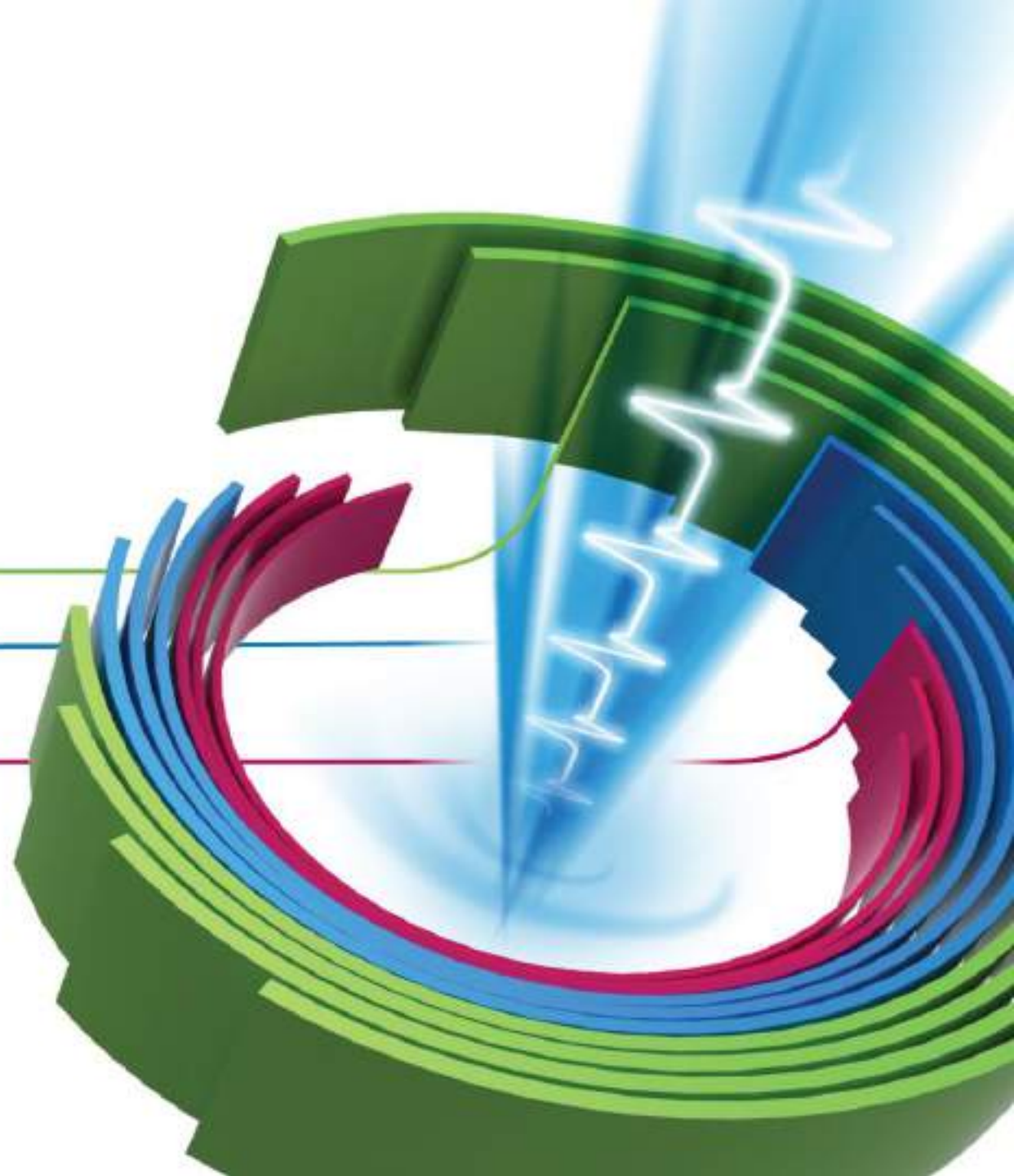


# ENLIVENING WAREHOUSES



*Godrej* | STORAGE SOLUTIONS



First Large Industrial House in India to enter the field of Intralogistics

Headquartered in **Chennai**, with a strong focus on  
**International Market**

Our Manufacturing facility is spread over  
**100,000 SQM**



# Comprehensive Product Portfolio

## Pallet Racking Solutions



Selective



Double Deep



High Bay



Mobile Racking



Pallet flow



Push Back



Drive-in



Shuttle



ASRS

# Comprehensive Product Portfolio

## Shelving Solutions



Light Duty



Medium Duty



Heavy Duty



Mobile Shelving



Mobistack SmartO



Mobistack Duo



Mezzanine



Bin Flow

**Design & Technology**

**Manufacturing**

**Installation**



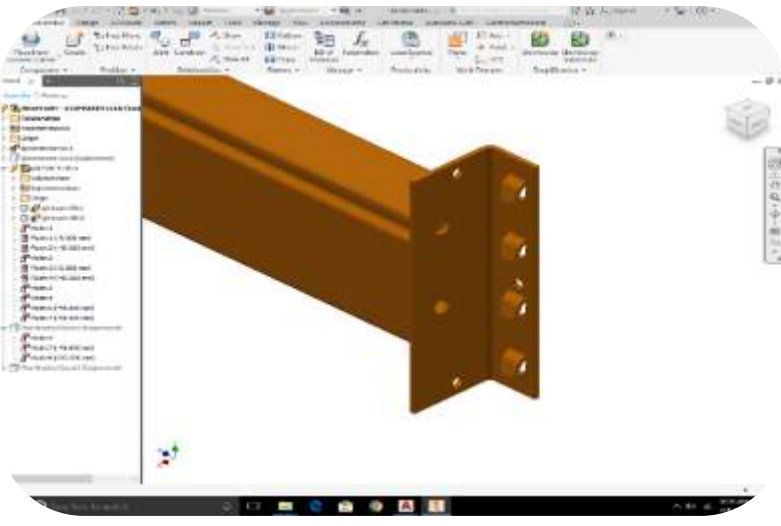
