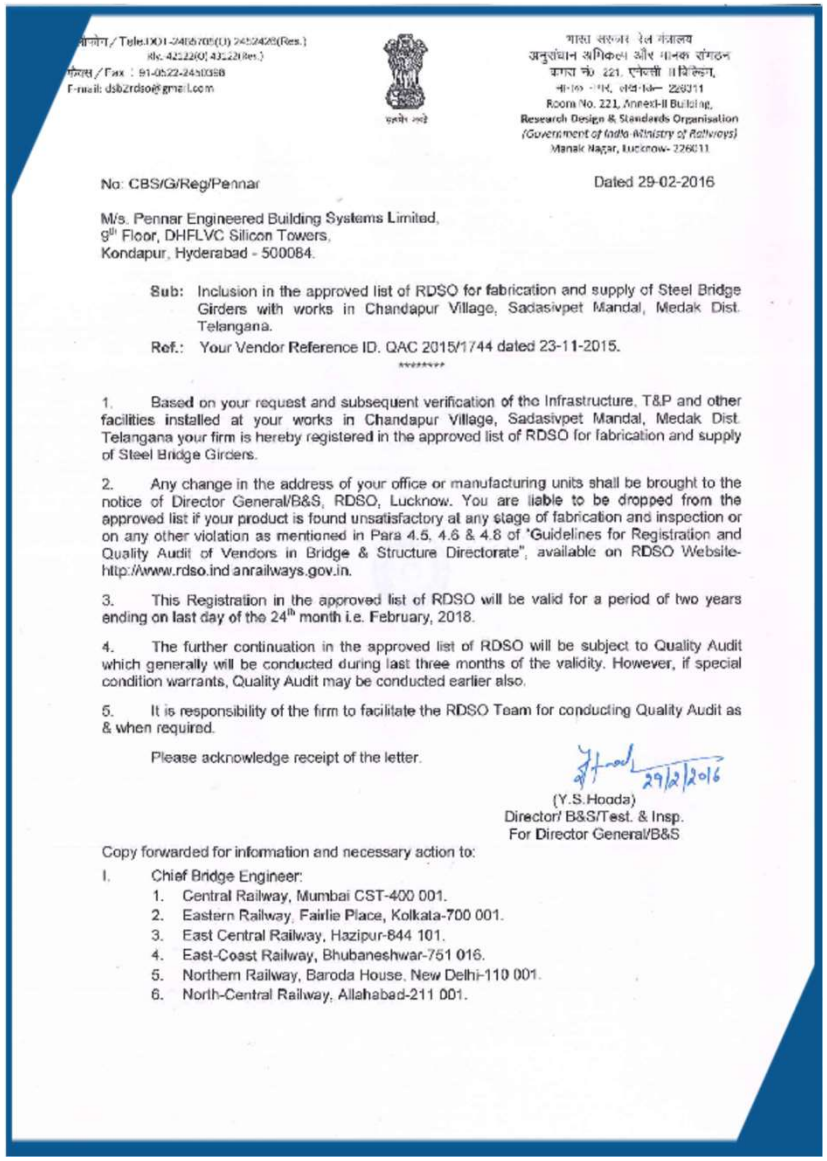
Approval Identification: 3034-434 Approval Granted: April 08, 2011

Said Approval is subject to satisfactory field performance, continuing follow-up Facilities and Procedures Audits, and strict conformity to the construction as shown in the Approval Guide, an online resource of FM Approvals.

