LIVE

STEEL-STR-007

SQVe Engineering

ONLINE COURSE

DESIGN OF PEB STRUCTURES

(PART 1)

Warehouse | IS 800 : 2007

STAAD.Pro| RAM Connection | RCDC

Bhavin Shah

Time :
8:30 PM TO
10:00 PM IST

28-MAR-24

TO

22-APR-24

Link : https://sqveconsultants.com/steel-str-007

Email : steel@sqveconsultants.com

INTRODUCTION

Pre-engineered steel building (PEB) offers cost optimisation over the conventional sizes of the structural members (non-tapered). However, as the structure becomes relatively slender, more precautions are to be taken in analysis and design of the structure for ensuring stability. For the stability of slender steel structures as well as for the optimisation, it is extremely important to understand the fundamentals of flexure buckling, lateral torsional buckling, interaction between different structural elements for transfer of load, etc.

In view of the above, we have designed a unique online course for design of PEB structure for warehouse, titled as **STEEL-STR-007 – Design of PEB steel structures as per IS 800:2007| Warehouse | STAAD Pro | RAM connection | RCDC**. In the present course, only warehouse is considered so that we can have more focused discussions related to fundamentals for design of the steel structure, as mentioned above. In the upcoming online courses, other functional requirements, such as heavy crane, mezzanine floor, etc. will be considered. The course will commence from **28-MAR-24**.

We will start the course with basic understanding of structural behaviour and stability concepts for shed type of structure. Following shows highlights of the course:

- ✓ The important limit states such as flexure buckling, lateral torsional buckling, local buckling, etc. will be explained through finite element modelling of the individual members.
- ✓ Interaction between different structural elements such as column, rafter, purlin, sag rod, girts, sheeting, flange bracing, etc. will be explained in detail.
- ✓ Case study of two warehouse structures (with and without central column), covering the following steps:
    - Preparing structural system, geometry generation, wind and seismic load calculations, load applications in the software, load combinations, performing analysis of structure, defining design parameters for different structural elements, design of typical members, connection design of the structure using RAM connection software, foundation design using RCDC software, etc.
- ✓ Design of the structures will be performed using IS 800 : 2007. Wind load calculations as per IS 875 (Part 3) : 2015 and seismic load calculations as per IS 1893 (Part 1):2016 & NBC 2016
- ✓ Analysis and design will be performed using software STAAD Pro, RAM connection and RCDC.
- ✓ Manual calculations will be performed for checking the different capacity calculations for taper member with slender web, etc.
  (For more details, please refer the detailed schedule, mentioned towards end of the document.)

WHO SHOULD ATTEND?

This course will be useful for following :

- ✓ **Practicing Structural Consultants**
- ✓ **PEB design engineers**
- ✓ **Owner's consultant**
- ✓ **Proof checking consultants**
- ✓ **Senior Structural Engineers in the company**
- ✓ **Junior Structural Engineers in the company**
- ✓ **Government representatives who are involved**
- ✓ **Civil/structural engineers who do not have prior exposure of steel structures and want to learn from first fundamental**
- ✓ **Post Graduate students in Structural Engineering**
- ✓ **Civil engineering students who are interested in Structural Engineering.**

WHAT IS UNIQUE ABOUT THIS COURSE?

The course is designed by the **experienced engineer** (Mr. Bhavin Shah) who have more than two decades of experience in the field of structural engineering.

