Prestress Design For Building Structures
&
Chemical Hazard Management at Worksite
1st Run

IES Academy

By Ir. Dr. Low Hin Foo & Dr. SIN Siang-Meng

Date: 4 & 5 July 2024, Thursday & Friday

Time: 4 July 2024: Virtual via Zoom from 1.00pm to 5.30pm
5 July 2024: Physical course from 9.00am to 5.30pm at Orchard Hotel Singapore

Address of Orchard Hotel Singapore: 442 Orchard Road, Singapore 238879

CPD Programme: 2 STU(Safety), 6 STU(Structural) – Confirmed
10 PDU (PE & CEng) – Confirmed

Fees: $408.75 (IES Members) / $452.35 (Non-Member

- ***Actual venue (hotel) will be stated in the confirmation email which will be sent to paid participant 2 weeks prior to event date***

  Please note that attendance for both the courses are compulsory, Certificate of Attendance will be issued to participants with 100% attendance for both days

  - **This is a blended course comprising 3 hours of zoom session and 7 hours of physical course at hotel.**
  - **This course is NOT SFC Funded**
  - **This course DO NOT HAVE SDU Points**
  - **UTAP under application, subject to approval**

- 2 Coffee Breaks & 1 Buffet Lunch (at Café) at Orchard Hotel
- Special Full Day Parking Rate at $10nett
- **Register between 20 May 2024 to 10 June 2024 will entitle 1 complimentary car park coupon at Orchard Hotel**

Prestressed buildings offer various advantages as compared to the conventional reinforced concrete design, including lighter structural weight, better crack resistance and more cost effectiveness. Prestress design with post-tensioning has been commonly adopted for cast in-situ building structures in Singapore due to the above advantageous.

This training course explains the design fundamental of the prestressed structures with post-tensioning. During the course, the structural behaviour of prestressed buildings and their benefits as compared to the conventional reinforced concrete are highlighted. The economical range with reference to the span length/ column grids for prestressed concrete structures are studied during the course

In the second part, the course explains the steps of designing a post-tensioned structure. This starts with the initial member sizing which maybe useful for architect and engineer to make provisions for sufficient floor-to-floor headroom. This is followed by the structural analysis of the prestressed structure, and the design of the tendon prestressing force at service state as well as the ultimate capacity of the prestressed structure at ultimate state.

This course also explains the rules and design requirements for tendon and steel reinforcement detailing for prestressed flat slabs, as well as how tendon elongation is used to monitor the QA/QC works for post-tensioned structures at site.

Prestress Design For Building Structures (6 hours)

Introduction to Prestressed Structures

- Brief History of Prestressing
- Reinforced Concrete vs Prestressed Concrete
- Advantages of Prestressed Concrete
- Prestress Structural System and Typical Applications
- Economical Span Range and Typical Span/Depth Ratio
- Types of Prestressing System
  - Pre-tension vs Post-Tension,
  - Bonded vs Un-bonded system
- Prestressing system components and material specifications
  - Concrete Strength
  - PC Strands
  - Grout

Prestress Concrete Design

- Set Design Criteria and Select Stress Limit
- Initial Member Sizing
- Analysis of Structure
  - Prestressing Primary and Secondary Moment
- Select Prestress Force and Eccentricity (Tendon Geometry and Profile)
- Allowable Stress Limit for Prestress Design (Flat Slab and Beam-Slab)
- Calculate Prestress Losses
  - Immediate Losses
  - Long Term Losses
- Check Ultimate Moment of Resistance
- Design for Shear
- Tendon Elongation for QA/QC Works

Analysis and Detailing of Prestressed Flat Slab

- Design Consideration and Framing for Prestressed Flat Slabs and Transfer Plates
- Initial Slab Thickness Sizing for Prestressed Flat Slabs and Transfer Plates
- Structural Modelling and Design Assumption for Prestressed Flat Slab
- Detailing for Prestressed Concrete Design
  - Tendon arrangement, spacing and horizontal diversion to locally avoid opening
  - Un-tensioned Reinforcement bars (rebar)
  - Pourstrip (stressing strip) design
  - Detailing consideration at interface with conventional RC areas
- Opening through flat slab and structural strengthening of prestressed structures

CV of Speaker

Ir. Dr. Low Hin Foo graduated from Monash University, Malaysia with a PhD(Structure). He graduated from University Malaya with an Honours degree in Civil Engineering. Since then he has almost 20 years of design and construction experience in various types of bridges, as well as prestressed building structures both locally and abroad. He was the Technical Manager for prestressing specialist contractor, BBR Construction Systems (M) Sdn Bhd; and he is currently the Principal Engineer of a bridge consultancy firm in Singapore, OS Alliance Pte Ltd, and the Group Managing Director of OSD Consultants Group in Malaysia.

