

DESIGN OF CONNECTIONS FOR STEEL STRUCTURES

ONLINE COURSE ID : STEEL-STR-006

Link: <https://sqveconsultants.com/steel-str-006>
email address : steel@sqveconsultants.com

INTRODUCTION

Design of connections for steel structures is one of the grey area in the industry. The practice varies from consultant to consultant to a great extent and there are number of ambiguities in the connection design. In India, IS 800:2007 was published before ~15 years and section 10 is included for the connection design. The important areas for the connection design are mentioned briefly in the section 10. However, in absence of the detailed practical handbook, there are number of doubts/ambiguities related to the connection design as per the Indian Standard. Also, there is a possibility of missing out on the important limit states while performing the connection design. The online course **STEEL-STR-006** is launched with an aim of increasing the confidence level of engineers related to the connection design and to enable them for developing their own means for the connection design.

The area of connection design is comprehensively covered in EUROCODE 3. Hence, in the course, we will initiate the discussions related to fundamentals & concepts for the connection design based on EUROCODE-3. Thereafter, we will discuss in detail, the connection design as per AISC 360-22. Seismic design requirements for connection design will be discussed as per AISC 358-16. Finally, we will take up the connection design as per IS 800:2007.

We will discuss design of different types of bolted connections, welded connections, connections for tubular sections, etc. The important limit states for connection design will be covered such as flange bending, block shear, bearing failure, shear failure, web yielding, web crippling, web panel zone shear, web compression buckling, requirements for seismic design, etc. along with the diagrams and worked out examples. For more details related to content of the course, please refer schedule towards end of the document.

We will discuss the connection design along with worked out examples and software RAM connection. It doesn't matter if you do not have access to the software since the software will be used only for performing the quick calculations for the connection design and to demonstrate the effects of important parameters in the connection design.

For design of connections, generally, a mix approach of Manual calculations + In house developed spreadsheets + Software is preferred. After the course, the participant will have better understanding of the fundamentals and concepts related to the connection design so that they can take the appropriate decisions and utilize engineering judgement, in case of the ambiguities.

For accessing recording of our previous online courses related to design of steel structures, you may contact us through email address: steel@sqveconsultants.com

WHAT IS UNIQUE ABOUT THIS COURSE?

The course is designed by the **experienced engineer** (Mr. Bhavin Shah) who has 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 session.
- ✓ 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. After going through the recording, the participants can share their doubts/queries in the WhatsApp group, which will be addressed in the next session.
- ✓ **Recording** will be available with all the participants for **180 days**.
- ✓ Certificate for participation will be issued on successful completion of the online course (minimum 80% of attendance is required).
- ✓ We will create a **focused group** of engineers after the course who would like to contribute in the area of the connection design for steel structures.
- ✓ The course is designed as a **process of learning together**.

WHO SHOULD ATTEND?

This course will be useful for following:

- ✓ **Practicing Structural Consultants**
- ✓ **Senior Structural Engineers in the company**
- ✓ **Junior Structural Engineers in the company**
- ✓ **Owner's consultants**
- ✓ **Proof checking consultants**
- ✓ **PEB designers**
- ✓ **Research scholars, Academicians**
- ✓ **Post Graduate students in Structural Engineering**
- ✓ **Civil engineering students who are interested in Structural Engineering.**

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 spread over ~**three weeks** with **approximate 24+ contact hours**.
- ✓ During the program, the interaction can be done with faculty and the participants using **WhatsApp**.
- ✓ The course includes few tutorials wherein the participants will get hands on experience related to **design of connections for steel structures**.
- ✓ The online sessions will be conducted using **ZOOM** software.

COURSE SCHEDULE

Start Date	10-MAY-2023
End Date	16-JUN-2023
Total contact hours	24+ (Sessions will be arranged on Monday, Wednesday & 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 9800 INR (inclusive of 18% GST).
For participant <u>outside from India</u>	Cost per participant shall be 140 USD.

**Discount offered:

- ✓ **For continuous learner:** 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.
- ✓ **Group participation** 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-006>

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** for online payment.

Kindly note that there are limited seats.

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

SCHEDULE OF THE COURSE : STEEL-STR-006

Session no.	Title	Date	Time (IST)
1	Structural behaviour and connections – Introduction <ul style="list-style-type: none"> • Importance of conceptual thinking • How type of connection to be decided? • Iterative process of connection design and structural analysis, etc. • Importance of connection design in the structure • Overall philosophy of the connection design, etc. 	10-MAY-23	8:30 PM TO 10:00 PM
2	Overview of connection design as per EN 1993-1-8 - Eurocode 3 <ul style="list-style-type: none"> • Bolts, nuts, washers • Shear connection • Tension connection • Positioning for holes • Group of fasteners • Long joints • Slip resistant connection • Block shear • Long joints • Prying forces, etc. • Welding consumables • Type of welds • Design resistance of Fillet welds • Design resistance of Butt welds • Long joints, etc. 	12-MAY-23	8:30 PM TO 10:00 PM
3	Overview of connection design as per EN 1993-1-8 - Eurocode 3 (P358) <ul style="list-style-type: none"> • Beam to beam and beam to column connections • Partial depth end plates • Full depth end plates • Fin plates • Column splices 	15-MAY-23	8:30 PM TO 10:00 PM