- ✓ The entire course is designed from the **practical aspects** which can be readily used in the real projects.
- ✓ The course is designed to have an **interactive mode** so that the problems / doubts of the participants can be addressed effectively.
- ✓ A WhatsApp group will be created for **quick communication** between the participants and the faculty. The participants will be able to share the discussion points, doubts, queries, etc. in the group. The details in the group will be collated for further discussion in the next sessions.
- ✓ All the sessions will be recorded and recording of each session will be shared **within few hours**. If someone miss out the live session then he/she can go through the recording before attending the next session. The participants can share the doubts/queries in the WhatsApp group, after going through the recording which will be addressed in the next session.
- ✓ **Two STAAD models** of PEB warehouses will be discussed from geometry generation to the foundation design.
- ✓ Participants will be encouraged to take up another geometry of the PEB structure and develop the model, perform analysis and design as we progress in the course. **Findings or queries** from the same will be discussed during the sessions.
- ✓ **Recording** will be available with all the participants for **180 days**.
- ✓ **Certificate** will be issued on successful completion of the online course (minimum 80% attendance is required.).
- ✓ The course is designed as a **process of learning together**.

COURSE FACULTY

Bhavin Shah – Founder & CEO, SQVe Consultants

Mr. Bhavin Shah is passionate about Engineering profession with two decades of experience. He is having a dream for enhancing the engineering profession in different organisations. He completed graduation in Civil Engineering and Masters in Structures from Sardar Patel University. He is having unique experience of working in the specialized firm of civil / structural consultancy which grew as multidisciplinary firm (VMS), large multidisciplinary firm (L&T Chiyoda Ltd.) and owner based engineering set up (Adani Infra (I) Ltd.). He worked in different organisations at different levels, starting from junior design engineer to CEO. He is Founder & CEO of **SQVe Consultants**. He is pursuing Ph.D. in Structural Engineering related to earthquake resistant design of industrial steel structures.

METHODOLOGY

- ✓ The entire course is designed in the **ONLINE mode**.
- ✓ The course will have **approximate 27+ contact hours.**
- ✓ During nearly one month of a time, the interaction can be done with faculty and the participants using **WhatsApp**.
- ✓ Participants will be given the **exercises** to further strengthen their learning.
- ✓ The participants will be encouraged to share their **real project problems** during the course. We will discuss possible solutions for the same.
- ✓ Participants will have **ample opportunities** for raising their doubts / queries related to the subject.
- ✓ The online sessions will be conducted using **ZOOM** software.
- ✓ The course is designed as a **process of learning together**.

COURSE SCHEDULE

Start Date	**28-MAR-2024**
End Date	**22-APR-2024**
Total contact hours	**27+** (Sessions will be arranged from **Monday to Friday** from **8:30 PM to 10:00 PM IST**.)
Details of each session	Please refer subsequent page for details of each session.

FEES FOR THE COURSE**

For participant <u>from India</u>	Cost per participant shall be **11500 INR** (inclusive of 18% GST).
For participant <u>from outside India</u>	Cost per participant shall be **165 USD.**

****Discount offered**:

- ✓ **<u>For continuous learner</u>**: If you have attended earlier one course of SQVe Consultants than **5%** of discount will be offered. For prior two courses, **10%** of discount will be offered. For three or more prior courses, **15%** of discount will be offered. To avail the discount, please send us an email at : steel@sqveconsultants.com . We will arrange to send an invoice considering the discount for online payment.

- ✓ **<u>Group participation</u>** from a company or institute is encouraged to get the discounts on this course. For more details, pl contact us at the above mentioned email address.

HOW TO REGISTER FOR THE COURSE?

Please click on the following link and thereafter click on "**Register Now**" button at bottom of the page. You will be directed to the **payment page**. Your registration will be confirmed after receipt of the payment at portal.

https://sqveconsultants.com/steel-str-007

Important notes: The above payment gateway will accept card only. If you prefer other type of payments such as net banking, UPI, Goggle Pay, etc. then please message us. We will arrange details for the same.

Payment gateway at the above-mentioned portal is configured only for **Indian participants**. Interested foreign engineers can contact us at the email address : steel@sqveconsultants.com. An invoice will be shared through **PayPal or Stripe** for online payment.

Kindly note that there are limited seats.

Your any queries/ doubts related to the course shall be addressed to the above mentioned email address.