Ir. Dr. Low has vast experience in the design and construction of long span bridges using precast and cast in-situ prestressed segmental box girder (SBG) and he is familiar with the design of integral bridge with prestressed girders made continuous. Besides, he has huge design experience in the design of prestressed structures for large commercial projects and high-rise towers, particularly in handling the design of prestressed flat slab or flat plate systems with irregular column grids, including prestressed transfer plate and raft foundation as well as their lateral response with columns of high-rise buildings.

Chemical Hazard Management at Worksite (Safety, 4 Hours)

Course Objective
This module aims to inculcate effective hazardous chemical management at worksites through lectures, interactive sharing, and group discussions. The module will increase awareness of how a well-designed and implemented hazardous chemical management program can effectively manage chemical risks associated with myriad of chemicals at worksites, enabling participants to better manage worksite chemical safety.

Course Outline
1. Legislative Requirements for Managing Hazardous Chemicals at Worksites
2. Understanding Chemical Hazards, Safety Data Sheets, Chemical Risks
3. Developing Chemical Risk Register, Safe Work Procedure
4. Control of Chemical Safety Related Works & Documentation

Target Audience
This course will benefit Construction Stakeholders (especially Resident Engineers, Resident Technical Officers and Resident Architects) involved in supervising the construction work.

Profile of Trainer
Associate Professor, Dr. SIN Siang-Meng, Ivan is currently the program chair professor for the MSc (Safety, Health & Environmental Technology) with the Department of Chemical & Biomolecular Engineering, National University of Singapore. As a certified and experienced emergency operation commander, crisis-emergency planner, fire-explosion Investigator, business continuity practitioner, Dr. SIN comes with more than 28 years of experience in government services and industry practices with the Singapore Civil Defence Force (SCDF), Monetary Authority of Singapore (MAS), Consultant Firm as Head (Hazardous Materials Program), Assistant Director (Crisis & Contingency Planning), Regional Head (EHSS & Business Resilience), and Consultant to projects. His areas of interest are in organization & business resilience, enterprise risk & resource management, corporate crisis and emergency management, business continuity & recovery management, workplace safety & health management, and chemical & process safety management. He is actively involved in various capacities with professional organizations such as the Fire Safety Managers' Association of Singapore (FSMAS), Society of Loss Prevention for Process Industries (SLP), Institution of Fire Engineers (IFE-UK), Institution of Chemical Engineers (IChemE-UK), Association of Company Emergency Response Teams Singapore (A-CERTS), and Technical Committee/Workgroups of ESG Singapore

Pre-requisites for Zoom session on 4 July 2024 from 1.00pm to 5.30pm

Prior to attending this course, you should:

- Have a PC / laptop / tablet / smart phone with built-in or external webcam.
- Installed the Zoom client.
- Have Wi-Fi / high speed internet connection available.
- Receive an email with a link for you to submit a registration for webinar 1 week prior to the commencement.
- Receive an email with a link and password for you to join the webinar session after your registration is successful.
- ***It is recommended that participants join the course on a 12-inch or larger screen in order to view clearly the text and photos in the presentation materials.***
- ***ALL PARTICIPANTS ARE REQUIRED TO KEEP WEBCAM OR CAMERA TURNED ON DURING 3-hours of zoom, FAILING OF WHICH THE E-CERTIFICATE OF ATTENDANCE WILL NOT BE ISSUED and names will not be submitted to PE Board (if Attendees are Professional Engineers)***

Target Audience

Consultant engineers & supervisors; Developers; Resident Engineer & Resident Technical Officer; Contractor PM, CM, site engineers & supervisors

Prestress Design For Building Structures & Chemical Hazard Management at Worksite 1st Run (Conducting via Virtual & Physical)