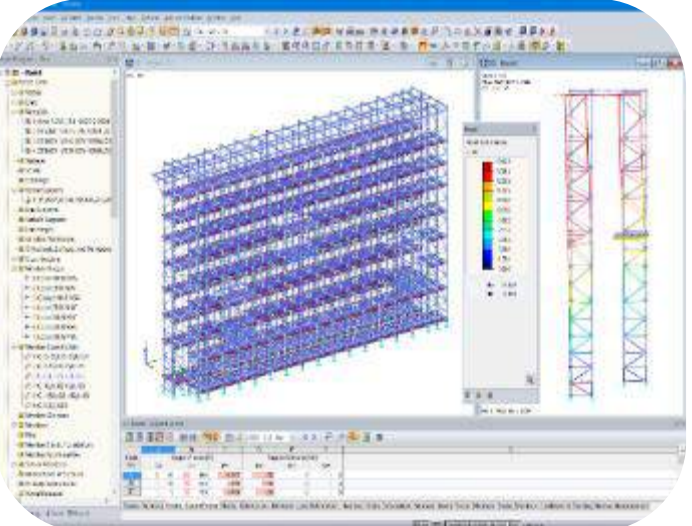
**Design & Technology**

**Manufacturing**

**Installation**



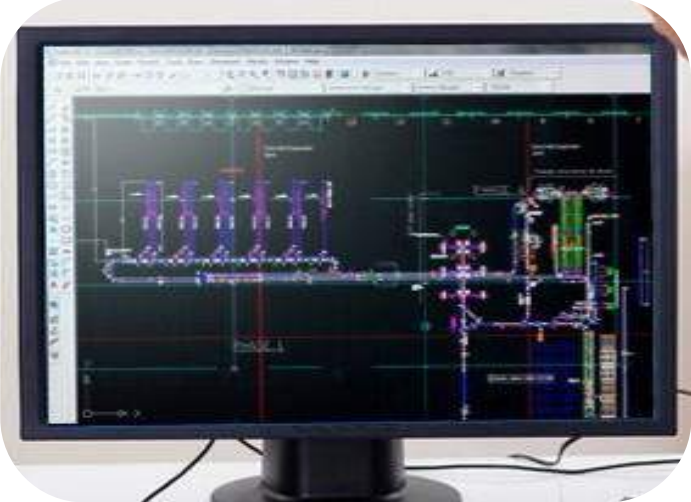
# Our Core Technical capabilities



**Structural Engineering**

**Product Development**

**Solution Design & Simulation**





DESIGN & TESTING COMPLIANCE	
 EN 15512	Steel static storage systems - Adjustable pallet racking systems - Principles for structural design
 FEM 10.2.02	The Design of Static Steel Pallet Racking
 FEM 10.2.06	The Design of Hand Loaded Static Steel Shelving
 FEM 10.2.08	Recommendations for the Design of Static Steel Pallet Racking in Seismic Conditions
 sema	Code of Practice for the Design of Static Racking
 ANSI-MH 16.1	Specification for the Design, Testing and Utilization of Industrial Steel Storage Racks