For more than 100 years FM Approvals has partnered with business and industry to reduce property losses

Richard P. Fenton, P.E.
Asst. Vice President, Group Manager
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062

FM Approvals



दूरभाष / Tele.(0)1-2418705(O) 2452428(Res.)
Rly. 4222(O) 4222(Res.)
फैक्स / Fax : 91-0522-2451088
E-mail: dsbzrdso@gmail.com

सत्यमेव जयते

भारत सरकार रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
कमरा नं. 221, एनेक्सी II बिल्डिंग,
मानक नगर, लखनऊ- 226011
Room No. 221, Annexi-II Building,
Research Design & Standards Organisation
(Government of India-Ministry of Railways)
Manak Nagar, Lucknow- 226011

No: CBS/G/Reg/Pennar

Dated 29-02-2016

M/s. Pennar Engineered Building Systems Limited,
9th Floor, DHFLVC Silicon Towers,
Kondapur, Hyderabad - 500084.

Sub: Inclusion in the approved list of RDSO for fabrication and supply of Steel Bridge Girders with works in Chandapur Village, Sadasivpet Mandal, Medak Dist. Telangana.

Ref.: Your Vendor Reference ID. QAC 2015/1744 dated 23-11-2015.

****

1. Based on your request and subsequent verification of the Infrastructure, T&P and other facilities installed at your works in Chandapur Village, Sadasivpet Mandal, Medak Dist. Telangana your firm is hereby registered in the approved list of RDSO for fabrication and supply of Steel Bridge Girders.

2. Any change in the address of your office or manufacturing units shall be brought to the notice of Director General/B&S, RDSO, Lucknow. You are liable to be dropped from the approved list if your product is found unsatisfactory at any stage of fabrication and inspection or on any other violation as mentioned in Para 4.5, 4.6 & 4.8 of "Guidelines for Registration and Quality Audit of Vendors in Bridge & Structure Directorate", available on RDSO Website-http://www.rdso.indianrailways.gov.in.

3. This Registration in the approved list of RDSO will be valid for a period of two years ending on last day of the 24th month i.e. February, 2018.

4. The further continuation in the approved list of RDSO will be subject to Quality Audit which generally will be conducted during last three months of the validity. However, if special condition warrants, Quality Audit may be conducted earlier also.

5. It is responsibility of the firm to facilitate the RDSO Team for conducting Quality Audit as & when required.

Please acknowledge receipt of the letter.

29/2/2016

(Y.S.Hooda)
Director/ B&S/Test. & Insp.
For Director General/B&S

Copy forwarded for information and necessary action to:

I. Chief Bridge Engineer:
   1. Central Railway, Mumbai CST-400 001.
   2. Eastern Railway, Fairlie Place, Kolkata-700 001.
   3. East Central Railway, Hazipur-844 101.
   4. East-Coast Railway, Bhubaneshwar-751 016.
   5. Northern Railway, Baroda House, New Delhi-110 001.
   6. North-Central Railway, Allahabad-211 001.

RDSO Approval for Railway Bridges & Girders

OUR CREDENTIALS

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L&T Construction
Buildings & Factories

Certificate of Merit

This is to certify that M/s. PENNAR ENGINEERED BUILDING SYSTEMS
has been selected as a Safety Conscious .... SUB - CONTRACTOR .....
during the Safety Month Celebration, January 2013 at

Renault Nissan Project, Oragadam

G.Chandrasekaran
EHS Incharge

C.Sivakumar
Project Manager

P&G

Award of Appreciation
To

L&T Construction
Buildings & Factories

We express our deep sense of appreciation to M/S LARSEN & TOUBRO LTD. ECC- Division, Factory (BU) for Health & Safety system procedures and there by achieving 4.16 Million safe man hours during the constructions of the project at P&G Baby Care Ph-II, Fem Care Ph-II, CIP-5 between 10-April-2010 to 30-April -2012. We also convey our total appreciation for individual and collective efforts of all staff and workmen who have devoted to this accomplishment. We wish all of you to make more and more achievements in future.

Date:- 30th April-2012

S. P. Singh (Site Construction Process Owner),
P&G - Mandideep Plant, Bhopal

raTech
EMENT
The Engineer's Choice

CERTIFICATE OF APPRECIATION

GREEN TRIANGLE FOR SAFERY

This is to certify that MR. BABY SUBIN of M/S. PEBS PENNAR has been adjudged "BEST SAFETY CONSCIOUS SUPERVISOR – CONTRACTOR" for the year 2011.