Date: **4 & 5 July 2024, Thursday &Friday**
Time: **4 July 2024 via Zoom(Virtual) from 1.00pm to 5.30pm**
5 July 2024 at Orchard Hotel Singapore(Physical) 9.00am to 5.30pm
Address: Orchard Hotel Singapore, 442 Orchard Road, Singapore 238879

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10 PDU (PEB & CEng) – Confirmed
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Register between 20 May 2024 to 10 June 2024 will entitle 1 complimentary car park coupon at Orchard Hotel

Fees*: 408.75 (IES Members) $452.35 (Non-Members)

Please register online/email in the completed form by 19 June 2024 to:
Karen Phua, karen@iesnet.org.sg
IES Academy@Jurong East, 80 Jurong East Street 21 #04-10
Devan Nair Institute For Employment and Employability, Singapore 609607

Participant Details

Name: _____ NRIC: _____

Company: _____ Designation: _____

Address 1: _____
(For mailing of invoice and receipt)

Address 2: _____
(For mailing of Certificate)

Tel: _____

Email: _____

Please indicate: ❑ IES members IES M'ship No.: _____ P.E. No.: _____ (if applicable)
❑ Non-members ❑ Sponsored by company

Contact Person Details *(if different from participant)*

Name: _____ Designation: _____

Tel: _____ Email :_____

Payment Details

Payment via bank transfer or PayNow. All Fees are inclusive of 9% GST.

Beneficiary: IES Academy Pte Ltd Bank: United Overseas Bank SWIFT: UOVBSGSG Bank Code: 7375 Branch Code: 016 Bank Account number: 339-326-153-4	**PayNow: IES Academy Pte Ltd UEN:202026912H**

Acceptance of Terms and Conditions for Registrations of IES Academy's Events
I agree to abide by the Terms and Conditions for Registration of IES Academy's Events.

Name: _____ Signature: _____

TERMS & CONDITIONS COURSE REGISTRATION

Registration

Any registration, whether on-line or fax will be on a ***first-come-first-served basis*** and will only be confirmed upon receipt of full payment by Engineers Singapore Pte Ltd unless otherwise invoice to company.

All registrations must be submitted with duly completed registration form.

Closing Date & Payment

The closing date of the event will be 2 weeks prior to event commencement date or earlier. Cheques should be crossed 'A/C payee only' and made payable to **'IES Academy Pte Ltd'**, with the ***Title of The Event indicated clearly written on the back of the cheques,*** and submitted with the duly completed registration forms to:

IES Academy@Jurong East
Devan Nair Institute for Employment and Employability,
80 Jurong East Street 21, #04-10 Singapore 609607

Confirmation of Registration

Confirmation of registration will be given at least 2 weeks before the commencement date via email. ***If you do not receive the said confirmation email, you are required to contact IESA at 6463 9211 during office hours.***

IESA reserves the right to allow only confirmed registrants to attend the Event.

Withdrawals/Refunds of Fees

Written notice at least 10 days in advance before the commencement of the event

Full course fee shall be refunded subjected to 4.5% transaction charge.

- **NO** refund otherwise.

No show of participant would not be accepted as a valid reason for withdrawal/refund.

One time replacement is allowed only if written notice is received by us at least 1 week before the commencement of the event. However, when an IES member is replaced by a non-member, the participant has to pay the difference in the relevant fees.

Cancellation/Postponement

Changes in Venue, Dates, Time and Speakers for the Events can occur due to unforeseen circumstances. IES reserves the full rights to cancel or postpone the Event under such circumstances without prior reasons. Every effort, however, will be made to inform the participants or contact person of any cancellation or postponement.

Fees will be refunded in FULL if any Event is cancelled by IESA.

UTAP (Union Training Assistance Programme) is an individual skill upgrading account especially for NTUC members. As a member, you enjoy UTAP funding at 50% of the unfunded course fee capped at $250 every year.

PERSONAL DATA PROTECTION ACT

I consent to the processing by Institution of Engineers, Singapore of personal data, including sensitive personal data as defined in the Data Protection Act 2014, about me for the proper purposes of Institution of Engineers, Singapore (IES). I undertake to observe the provisions of the Data Protection Act 2014 in relation to any personal data I may myself hold and process as a Members of Institution of Engineers, Singapore, and I agree to indemnify Institution of Engineers, Singapore from liability for any claims or damages that may arise from the processing of this data. For more information kindly refer to here.

Enquiries

For further enquiries, please contact IESA general office at Tel: 6463 9211.