BCA ACADEMY
of the built environment

Certification course in

Design of Precast Concrete Structures for Engineers

Introduction

BCA's International Panel of Experts (IPE) for Construction Productivity and Prefabrication Technology has identified Precast and Prefabrication as one of the key focus areas to improve the productivity in the construction industry. It has been observed that there is indeed more room for the greater adoption of precast technology in Singapore. While our industry gears towards increased adoption of precast concrete technology, it is necessary to build up the capability of the precast industry's workforce in the areas of design, construction, management and other relevant areas.

Objective

Structural design of precast concrete structures is significantly different from the design of cast-in-situ structures. The difference lies in the structural continuity of individual precast concrete components that are connected by a number of joints. The connections act as bridging links between the components. Hence structural engineers who design precast concrete structures should have a good understanding of the behavior and design principles of connections to ensure stability and safety of the structure.

Organised by the BCA Academy, this course will address the structural design issues of precast concrete technology. It also aims to train the practitioners on the practical design of precast concrete structures in an interactive manner.

This course will be taught by precast industry specialists who have vast experience in the design of precast concrete structures. The Housing Development Board (HDB) will also share a case-study on the design of a tall precast residential building. The application of building information modeling for precast concrete structures will also be demonstrated.

Course Content

1. Introduction to Precast Concrete Construction
- Factors to consider when choosing precast
- Cost implications
- Standardisation & modularisation
- Buildability & constructability
- Process involved in precast concrete: planning, production, transportation, erection & connections.
- Precast concrete components
- Considerations in adopting & execution of precast concrete construction

2. Precast Design Concepts
- Difference in the design of precast & cast-in-situ concrete structures
- Precast concrete systems
- Structural stability of precast structures
- Design for progressive collapse
- Diaphragm action in floors
- Joints and connections

3. Precast Concrete Components: Selection & Design
- Principles and criteria for selection of the following precast components
- Design principles and methodologies for various precast components

4. Design of Precast Concrete Connections
- Types of joints and connections (pinned & moment resisting)
- Design principles & methodology for various connections

5. Case Study 1: Design of a Typical Tall Residential Precast Concrete Structure
- Design and details of the structure
- Constraints & considerations in precast manufacturing
- "Precastability" - Precast design to achieve ease of production and construction
- Good practices in precast design

6. Case Study 2: Design of a Typical Multi-story Industrial Building with Long-spans & Heavy Loading
- Design and details of the structure
- Constraints & considerations in precast manufacturing
- Good practices in precast design

7. Application of Building Information Modelling (BIM) in Precast Concrete Construction
- Demonstration of commonly used BIM solutions for public and private sector precast projects.

8. Practical Hands-on Sessions/Assignments
- Scheming of precast elements in a given layout of a building
- Design of selected typical precast concrete components
- Selection & design of appropriate connections
- Presentation

Details

5th Run: 2 Apr - 23 May 2013
Duration: 13 evenings, twice a week
Time: 6:30pm to 9:30 pm
Venue: BCA Academy
Fee: S$1,284.00 (Incl GST)
S$684.00 (After WTU subsidy, incl GST)

The fee includes course material and refreshments.

Singaporeans and Permanent Residents are eligible for 50% course fee subsidy from the Construction Productivity Capability Fund (CPCF). Participants should obtain Certificate of Successful Completion (CSC) to enjoy the subsidised fee. Participants who fail to obtain CSC in two attempts will have to pay full fees.

Effective 1 April 2013, the course fee will be revised to S$1,400.00 (incl. GST).
To enjoy the current course fee, completed registration form with payment must be received by BCA Academy latest by 28 March 2013.

Entry Requirements

A civil or structural engineering diploma (or) degree, **AND**
At least 2 years of relevant working experience in building construction or structural design.

Certificate

- Participants who achieve at least 75% physical attendance and complete the assignments will be awarded a Certificate of Successful Completion (CSC).
- Achieving CSC is mandatory for each participant to enjoy the course fee subsidy

CPD Points

PEB: Pending
IES & ACES *(For REs & RTOs)*: Pending

Target Audience

- Practising Engineers
- Structural Designers

BCA ACADEMY
200 Braddell Road Singapore 579700
Tel: 6248 9999 Fax: 6258 0558
www.bcaa.edu.sg

Lecturers

DR LAI HOKE SAI, *Partner, Advan-TIS Consultants LLP*
Dr Lai is a registered professional engineer and has more than 20 years of experience in the design, supervision and management of many commercial, institutional, residential and industrial building projects including precast concrete structures. He was the principal author of the Structural Precast Concrete Handbook which was published by the BCA in 2001.

ER WONG WAI YIN, *Managing partner, Advan-TIS Consultants LLP*
Er Wong WY is a registered professional engineer and has more than 25 years of experience in the structural design and precast concrete industry. He was a design/project engineer in Houkehua Consulting Engineers, general manager (precast concrete division) in Hong Leong Asia Ltd and CEO in Excel Precast Pte Ltd.

ER WONG SWEE KHIAN, *Head (Building Research Unit), HDB Building Research Institute*
Er Wong SK is a registered professional engineer with more than 20 years of working experience in building design and construction supervision. He has played a key role in the development of HDB precast design and detailing standard, research and development and implementation of many innovative precast and prefabricated products/building systems in the public housing projects.