Management is looking forward for your total involvement and further contribution in the field of Occupational Health & Safety in making this unit a complete incident free unit at all times.

Date: 04.03.2012

ADITYA BIRLA GROUP

Chairman – Apex Safety Committee
UltraTech Cement Ltd.
Unit: Kotputli Cement W

HEAVY STRUCTURES

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RELIANCE PROJECT

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4G Towers for Reliance Jio Infocomm

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SOLAR STRUCTURES

SOLAR STRUCTURES

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APPLICATIONS

- Solar Photovoltaic plants
- Solar Canal-top
- Solar Roof-top
- Solar Thermal plants
- Solar Car Parks

PROJECT PHOTOGRAPHS

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IOT Infrastructure & Energy Services Ltd. building for ONGC OPAL, the length of the building is approx. 1 km, Gujarat

Area: 15.16 lakh sft

Stacker Reclaimer Building for UltraTech Cement Ltd., at Kotputhli

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Reliance Retail – National Distribution Center, Pune

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Area: 4 lakh sft

Tata Steel Processing & Distribution Ltd., Chennai

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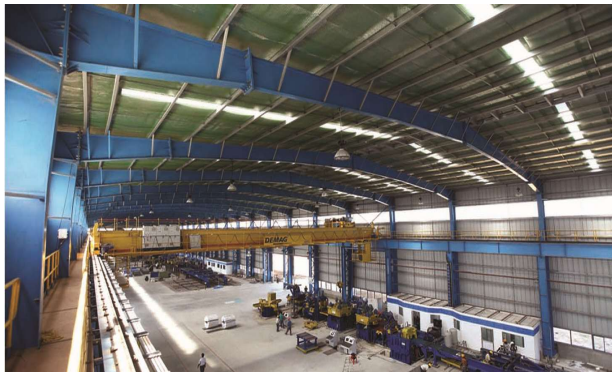

Volvo India - Bengaluru

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ETNA Phoenix - Hyderabad

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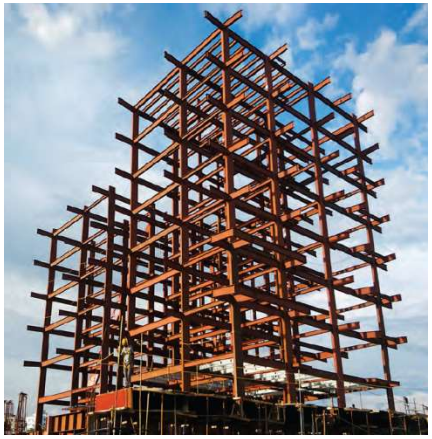

UltraTech Cements – Rajshree, Karnataka

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Bharat Biotech, Multi-storey G+7, R&D center, Hyderabad

pebs pennar
SHAPING YOUR IMAGINATION

DOUBLE LOK® 360° STANDING SEAM *
FM APPROVED

85,000sft

Jayabheri Orange County, Multi-storied building G + 10, Hyderabad

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My Home Industries, 700m long building, Visakhapatnam

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Length: 710m

L & T Metro Stations – Hyderabad

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SOLAR PROJECTS

CIRUS SOLAR - ANDHRA PRADESH

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AZURE POWER - RAJASTHAN

30 MW

NEW ERA - PEDDALINGAPUR

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12 MW

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NEW ERA - KOWDIPALLY

10 MW

PREMIER SOLAR - TALAMADLA

8.5 MW

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5 MW

PREMIER SOLAR – HYDERABAD

OUR ELITE CUSTOMERS/END USERS

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PEBS PENNAR PLANT

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INDIA'S 1ST IGBC GOLD RATED GREEN FACTORY

ENTRANCE CANOPY

FABRICATION BAY

HEADER BAY

CANTEEN

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THANK YOU