Design from  
first principles

1.2.1.1 Flexural, Torsional, or Torsional-Flexural Buckling

The nominal axial strength,  $P_{nr}$  for flexural, torsional, or torsional-flexural buckling is

for  $\lambda_c \leq 1.5$

$$P_{nr} = \left( 0.658^{\lambda_c^2} \right) P_y \quad (\text{Eq. 1.2.1-1})$$

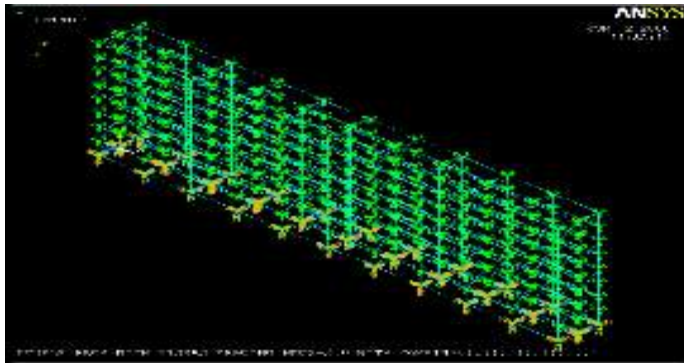
for  $\lambda_c > 1.5$

$$P_{nr} = \left( \frac{0.877}{\lambda_c} \right) P_y \quad (\text{Eq. 1.2.1-2})$$

where  $\lambda_c = \sqrt{P_y / P_{cr}}$  (Eq. 1.2.1-3)

$P_y = A_g F_y$  (Eq. 1.2.1-4)

$P_{cr}$  = Minimum of the critical elastic column buckling load in flexural, torsional, or torsional-flexural buckling determined in accordance with Section 1.1.2



Software simulation  
& Analysis



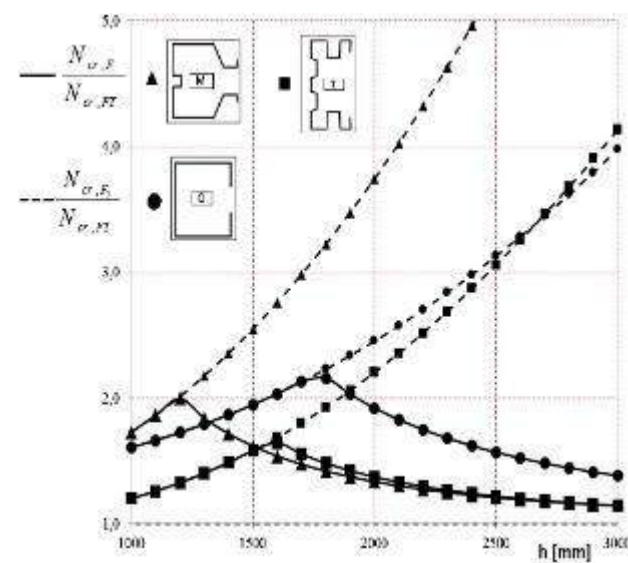
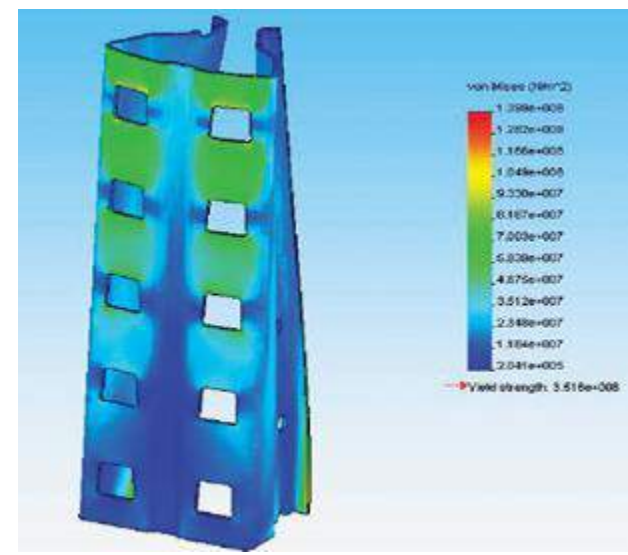
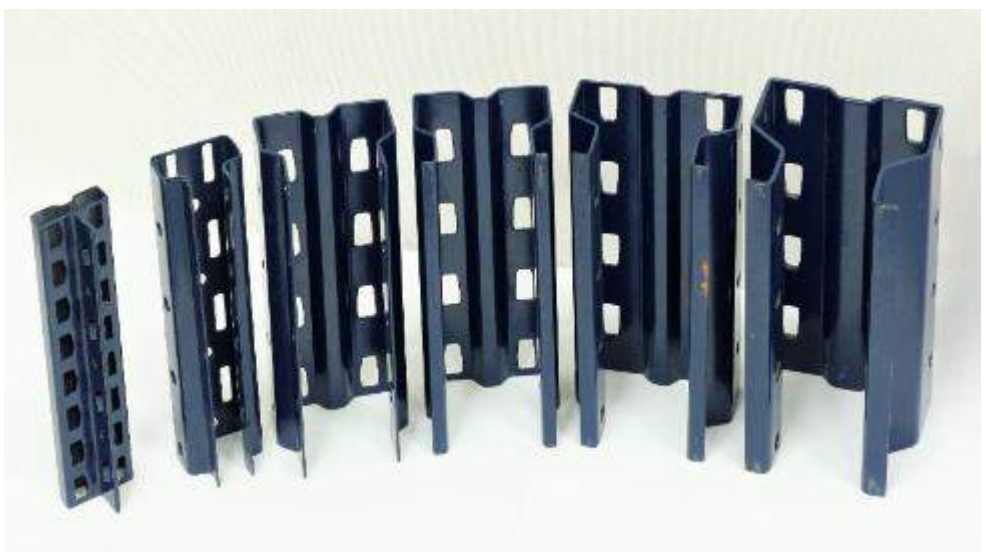
Validation testing &  
Design by testing



