SQVe
Engineering

DESIGN OF COMPOSITE STRUCTURES

ONLINE COURSE ID: CS-STR-001

Link: https://sqveconsultants.com/cs-str-001
email address: steel@sqveconsultants.com

INTRODUCTION

There have been a large number of requests from structural engineers and industry professionals for launching an online course related to the design of composite structures. Considering the increasing adoption of composite construction in commercial buildings, industrial projects, high-rise structures, infrastructure projects, and fast-track construction practices, the importance of understanding composite structural systems has significantly increased in India in recent years.

Composite structures offer several advantages such as improved structural efficiency, reduction in structural weight, faster construction, better utilization of materials, enhanced spanning capability, and improved overall project economy. Composite structures are expected to play a major role in the future of fast-track and high-rise construction in India. However, many engineers still lack systematic understanding of IS 11384:2022 and practical implementation of composite design in real projects

In view of this requirement, SQVe is launching the online course **"CS-STR-001: Design of Composite Structures"**, commencing from **28th May 2026**. The course is planned with a step-by-step practical learning approach focusing on clause-by-clause discussion of **IS 11384:2022**, along with detailed understanding of the intent, philosophy, and fundamental concepts associated with each important clause and provision of the code. The methodology adopted in this course will focus on understanding structural behaviour, important engineering concepts, manual calculations, software applications in ETABS, interpretation of ETABS design outputs, validation through manual calculations, exercises, and practical discussions related to real project applications.

The course will broadly cover the design philosophy and practical implementation related to composite beams, composite slabs, and composite columns. Detailed discussions will be carried out on important aspects such as clause-by-clause understanding of IS 11384:2022, behaviour of composite structural systems, load transfer mechanisms, shear connectors, serviceability requirements, construction stages, stability considerations, buckling behaviour, fatigue, fire resistance, detailing requirements, interpretation of ETABS outputs, etc.. The sessions are structured in a progressive manner so that participants can systematically understand the intent of the code provisions and develop competency in composite structural design through both manual calculations and practical software applications.

Special Emphasis of the Course

- Clause-by-clause discussion of IS 11384:2022 | Understanding the intent and fundamental concepts associated with important code provisions
- Step-by-step approach for manual design
- Performing design examples in ETABS
- Detailed interpretation of ETABS design outputs
- Comparison of ETABS output with manual calculations
- Understanding assumptions and limitations of the software
- Exercises and interpretation of results
- Development of engineering judgement in composite design

Detailed content of the training program is mentioned in **Annexure-A** of the brochure.

The course is expected to be highly useful for practicing structural engineers, consultants, design professionals, and young engineers who are planning to work on composite structures or wish to upgrade their skills in this specialized area. It will also be beneficial for organizations intending to develop their internal design procedures, working instructions, design checklists, standard practices, and Do's & Don'ts related to composite structures.

WHAT IS UNIQUE ABOUT THIS COURSE?

The course is designed by the **experienced engineer** (Mr. Bhavin Shah) who has 25+ years 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 **uploaded at our online portal** next day. 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** can be accessed by the participants for **180 days**.
- ✓ Certificate for participation will be issued on successful completion of the online course. For successful completion of the course, the participant is required to complete the exercises during the program.
- ✓ 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**
- ✓ **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**.

METHODOLOGY

- ✓ The entire course is designed in the **ONLINE mode** with live sessions.
- ✓ The course will spread over ~**five weeks** with **approximate 57+ contact hours.**
- ✓ During the program, the interaction can be done with faculty and the participants using **WhatsApp**.
- ✓ **Fundamentals and the concepts** will be main focus of the course.
- ✓ The online sessions will be conducted using **ZOOM** software.

COURSE SCHEDULE

Start Date	**28-MAY-26**
End Date	**26-JUN-26**
Total contact hours	**57+ contact hours** (~33 hrs. online + ~24 hrs. for assignment) (Sessions will be arranged on **Monday to Friday** from **8:30 PM to 10:00 PM IST**.)
Details of each session	Please refer **Annexure A** for details of each session.

FEES FOR THE COURSE**

For participant <u>from India</u>	Cost per participant shall be **14,500 INR** (inclusive of 18% GST).
For participant from <u>outside India</u>	Cost per participant shall be **209 USD.**

****Important notes:**

1. 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.
- **Group participation** from a company or institute is encouraged to get the discounts on this course. For more details, please contact us at the above-mentioned email address.

2. Payment in installments:

- Participants have the option to pay the total applicable fees in **six monthly installments**. In this case, the total fee amount will increase by approximately **3%**. For example, if the total applicable fee is **₹14,500**, the monthly installment will be **₹2,490** (i.e., ₹2,490 × 6 = ₹14,940).
- To avail this facility, please drop a message at steel@sqveconsultants.com and please mention your name, email address, WhatsApp number & city. We will create a **subscription plan through Razorpay** with an auto-pay feature.

