Design of Flat or Irregular Slabs, Frames and Joints

INTRODUCTION

Reinforced Concrete (RC) is the most widely used construction material in Singapore. In addition, RC structures are getting more complex requiring engineers to be increasingly reliant on computer-aided tools in their work. This course will equip engineers with technical knowledge and tools to compare against software computations.

OBJECTIVES

At the end of the course, participants should be able to:

- Develop knowledge on complex slab design, frame design, beams with openings, etc
- Understand the principles of Strut and Tie Model (STM), and apply STM in the design of disturbed regions of reinforced concrete structures.
- Apply STM to corbels, brackets, beams with openings and deep beams.
- Understand the function of deep beams
- Analyze and design of slabs using Upper and Lower Bound Methods – Strip Method and Yield Line Method.

COURSE OUTLINE

DAY 1

- **Analysis of Indeterminate Frames**
  - Idealization and method for elastic analysis
  - Approximate elastic analysis
  - Moment coefficient method
  - Plastic theory on beams & frames
  - Limited plasticity & moment redistribution
- **Flat Slab design**
  - Types of slabs
  - Two-way column supported slabs
  - EC2 flat slab design using continuous slab coefficients
  - Equivalent Frame Method
- **Strip Method for slab design**
  - Basic principles: lower and upper bounds
  - Load distribution part 1

DAY 2

- **Strip Method for slab design**
  - Load distribution part 2
  - Worked example on rectangular slab
- **Yield Line Method for slab design**
  - Underlying assumptions and Work Equations
  - Worked examples: one-way & two-way slabs
  - Membrane actions and tests at NTU
  - Yield line method versus BS8110

TRAINER

PROF. TAN KANG HAI, *BSc(Eng), PhD, PEng, MIES, MASCE*

Er Tan Kang Hai is Professor of Structural Engineering in the School of Civil and Environmental Engineering, NTU. He is concurrently Director of Protective Technology Research Centre (PTRC) and Transport Research Centre (TRC) in NTU. Prior to joining NTU, he worked in Ove Arup & Partners, UK. He is a registered Professional Engineer in Singapore. His consultancy involves numerical simulations of fire effects on structures and experimental testing of sub-assemblies using electrical heating furnaces. Since 1996, he and his research team have developed finite element software FEMFAN3D to be used for progressive collapse analysis of structures. He also served as Chairman of a few task force groups on Structural Eurocodes relating to structural fire applications. He has been regularly conducting professional short courses and seminars on Eurocodes for reinforced concrete and steel structures and Structural Fire Engineering in Singapore, Hong Kong and China. He has written over 180 SCI international journal papers and is an active researcher on concrete materials and structures.

DETAILS

Date: To be advised
Duration: 1.5 days
Time: 9.00am to 5.30pm (1st day)
           9.00am to 1.00pm (2nd day)
Venue: BCA Academy
Fee (incl. GST) : $900.00
Refreshments will be provided.

In keeping with our green and sustainable practices, course notes will be available in e-format.

CPD POINTS

PEB: Pending

TARGET AUDIENCE

The course is targeted to civil engineers, structural engineers and contractors.

REGISTRATION

Visit BCA Academy Online StoreFront (OSF) @ https://eservices.bcaa.edu.sg/registration/#/login
(Course code: 80019)

80019.041119.0003