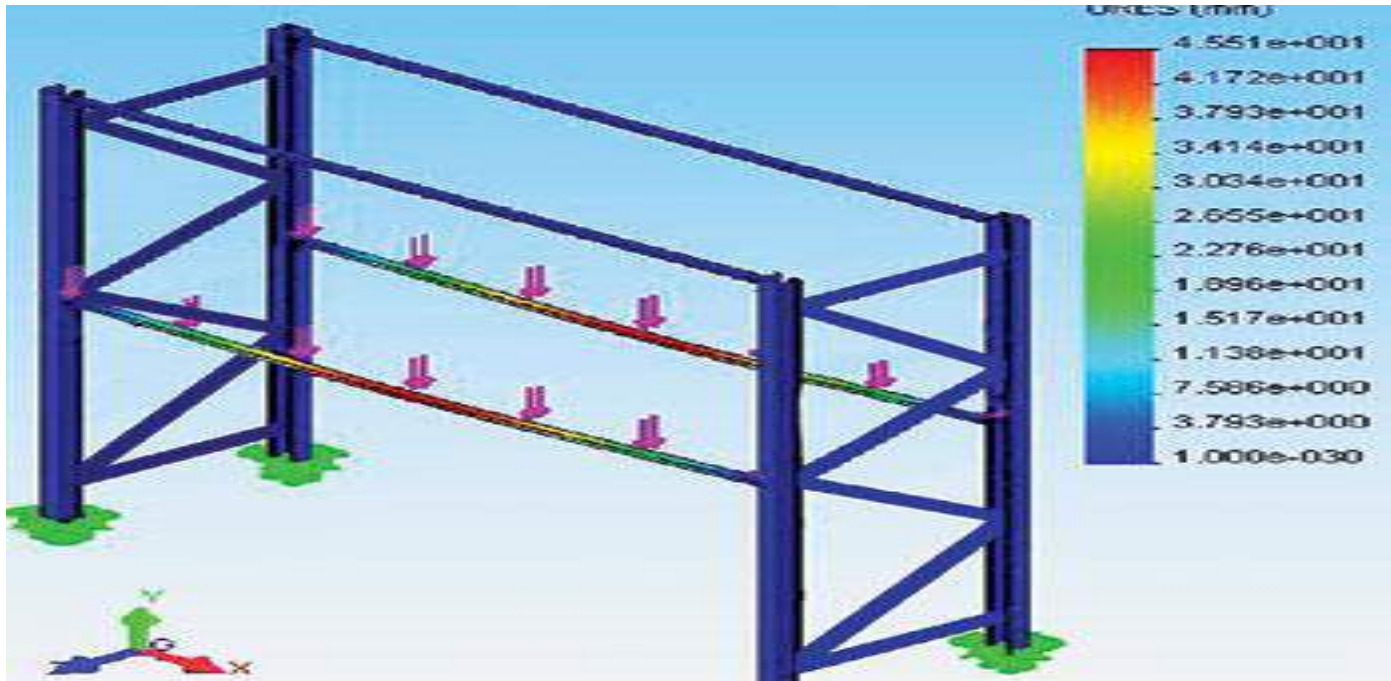
Fully equipped Research & Development Lab