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/cs-str-001

Important notes related to payment gateway:

- ⇨ At this payment gateway, discount and monthly installment options are not activated.
- ⇨ If you are eligible for the discount then, please connect with us through email: steel@sqveconsultants.com. We will create separate payment link for the same.
- ⇨ To opt for monthly installment payment option, please drop a message at steel@sqveconsultants.com and pl mention your name, email address, WhatsApp number & city. We will create a **subscription plan through Razorpay** with an auto-pay feature.
- ⇨ 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 online course are welcome at the above-mentioned email address.

ANNEXURE - A

CS-STR-001: CONTENT OF THE ONLINE COURSE

Session no.	Title	Date	Time (IST)
1	**Composite structures in India | Introduction** • What is composite construction? • Why composite structures? • Components of composite structures • Where composite structures are used? • Why important for India now? • Design philosophy for composite structures • IS codes related to composite structures | IS 11384: 2022 • Terminology | Camber, Composite action, Differential shrinkage, Flexible shear connector, Initial dead load, m-k factors, Rigid shear connectors	**28-MAY-26**	**8:30 PM TO 10:00 PM**
2	**Discussion related to IS 11384** • Properties of structural steel • Properties of concrete • Reinforcement steel • Modelling and basic assumptions • Local buckling of plate elements • Section classification • Minimum reinforcement requirement in hogging region • Composite sections without concrete encasements • Composite sections with concrete encasements • Type of joints • When second order analysis is required?	**29-MAY-26**	**8:30 PM TO 10:00 PM**

Session no.	Title	Date	Time (IST)
3	**Discussion related to IS 11384** • Shear lag due to shear deformation • Creep, shrinkage and Temperature • Sequence of construction | SLS | ULS • Linear elastic analysis | Instability • Redistribution of moments from first order elastic analysis • Non-linear global analysis • Rigid plastic analysis • Limit state design | Ultimate limit state | Serviceability limit state | Fatigue limit state • Design philosophy • Dead load, Live load, Accidental loads • Load combinations • Partial safety factors for loads and material	**1-JUN-26**	**8:30 PM TO 10:00 PM**
4	**Discussion related to IS 11384** • Design for ultimate limit states | Flexure, Lateral-torsional buckling, Web shear buckling, Longitudinal shear • Basic assumptions in the design • Equivalent rectangular stress block • Ultimate bending resistance • Position of neutral axis • Precast slab | Full depth, Partial depth • Design principles for precast slab • Full depth precast slab vs Partial depth precast slab • Protection against corrosion for precast slab • Joints between precast members • Structural connection at joints • Design method • General requirements	**2-JUN-26**	**8:30 PM TO 10:00 PM**
5	**Discussion related to IS 11384** • Effective width of concrete slab • Effective cross section for strength calculations • Importance of load history for composite design	**3-JUN-26**	**8:30 PM TO 10:00 PM**

Session no.	Title	Date	Time (IST)
	• Sagging moment vs Hogging moment • What is partial shear connection? • Lateral buckling during construction stage vs composite stage • Simplified design of continuous beams • Concept of inverted U-frame action • Web bearing stiffener • Maximum depth of the beam • Design of structural steel web against vertical shear force | Plastic shear resistance, shear buckling resistance • Reduction in bending resistance due to high shear force • Hybrid sections | Reduction in strength of semi-compact section • Partially encased section		
6	**Discussion related to IS 11384** • Design for serviceability limit states • Un-propped construction vs Propped construction • Non-composite construction • Negative moment • Stresses and deflections • Different modular ratio for short-term and long-term loads • Limiting stresses for serviceability • Deflection limit • Camber • Vibration • Durability • Fire resistance • Crack width check • Design for fatigue limit • Shear connectors • Longitudinal shear in beams and slabs • Design strength of shear connectors | Stud connectors, Channel connectors • Design strengths for some standard shear connectors	**4-JUN-26**	**8:30 PM** **TO** **10:00 PM**