Session no.	Title	Date	Time (IST)
	<ul style="list-style-type: none"> Column bases Bracing connections Examples, etc. 		
4	Design of Simple joints as per Eurocode 3 using RAM connection software - (PART 1) <ul style="list-style-type: none"> Beam to column flange Beam to column web Beam to Beam With Fin plates Bracing connection, etc. 	17-MAY-23	8:30 PM TO 10:00 PM
5	Design of Simple joints as per Eurocode 3 using RAM connection software (PART 2) <ul style="list-style-type: none"> Beam to column flange Beam to column web Beam to Beam With Fin plates Bracing connection, etc. 	19-MAY-23	8:30 PM TO 10:00 PM
6	Moment resisting joints as per Eurocode 3 (P398) <ul style="list-style-type: none"> Bolted beam to column connection Welded beam to column connection Splices Column bases, etc. 	22-MAY-23	8:30 PM TO 10:00 PM
7	Design of Moment resisting joints as per Eurocode 3 using RAM connection software - (PART 1) <ul style="list-style-type: none"> Bolted beam to column connection Welded beam to column connection Splices Column bases, etc. 	24-MAY-23	8:30 PM TO 10:00 PM
8	Design of Moment resisting joints as per Eurocode 3 using RAM connection software - (PART 2) <ul style="list-style-type: none"> Bolted beam to column connection Welded beam to column connection Splices Column bases, etc. 	26-MAY-23	8:30 PM TO 10:00 PM

Session no.	Title	Date	Time (IST)
9	Overview of connection design as per AISC 360-22 <ul style="list-style-type: none"> • Introduction to welds and bolted connections • Snug tightened bolts, Pretensioned bolts and Slip critical bolts • Capacity of weld connections • Capacity of bolted connections • Different limit states for connection design such as web yielding, web local crippling, web compression buckling, web panel zone shear, etc. 	29-MAY-23	8:30 PM TO 10:00 PM
10	Worked out examples for connection design as per AISC 360-22 (PART 1) <ul style="list-style-type: none"> • Beam to column flange • Beam to Beam • Bracing connection • Splices • Moment connections • Column bases, etc. 	31-MAY-23	8:30 PM TO 10:00 PM
11	Worked out examples for connection design as per AISC 360-22 (PART 2) <ul style="list-style-type: none"> • Beam to column flange • Beam to Beam • Bracing connection • Splices • Moment connections • Column bases, etc. 	2-JUN-23	8:30 PM TO 10:00 PM
12	Design of different connections as per AISC 360-22 using RAM connection software <ul style="list-style-type: none"> • Beam to column flange • Beam to Beam • Bracing connection • Splices • Moment connections • Column bases, etc. 	7-JUN-23	8:30 PM TO 10:00 PM
13	Prequalified connections as per AISC 358-16 <ul style="list-style-type: none"> • Seismic design requirements for connections • What is prequalified connections? • Welding and bolting requirements • Reduced beam section Moment connection 	9-JUN-23	8:30 PM TO 10:00 PM

Session no.	Title	Date	Time (IST)
	<ul style="list-style-type: none"> Bolted End Plate Moment connections Bolted Flange Plate Moment connections Performing design of connections in RAM connection software 		
14	Overview of IS 800 : 2007 for connection design <ul style="list-style-type: none"> Discussion on section 10 Location details of fasteners Bearing type bolts Friction grip type of bolting Long joints Prying Welding Minimum design action on connections Analysis of bolt/weld group Seismic design requirements as per Section 12 Comparison with Eurocode, AISC 360-22 and AISC 358-16 	12-JUN-23	8:30 PM TO 10:00 PM
15	Design of Simple joints as per IS 800 : 2007 using STAAD.Pro RAM connection software - (PART 1) <ul style="list-style-type: none"> Beam to column flange Beam to column web Beam to Beam With Fin plates Bracing connections Splice connections Moment connections, etc. 	14-JUN-23	8:30 PM TO 10:00 PM
16	Open Discussion <ul style="list-style-type: none"> Discussion on doubts/queries Development of inhouse excel sheets for connection design Discussion on appropriate format for connection design Strategy for standardization of connection 	16-JUN-23	8:30 PM TO 10:00 PM

Session no.	Title	Date	Time (IST)
	<ul style="list-style-type: none"> • Input required for connection design (types of forces, etc.) • Q & A • Concluding remarks 		

About SQVe Consultants

SQVe Consultants is a recently established innovative company with a vision of enhancing the engineering profession. The name of the company is derived from first letters of goals of engineering, i.e. **S**chedule adherence, **Q**uality assurance & **Ve**-Value Engineering.

Our ALL services are designed to have maximum of ONLINE interaction with the least OFFLINE interaction.

We look forward for long term association with different organisations for enhancement of engineering profession through our unique services. We also provide mentoring to the structural engineers through one-on-one session. 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 (soft skills).

For more details, please refer website : <https://sqveconsultants.com>

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