# Rack column range from 3 ton to 35 ton capacity

- Design & Testing complaint with all Global codes



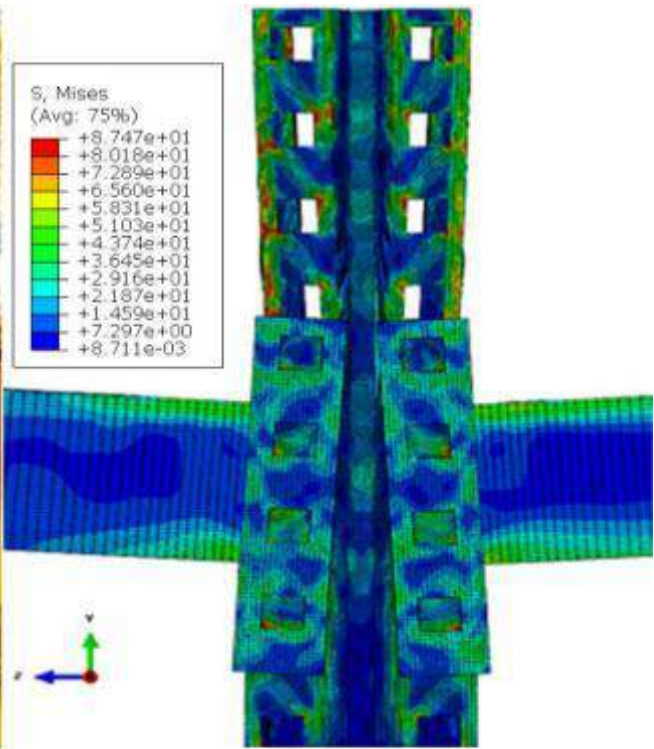
# Most competitive Beam range in racking industry (Highest Load – to – Steel content ratio)