SCHEDULE OF THE COURSE : STEEL-STR-007

Session no.	Brief details	Date	Time (IST)
1	**Structural behaviour and Stability concepts for design of shed type of structure (Part 1)** • Learning from failures • Different structural elements like, column, rafter, purlin, girt, sheeting, sag rod, etc. • Comparison of structural behaviour with and without slope for two dimensional portal frame • Flexural buckling, Lateral torsional buckling (LTB) and local buckling, etc.	**28-MAR-24**	**8:30 PM TO 10:00 PM**
2	**Structural behaviour and Stability concepts for design of shed type of structure (Part 2)** • Finite element modelling of rafter for simulation of lateral torsional buckling • Concept of flange bracing and it's importance • Importance of flange bracing • How to design flange bracings? • Simulating the flange bracing concept in the FEM model of rafter • Comparison of results obtained from FEM modelling and as per IS 800:2007 for rafter, etc.	**29-MAR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
3	**Structural behaviour and Stability concepts for design of shed type of structure (Part 3)** • Importance of purlins and girts for elastic stability of the shed • Function of sag rod • Simulating lateral torsional buckling of purlin through FEM model • Impact of sag rod on behaviour of the purlin • Comparison of Z purlin capacity obtained from FEM model and as per brochure of purlin manufacturer, etc.	**1-APR-24**	**8:30 PM TO 10:00 PM**
4	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 1)** • Deciding structural system for the structure • Preliminary sizing of the members for initial run of the computer • Finalising different types of connections • Deciding fixed vs pinned condition at bottom of the steel structure • Geometry generation in the software • Applying gravity loads on the structure • Reference load for seismic load calculations in the software, etc. • Changes made in NBC 2016 with reference to section 12 • Applying seismic load in the software • Observing behaviour of structure under gravity load, etc.	**2-APR-24**	**8:30 PM TO 10:00 PM**
5	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 2)** • Discussion on wind load for low rise structures as per IS 875 (Part 3) : 2015 • External pressure coefficient, local pressure coefficients, etc. • Permeability coefficient • Reading coefficients for the shed from the IS code, etc.	**3-APR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
6	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 3)** • Calculation of basic wind speed and design wind pressure • Identifying different conditions for wind load • Preparation of summary for the different wind loads • Application of wind load in the software • Observing behaviour of structure under different wind loads, etc.	**4-APR-24**	**8:30 PM TO 10:00 PM**
7	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 4)** • Defining load combinations for strength and serviceability • Load combinations vs repeat load • Use of envelope function in the software for design of steel structures • Understanding of Design parameters for steel structures in the software • Application of the design parameters in the software, etc.	**5-APR-24**	**8:30 PM TO 10:00 PM**
8	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 5)** • Performing design of steel structure in the software • Observations on the design results • Design of column, rafter, bracing, etc. in the software • Checking the design of taper steel member with the slender web in the software, etc.	**8-APR-24**	**8:30 PM TO 10:00 PM**
9	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 6)** • Manual calculations for capacity of taper member with slender web for following conditions:	**9-APR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
	✓ Axial tension ✓ Axial compression ✓ Shear ✓ Bending ✓ Combination of forces, etc.		
10	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 7)** • Design of connections using RAM software • Integration of STAAD Pro and RAM connection software for connection design • Performing design of below mentioned connections in RAM connection software ✓ Column to rafter moment connection ✓ Requirements of different types of stiffeners ✓ Splice connection ✓ Base plate connection ✓ Deciding number of anchor bolts, etc.	**10-APR-24**	**8:30 PM TO 10:00 PM**
11	**Design of PEB shed for warehouse 30mX60m using STAAD Pro (Part 8)** • Sizing of RCC pedestal to accommodate base plate and anchor bolts • Design of RCC pedestal and tie beams • Design of foundations using RCDC software • Important parameters in the software RCDC for foundation design • Observations on the design results obtained from the software, etc.	**11-APR-24**	**8:30 PM TO 10:00 PM**
12	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 1)** • Deciding structural system for the structure • Preliminary sizing of the members for initial run of the computer • Finalising different types of connections	**12-APR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
	• Deciding fixed vs pinned condition at bottom of the steel structure • Geometry generation in the software • Applying gravity loads on the structure • Reference load for seismic load calculations in the software, etc. • Applying seismic load in the software • Observing behaviour of structure under gravity load and seismic load, etc.		
13	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 2)** • Calculation of basic wind speed and design wind pressure • Identifying different conditions for wind load • Preparation of summary for the different wind loads • Application of wind load in the software • Observing behaviour of structure under different wind loads, etc.	**15-APR-24**	**8:30 PM TO 10:00 PM**
14	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 3)** • Defining load combinations for strength and serviceability • Load combinations vs repeat load • Use of envelope function in the software for design of steel structures • Application of the design parameters in the software, etc.	**16-APR-24**	**8:30 PM TO 10:00 PM**
15	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 4)** • Performing design of steel structure in the software • Observations on the design results • Design of column, rafter, bracing, etc. in the software	**17-APR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
	• Checking the design of taper steel member with the slender web in the software, etc. • Manual check for few members for following conditions: ✓ Axial tension ✓ Axial compression ✓ Shear ✓ Bending ✓ Combination of forces, etc.		
16	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 5)** • Design of connections using RAM software • Integration of STAAD Pro and RAM connection software for connection design • Performing design of below mentioned connections in RAM connection software ✓ Column to rafter moment connection ✓ Requirements of different types of stiffeners ✓ Splice connection ✓ Base plate connection ✓ Deciding number of anchor bolts, etc.	**18-APR-24**	**8:30 PM TO 10:00 PM**
17	**Design of PEB shed for warehouse 54mX125m using STAAD Pro (Part 6)** • Sizing of RCC pedestal to accommodate base plate and anchor bolts • Design of RCC pedestal and tie beams • Design of foundations using RCDC software • Important parameters in the software RCDC for foundation design • Observations on the design results obtained from the software, etc.	**19-APR-24**	**8:30 PM TO 10:00 PM**