ER TOH BOO THIAN WINSTON, *Senior Engineer, HDB Building Research Institute*
Er Winston Toh is a registered professional engineer with more than 17 years of engineering experience in HDB in the areas of design and supervision of public housing, industrial, commercial, upgrading and A&A building projects. He also has good experience in the defects investigation and the periodic building inspection of HDB's prefab and non-prefab structures.

ER R S PRAKASH, *Vice President, Surbana International Consultants*
Er Prakash is a registered professional engineer with over 18 years of experience in the building and construction industry. He was one of the pioneers involved in Precast Research and Development at the HDB Prefabrication Technology Centre (PTC). Er Prakash has also carried out serveral international precast projects and contributed in seminars.

ER PUNITHAN, *Senior Executive Engineer, Building and Construction Authority*
Er Punithan is a registered professional engineer with over 17 years of experience in the building and construction industry. He has headed the HDB Prefabrication Technology Centre (PTC) in overseeing the production of precast components. He has extensive design knowledge in the design and supervision of projects with precast concrete structures.

REGISTRATION FORM - **Certification course in Design of Precast Concrete Structures for Engineers**

Event Code: 77062

Date: _____ **Venue**: BCA Academy

Time: 6.30pm to 9.30pm **Fee** (Inclusive of GST): ☐ S$1,284.00 ☐ S$ 684.00 (after WTU subsidy)

Name of Participant	NRIC/Passport No	Designation	HP no.	Email

☐ Yes, I would like to receive course - seminar updates via email _____. PEB ☐ IES & ACES ☐ Please tick accordingly

Company Name: _____ Company UEN No.: _____

Mailing Address: _____

Contact Person Particulars

Name: (Dr/Mr/Mrs/Ms) _____ Email: _____

Designation: _____ Hp no.: _____

Telephone No.: _____ Fax no.: _____

Payment

Enclosed is a cheque no._____ (Cheque should be crossed, marked "account payee only" and payable to 'Building and Construction Authority') for S$_____ **OR** Deduct from GIRO acc. No _____

(should be the same bank account number as indicated in the Direct Debit Authorisation form submitted to BCA)

.....
Name/Signature (*Company / individual applicant)

Company Stamp
(For company application)

DECLARATION (please tick √ where applicable)

☐ I/We agree to allow BCA to disclose to other government agencies and / or the Government any information relating to me/us in connection with, arising from or relating to this application, including but not limited to my/our personal particulars and my/ our test results.

a) *I/We hereby declare that the particulars given in the Application Form are true and correct in every respect. *I/We understand that the application will be disqualified if any information given is found to be untrue and the fees paid will be forfeited.

b) *I/We declare that the above applicant meets the entry requirements as stated in this brochure.

c) *I/We also accept that BCA Academy reserves the right to accept or reject the application for whatever reason and no refund of fees will be made for withdrawal on or after the commencement of the course which the applicant has been accepted.

d) **The company will sponsor the above applicant & apply for WTU funding, and declare as follows:**
We, the applicant company, agree and undertake to pay BCA Academy the WTU funding training assistance amount in full if the registered trainee does not satisfy or comply with the terms and conditions of the course and/or the WTU funding scheme or in the event that, for whatever reasons, the WTU administrator does not pay to BCA Academy that subsidised portion of the course fee.

e) **For company using GIRO for payment**
We hereby declare that our Direct Debit and Direct Credit Authorisation for GIRO application with the Building and Construction Authority (BCA) remains in force. We authorise BCA to issue instructions to our bank/finance company to debit our account for the total amount shown above for the purpose of course registration.

Reservation may be made by fax, e-mail, post or by hand. To confirm the reservation, payment will have to be made before the course date via cheque, VISA or Nets/cash. No invoice will be issued. Walk-in applicants will only be admitted on the basis of seat availability and full payment. Please inform us in writing of any change in your registration, which is subject to administrative charges as shown below:

Request for Replacement and/or Withdrawal
- Request for replacement in writing, must reach BCA Academy before the commencement date of the course: No administrative charge
- Request for withdrawal in writing, that reaches BCA Academy at least 2 weeks before the course date: 90% refund of course fee.
- Request for withdrawal in writing, that reaches BCA Academy less than 2 weeks but more than 3 working days before the course date: 75% refund of course fee.
- Request for withdrawal in writing, that reaches BCA Academy 3 working days or less before the course date: No refund of course fee.

BCA Academy reserves the right to amend the course details or cancel the course and fully refund the participants should unforeseen circumstances warrant it.

Enquiries

For enquiries, please call **6248-9999**
or email us at **bca_academy@bca.gov.sg**
or fax us at **6258-0558**

For details of other seminars/courses/workshops, please visit our website @ **www.bcaa.edu.sg**

Registration

Seats are limited; registration is on a first-come, first served basis. Training places will be confirmed upon the payment of the fees before the commencement date. Cheques with original application and supporting documents should be mailed to **BCA Academy, 200 Braddell Road, Singapore 579700**

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