# Column – Beam connection Design



(a) Experimental failure



(b) FE Failure



# Testing for Life : (Over and above code requirements)



**Plain Walkway Panel**



**Beam Lip Connector**

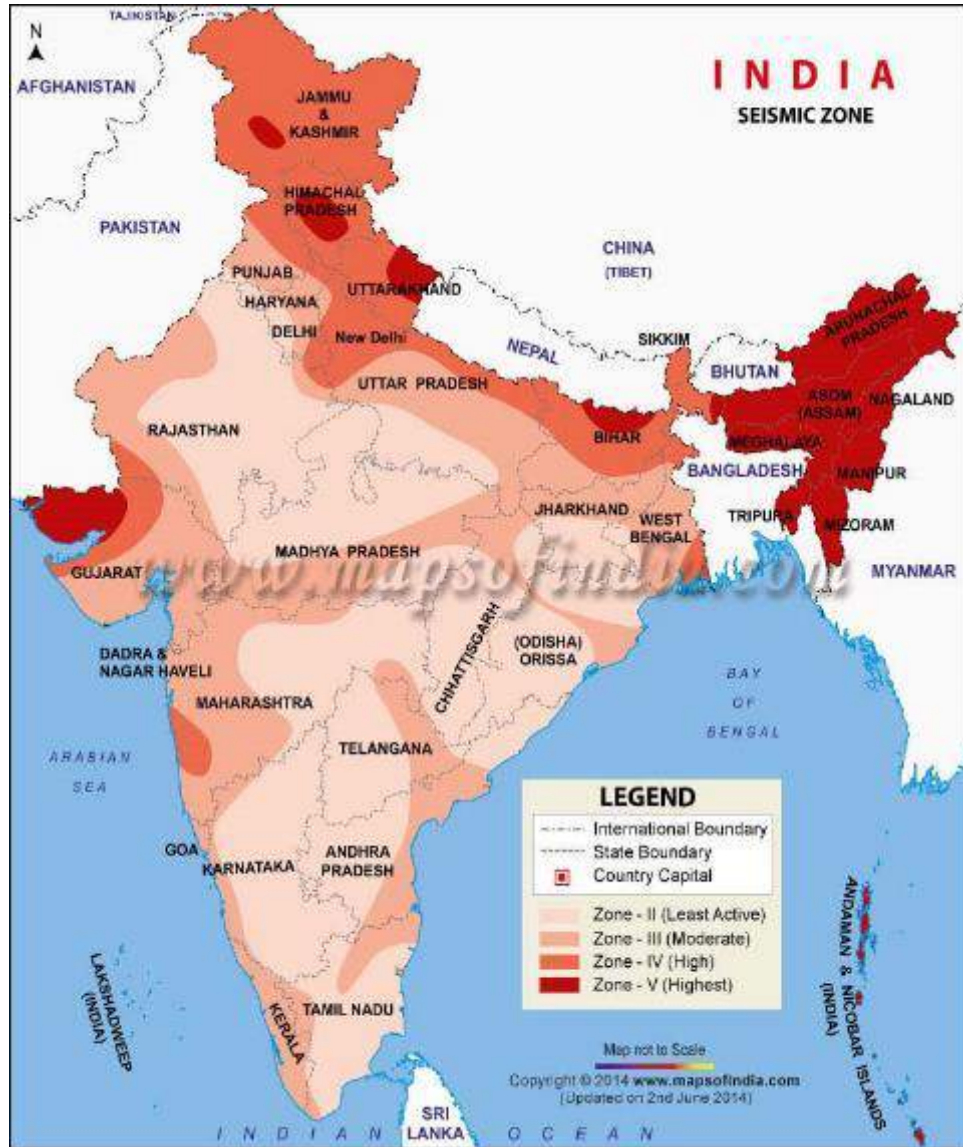


**Perforated Walkway Panel**

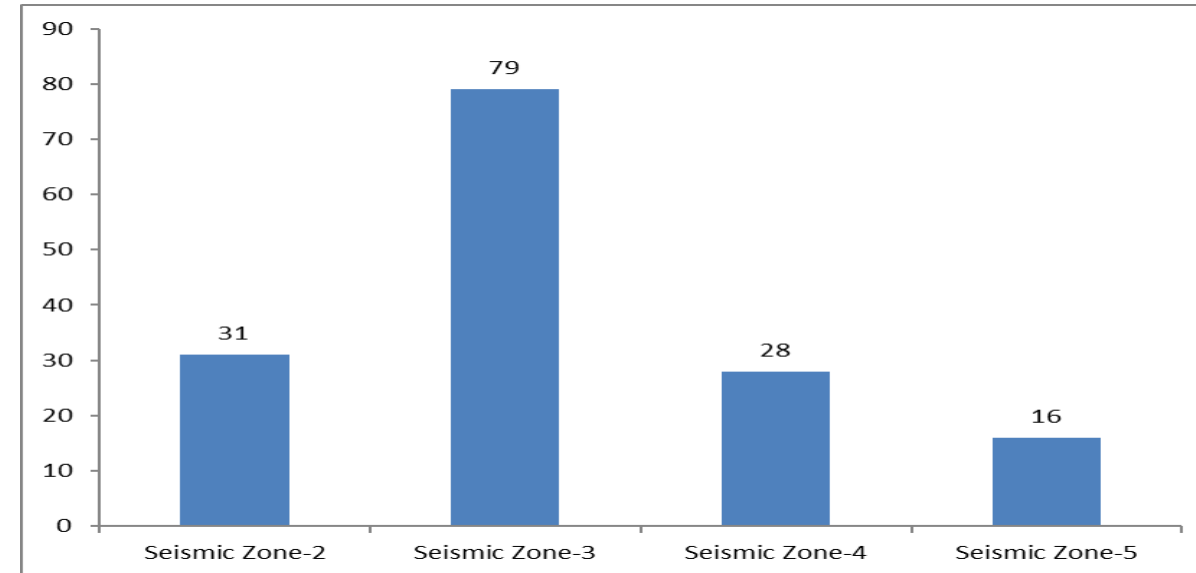


**Mobistack Undercarriage**

# Capability to give Earthquake resistant Racking for highest seismic zones in world



## 154 Seismic installations in last 5 years



India: ITC, Reliance, Amazon, Zydus, Myntra,

Volkswagon, P&G, Croda chemicals, Pepsi

International: ITC SuryaNepal, Dabur, Saihem

*300 plus Installations standing strong*

# Godrej Racking fully functional after Nepal Earthquake

Richter scale:7.9

2 after shakes @ 6.8





# Our calculations are vetted & certified by global experts



**Dr. A.R Santhakumar**

Advisor

*Centre for Disaster  
Mitigation Management*



**Steve Cowen**

Tech. Committee Chairman  
SEMA, UK

*Member of most Technical  
committees of SEMA / FEM /  
Euro codes*



**Colin Hinton**

Tech. Committee Member,  
ERF, UK

*Member of most Technical  
committees of SEMA / FEM /  
Euro codes*



**Stefano Sesana**

Architect of FEM Seismic code

*Seismic expert, Italy.*

# Our knowledge partners

## INDIA



Anna University



IIT Madras



SERC Chennai

## INTERNATIONAL



Cowen Associates



# Only Racking Manufacturer in Asia with Euro code certification

<p><b>Cowen Associates Ltd</b> Chartered Civil &amp; Structural Engineers</p> <p>Specialists in Storage Product Design, Manufacture &amp; Installation Technology</p> 		
<p><b>CERTIFICATE OF SELECTIVE PALLET RACKING TESTS</b></p> <p>For: Godrej Storage Solutions, No. 1, SESCO Industrial Estate, Ambattur, Chennai, Tamil Nadu, INDIA-600 099</p>		
<p>The product "Selective Pallet Racking" manufactured by Godrej Storage Solutions at Chennai facility in India, was tested and its technical calculations evaluated by Cowen Associates Ltd., UK.</p> <p>Various tests were conducted on the Pallet Racking components in accordance with the SEMA Code of Practice at Godrej R&amp;D laboratory, a selection of the tests were witnessed by Cowen Associates Ltd.</p> <p>A proportion of the tests were repeated at Cowen Associates Ltd. test facility at Shropshire - UK and at The University of Sheffield - UK.</p>		
 <p>Shear capacity test on Beam end connector - Godrej.</p>	 <p>Joint Stiffness test on Beam end connector - Godrej.</p>	 <p>Joint Stiffness test on Beam end connector - Cowen Associates Ltd.</p>
<p>Using the test data, the safe working loads have been calculated based on the steel used in the tests of guaranteed physical properties. The test results and calculations carried out in accordance with the SEMA Code of Practice have been recorded in the GSR reports and are available in the Godrej Technical File for Selective Pallet Racking.</p>		
<p>We confirm and certify that the product tests of the "Godrej Storage Solutions - Selective Pallet Racking range" and the Technical File are in accordance with the SEMA Code of Practice.</p>		