Session no.	Brief details	Date	Time (IST)
18	**Open discussion | Concluding remarks** • Discussion related to balance queries of participants • Discussion for the results obtained by participants in different tutorials • Concluding remarks • Way-forward, etc.	**22-APR-24**	**8:30 PM TO 10:00 PM**

About SQVe Consultants

SQVe Consultants (SQVe) is a recently established company with a vision of enhancing the engineering profession. Name of the company is derived from the first letters of major goals of engineering, i.e. **S**chedule adherence, **Q**uality assurance & **V**alue **e**ngineering. For success of any project, it is required that all these goals are considered simultaneously in the projects. However, in today's fast track projects, it is indeed difficult to address all the goals in the design engineering cycle simultaneously. We believe that for achieving these desired goals, there are many developmental activities (off-project) required in the organisations for continual improvement. Our all services are designed to assist different organizations to achieve the engineering goals. We intend to collaborate with the different organisations for long term basis and aim towards enhancing the engineering profession through our unique services. Our values are Innovation, Commitment & Integrity. Your partner for achieving engineering goals!

We also provide coaching/mentoring to the structural engineers through one-on-one sessions. Please get in touch with us for any requirements related to online training related to civil/structural engineering as well as in the area of people management.

Learn at your own pace:

If you wish, you can purchase access to recorded sessions of our previous online courses and learn at your own pace. For more details, please connect with us through email address: contact@sqveconsultants.com

For more details, please refer website : https://sqveconsultants.com
You may contact us at email address : contact@sqveconsultants.com

Follow us on social media :

Youtube : https://youtube.com/c/StructuralEngineering

LinkedIn : https://www.linkedin.com/company/sqve-consultants

Facebook : https://www.facebook.com/sqveconsultants

Twitter : https://twitter.com/sqveconsultants

Instagram : https://instagram.com/sqveconsultants

SQVe
Engineering