Session no.	Title	Date	Time (IST)
	• Design resistance of studs used with profiled steel sheeting | sheeting with ribs parallel to beam & with ribs transverse to the beam		
7	**Discussion related to IS 11384** • Fatigue strength of shear connectors • Spacing of shear connectors • Maximum spacing of shear connectors • Fatigue strength of shear connectors • Partial shear connection • Limitation on the use of partial shear connection in beams for buildings • Precautions against separation of steel beam from concrete • Detail of haunches in RC • Clear cover to shear connectors • Spacing of shear connectors for semi-compact flange • Transverse shear check (check for bottom steel in concrete slab) • General arrangement of transverse reinforcement • Total transverse reinforcement • Composite slabs with profiled steel sheeting • Prequalification of slab dimension • Bearing length • Reinforcement for shrinkage and temperature stresses • Minimum reinforcement	**5-JUN-26**	**8:30 PM** **TO** **10:00 PM**
8	**Discussion related to IS 11384** • Analysis for internal forces and moments • Ponding due to shuttering deflection • Linear analysis with and without redistribution • Effective span • Design of profiled steel sheeting as shuttering during construction • Design flexural resistance | sagging bending resistance, hogging bending resistance, partial shear connection • Shear resistance of composite slab • Punching shear • Resistance to shear	**8-JUN-26**	**8:30 PM** **TO** **10:00 PM**

Session no.	Title	Date	Time (IST)
	• Design against cracking • Deflection limits • Fire resistance		
9	**Discussion related to IS 11384** • Composite columns • Steel contribution ratio • Local buckling • Types of composite columns | Fully or partly encased steel columns, concrete in-filled rectangular or circular steel tubes • Details for composite action • Members under axial compression • When effects of creep and shrinkage may be ignored? • Design guidelines for simplified design provisions • Local buckling of steel sections • Design compressive resistance of short composite columns • Effective elastic flexural stiffness • Long members subjected to axial compression • Members subjected to combined compression and bending • Bending resistance under high shear • Second order effects on bending moment	**9-JUN-26**	**8:30 PM** **TO** **10:00 PM**
10	**Discussion related to IS 11384** • Members subjected to axial force and uniaxial bending • Members subjected to axial force and biaxial bending • Mechanical shear connection and load introduction • Design shear strength • Shear connection • Longitudinal shear outside area of load introduction • Requirement of shear connectors when bending about the weak axis • Construction and erection • Fire resistance and fire design • Fire protection methodology • Fire resistance of composite slabs	**10-JUN-26**	**8:30 PM** **TO** **10:00 PM**

Session no.	Title	Date	Time (IST)
11	**Discussion related to IS 11384** • ANNEX B – Bending resistance of composite beams • Sagging moment of resistance of composite section with plastic or compact structural steel beams • Sagging bending resistance with full shear interaction • Based on parabolic stress block vs rectangular stress block • Parabolic stress block - Stress distribution in a composite beam with plastic neutral axis within the concrete slab at ultimate moment | within flange of steel beam | within web of steel beam • Rectangular stress block - Stress distribution in a composite beam with plastic neutral axis within the concrete slab at ultimate moment | within flange of steel beam | within web of steel beam • Bending moment with partial shear interaction • Sagging bending resistance of composite section with non-compact structural steel beams • Exercise	**11-JUN-26**	**8:30 PM** **TO** **10:00 PM**
12	**Understanding of overall approach in ETABS for design of composite beams** • Soft requirements • Non composite beams in composite design module • Unbraced length | Orientation of the deck sheet • Effective slab width and 70% rule • Effective width • Openings in slab • Transformed moment of inertia | Transformed elastic section modulus • Adjustment for high shear • Partial composite connection • Non-composite beam • Deflection	**12-JUN-26**	**8:30 PM** **TO** **10:00 PM**

Session no.	Title	Date	Time (IST)
	• Stud design • Shear connector spacing • Shear connector distribution		
13	**Design of composite beam in ETABS for sagging moment | Manual calculations** • Step by step approach in ETABS • Perform design of composite beam in ETABS • Different design parameters in ETABS • Study of generated output for composite beams in ETABS • Interactive design in ETABS for composite beams • Step by step approach in manual calculations • Comparison of ETABS output with manual calculations • Exercise	**15-JUN-26**	**8:30 PM TO 10:00 PM**
14	**Discussion related to IS 11384** • Moment of resistance of composite section | Negative moment • Hogging bending resistance for plastic and compact structural steel sections • Stress diagram for hogging moment region at ultimate moment | Plastic and compact section | Semi-compact section • Hogging bending resistance for non-compact section • Flange stress reduction factor for hybrid sections • Moment of resistance against lateral torsional buckling (construction stage) • Sagging lateral buckling resistance of structural steel beams • Hogging lateral buckling resistance of composite beams • Moment of resistance for filler beam deck • Step by step calculations for hogging bending resistance	**16-JUN-26**	**8:30 PM TO 10:00 PM**