<p>Cowen Associates Limited is an independent Civil and Structural Engineering consultancy company specialising in storage products. Directors Steve Cowen and Colin Hinton have extensive experience in this field and independently chair various technical committees of SEMA, ERF-FEM and CEN.</p>		
<p><b>Steve Cowen</b> Director</p> <p>Signature:  Date: 27.11.2012</p>	<p><b>Colin Hinton</b> Director</p> <p>Signature:  Date: 27.11.2012</p>	
<p>Lundbrek, Donnington, Nr Wroxeter, Shrewsbury, Shropshire, SY5 6PT, United Kingdom Phone / Fax: +44 (0) 1952 740429 Email: stevecowen@aol.com</p>		



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Cowen Associates Ltd**  
Chartered Civil & Structural Engineers


Specialists in Storage Product Design,  
Manufacture & Installation Technology




The  
University  
Of  
Sheffield.

# Fully equipped Rack Structural Testing Lab accredited by Anna University for Ph.D level research



 **CENTRE FOR RESEARCH**  
ANNA UNIVERSITY  
CHENNAI - 600 025



Dr. K.P. JAYA  
DIRECTOR

Telephone : +91-44-2220 7367/2255 0101  
Fax : +91-44-2220 1212  
Email : drresearch@annauniv.edu  
drresearch@gmail.com

Lr.No.IR/0010/R&D/AR2

Date: 29.01.2019

To  
The Principal  
Godrej and Boyce Mfg co Ltd,  
No.1 SIDCO Industrial Estate Ambattur,  
Chennai - 600098

Sir/Madam,

Sub : Anna University - Research centre recognition - R&D centre  
(Mechanical & Civil) - Renewal - Orders - Issued.

\*\*\*\*\*


I am to inform that the recognition of R&D (Mechanical & Civil) centre of your organization has been renewed up to December 2021, as per "Common Renewal Session" to do collaborative research programme with this University. The regular employees working in your organization with relevant UG/PG qualification may be permitted to register for M.S. (By Research) and Ph.D. programme respectively in this University under part-time mode as per the norms.

The recognized supervisors working in your R&D centre may be permitted to function as Joint Supervisor only, to carry out Ph.D. / M.S. (By Research) programme in the above R&D centre relevant to their field of specialization. Please refer "clause 7" of Ph.D./M.S. (By Research) Regulations.

The above recognition shall be renewed once in three years in compliance with the required norms for research centre including the availability of two faculty members with Ph. D. Degree in the broad area of research.

In all future correspondence quote "5001000" for reference.

The next renewal application in the prescribed format available in our website: [cf.annauniv.edu](http://cf.annauniv.edu) along with the number of papers published in SCI Journals during the recognized period shall be made during **December 2021** with a renewal fee on fulfilling the required norms.

Yours faithfully,  
  
29/1/19  
DIRECTOR

# Only Racking Manufacturer to receive 6 Design marks

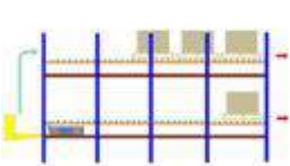


India Design Mark has been initiated in cooperation with Japan Institute of Design Promotion (JDP)



# Our IP Assets

Patents



HIGH DENSITY DYNAMIC STORAGE  
PATENT NO: 2746/CHE/2011



BOLTLESS SHELF PANEL  
PATENT NO:5287/CHE/2012



ADJUSTABLE STAIR CASE  
PATENT NO:5288/CHE/2012



RIFLE RACK  
PATENT NO: 3212/CHE/2013



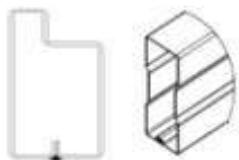
ART STORAGE SYSTEM  
PATENT NO:1838/CHE/2014



ENTRY GUIDE RAIL FOR FORKLIFT  
PATENT NO:1840/CHE/2014



SUPPORT BRACKET FOR DRIVE IN  
PATENT NO: 1840/CHE/2014



L BEAM  
PATENT NO: 1768/CHE/2008



STIFFNER  
PATENT NO: 1877/CHE/2009



OVER LOAD INDICATOR  
PATENT NO: 1955/CHE/2008



TRUCK LOADING SYSTEM  
PATENT NO:2016410276B9



MULTI FLEX SHOE  
PATENT NO: 4212/CHE/2011



IMPROVED HDDS  
PATENT NO: 5604/CHE/2013



HEM BEAM  
PATENT NO: 3021/CHE/2009

Registrations



BOLT FREE SHELF PANEL  
DESIGN NO: 248902



PALLET ENTRY GUIDE DRIVE IN  
DESIGN NO: 266427



ENTRY GUIDE RAIL FOR FORKLIFT  
DESIGN NO: 258177



ENTRY SUPPORT FOR SHUTTLE  
DESIGN NO: 258176



ART STORAGE SYSTEM  
DESIGN NO: 259568



SUPPORT BRACKET FOR DRIVE IN  
DESIGN NO: 266428



NEWS PAPER STACK  
DESIGN NO: 229018



DISPLAY SHELF  
DESIGN NO: 229017



BEAM FOR SHUTTLE  
DESIGN NO: 259570



UPRIGHT GUARD FOR SPR  
DESIGN NO: 248905



ENTRANCE GTPS FOR SHUTTLE  
DESIGN NO: 248904



ART STORAGE SYSTEM  
DESIGN NO: 259569



RIFLE RACK  
DESIGN NO: 252437



CD STACK  
DESIGN NO: 229016



BOOK STACK  
DESIGN NO: 229015



CAT WALK PANEL  
DESIGN NO: 249101

Patents

Registrations

16 Patents & 17 design registrations

# Only Racking manufacturer to get INSDAG Structural design excellence award



Design & Technology

Manufacturing

Installation





# Careful Selection of Raw material

Steel



Powder for surface coating



- Steel is carefully selected for application and controlled through stringent specification.
- Grades equivalent to SS490 and SS400 are used to ensure reliability of the product.
- Only RoHS compliant steels are used.
- Lead free powders are used for surface coatings

# World Class Manufacturing Facility



Inhouse steel processing capability

Roll forming lines to meet European tolerance requirements



3 powder coating booths – Maximum 12 m

Auto welding facility

# Stringent Quality Assurance Practices

## Inhouse Raw Material and Powder Coating Test Labs

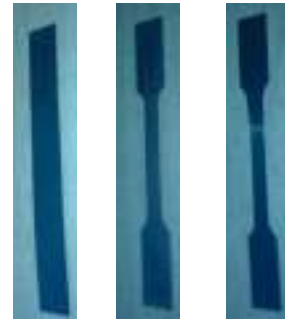
- Every coil is tested for its mechanical properties
- Absolute traceability from component to raw material

- Series of tests to ensure quality of surface coating

### Powder Coating Testing Equipment



Universal testing machine



Tensile testing



Hardness testing



SPECTROPHOTOMETER



GLOSS METER



DRY FILM THICKNESS TEST



SALT SPRAY TEST



CONICAL MANDREL TEST

**Design & Technology**

**Manufacturing**

**Installation**



# Installation to Global Standards

Installation to meet stringent tolerance requirements (EN 15620)



Capability to handle multiple projects across the globe concurrently

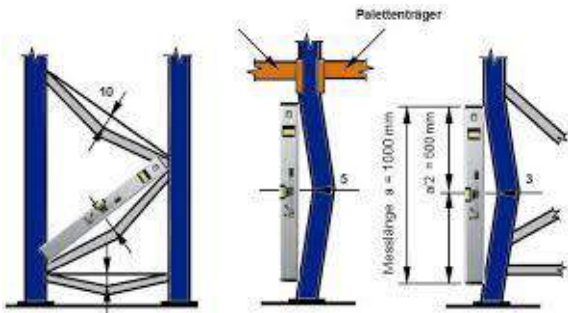


# Life cycle support

Capability to conduct site audits as per EN 15635



EN 15635 - Steel static storage systems.  
Application and maintenance  
of storage equipment.



Training customers/users on  
warehouse safety

WAREHOUSE SAFETY TIP #10

Goony | STORAGE SOLUTIONS

DON'T OVERLOAD YOUR RACKING SYSTEM!

1. Overloading is the prime cause of rack failure and the damages that follow it.
2. Always refer the load capacity of your racking system before changing the loads.
3. Beams can suffer damage due to overloading. If defects beneath a load. Deflection should disappear on unloading. If it is permanent then beam should be replaced.



Setting up Audit program to ensure  
safety in operation



Remote diagnostic capability



# Eminent Brands Who Trust Us



*Godrej* | STORAGE SOLUTIONS







# Thank You...

**For More Information:** [www.godrejstoragesolutions.com](http://www.godrejstoragesolutions.com)

*Godrej* | STORAGE SOLUTIONS