Session no.	Title	Date	Time (IST)
	• Exercise		
15	**Discussion related to IS 11384** • Annex-C | Composite slabs • Structural elements • Shear connectors • Reinforcement for shrinkage and temperature stresses • Ponding of profiled decking • Bending resistance of composite slabs with full shear connection • Sagging bending resistance | NA above steel decking | NA is within the steel decking • Hogging bending resistance of composite deck • Bending resistance of composite deck with partial shear connection • m-k method for composite slabs without end anchorage • Step by step manual calculations for design of composite slabs • Exercise	**17-JUN-26**	**8:30 PM** **TO** **10:00 PM**
16	**Discussion related to IS 11384** • Annex D – Plastic design resistance of symmetric composite columns • Design compressive resistance of short composite column • Design bending resistance of composite column • Stress distribution at ultimate stage under only axial force • Stress distribution at ultimate stage under only bending moment • Short column – Compression and bending interaction • Design resistance of composite short column under combined bending and compression • Location of neutral axis in composite column at ultimate moment | Major axis bending | Minor axis bending • Interaction diagram for short column subjected to compression and bending | Design resistance for point C & D	**18-JUN-26**	**8:30 PM** **TO** **10:00 PM**

Session no.	Title	Date	Time (IST)
	• Annex E – Testing of shear studs • Annex F – Strength details and elastic modulus of normal concrete		
17	**Understanding of overall approach in ETABS for design of composite columns** • Design load combinations • P-delta effects • Plastic vs elastic section modulus • Plastic section modulus for reinforcement • Neutral axis for composite columns for major axis bending • Composite columns | Encased vs Filled • Neutral axis in composite columns for minor axis bending • Bending resistance of composite column • Interaction curve for composite column • Biaxial Interaction Check for Composite Column • Plastic section modulus for circular hollow section + reinforcement • Shear design of circular concrete filled composite columns	**19-JUN-26**	**8:30 PM TO 10:00 PM**
18	**Design of encased composite column in ETABS | manual calculations** • Step by step approach in ETABS • Perform design of composite encased columns in ETABS • Different design parameters in ETABS • Study of generated output in ETABS • Interactive design in ETABS • Step by step approach in manual calculations • Comparison of ETABS output with manual calculations • Exercise	**22-JUN-26**	**8:30 PM TO 10:00 PM**

Session no.	Title	Date	Time (IST)
19	**Design of filled composite column in ETABS | manual calculations** • Step by step approach in ETABS • Perform design of composite filled columns in ETABS • Different design parameters in ETABS • Study of generated output in ETABS • Interactive design in ETABS • Step by step approach in manual calculations • Comparison of ETABS output with manual calculations • Exercise	**23-JUN-26**	**8:30 PM TO 10:00 PM**
20	**Variation for different design parameters in ETABS and impact on the output** • Composite beams • Composite encased columns • Composite filled columns • Exercise	**24-JUN-26**	**8:30 PM TO 10:00 PM**
21	**Moment connections in composite structures** • Overview of moment connection in composite structures • Connection design • Frame design • Step by step design procedures • Connection detailing • Exercise	**25-JUN-26**	**8:30 PM TO 10:00 PM**
22	**Open discussion | Way forward** • Balance queries from the participants • Discussion related to queries of the ongoing projects, if any • Concluding remarks • Way forward, etc.	**26-JUN-26**	**8:30 PM TO 10:00 PM**

ANNEXURE - B

About SQVe Consultants

SQVe Consultants (SQVe) is a company established 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 look forward for long term association with different organisations for enhancement of engineering profession through our following unique services.

- ✓ Training on customised areas as per specific requirements of the company
- ✓ Consultation on the areas related to structural engineering
- ✓ Induction training program for new joiners in the company
- ✓ Improvement in Quality Assurance of the company
- ✓ Development of unique software tools for structural engineers
- ✓ One-on-one training sessions for structural engineers, etc.

For more information, please get in touch with us for scheduling the free call to understand the details.

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

You may contact us at email address: contact@sqveconsultants.com

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   https://sqve-academy.thinkific.com/products/digital_downloads/ebook-str-001

2. Comments on draft of IS 1893 (Part 4):
   https://sqve-academy.thinkific.com/products/digital_downloads/ebook-str-002

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ONG-STR-001: Design of Pipe-rack for oil & gas industry:

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STEEL-STR-008: Design of PEB structures with cranes:

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STEEL-STR-005: Design of steel structure as per American codes:

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STEEL-STR-006: Design of connections for steel structures:
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EQ-STR-004: Push-over analysis, P-delta analysis, Nonlinear dynamic analysis, Response spectrum analysis: https://sqveconsultants.com/eq-str-004

RCC-STR-001: Comparison of design results of RC between STAAD Pro, RCDC & ETABS:
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Link for joining WhatsApp community of SQVe Academy:
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Link showing playlist of member-only videos:
https://www.youtube.com/playlist?list=UUMOwkjEFL_gGDE6peoapW8Few

You are welcome to join the channel at following link:
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To decide appropriate online courses for your specific requirements, feel free to connect with us through email address: contact@sqveconsultants.com

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