Imperial College
London

Post-Tensioning
Design and Construction

3 - 5 April 2017
5 April 2017 (Optional hands-on workshop)

Course Director
Dr Bijan O. Aalami
Professor Emeritus of San Francisco State University

A Centre for Continuing Professional Development Programme
Purpose and Background

This course provides the know-how and tools for efficient and economical design of post-tensioned structures. It presents the latest developments in construction technology, code provisions, design procedures, and software tools. After a brief introduction to current post-tensioning systems and construction practice, the course continues with the economics of both grouted and unbonded post-tensioning systems. It covers the concepts and practical design procedures for post-tensioned beams, one-way and column supported two-way flat slab construction. Each step is supplemented with well-documented literature, examples, and computer simulations.

The course continues with the state-of-the-art methods for graphical modelling of structures for analysis and design of floor systems, including the efficient use of AutoCad drawings, Revit Structure© and ADAPT’s model generation tools in bringing BIM within reach of everyday consulting work. It presents an integrated and seamless process for generating structural calculations, post-tensioning and reinforcement drawings, shop (fabrication) drawings and the estimate of quantities. The course demonstrates an integrated workflow for detailed design of post-tensioned floor systems, foundations, vertical elements, and the overall global design of a building for gravity and lateral loads. The course also covers short and long-term deflections, cracking, temperature loads, crack mitigation schemes, and vibration evaluation and control.

Learning Objectives

This programme will include:
* Current post-tensioning systems and construction practice in buildings and parking structures
* Economic advantages of post-tensioning in building construction
* Design know-how and detailing of post-tensioned structures
* Overview and application of TR43 Report
* Short and long-term deflections; cracked deflection
* 10-Step design of post-tensioned floors
* Effects and design for restraint of supports to shortening of post-tensioned members
* Evaluation of concrete floors for vibration and vibration control
* Assessment and design of temperature loading
* Design of post-tensioned floors for wind and earthquake forces
* Structural modelling of post-tensioned buildings & design, using ADAPT software system, AutoCad & Revit Structure
* Hands-on software and design training workshop

Course Benefits

Course attendees will receive comprehensive course notes and reference material including detailed design examples, as well as a copy of the “must have” book on Post-Tensioned Buildings, Design and Construction by Dr Bijan Aalami, valued at 120 Euros.
* Find out about the latest developments in post-tensioning systems, its construction practice, and economic advantages
* Understand the requirements of EC2, ACI, IBC (International Building Code) building codes, TR43 Report, and their impact on your design
* Learn how to avoid costly errors by using an integrated, BIM-based approach in design from architectural drawings to structural documents
* Become skilled in tendon layout and detailing for good construction practice
* Examine the possibilities of using powerful software tailored for the design of post-tensioned and conventionally reinforced concrete, including modelling and design through ADAPT software and Revit Structure
* Learn to design for for restraints of support in mitigating cracking and evaluation
* Acquire the required skill to effectively design floor systems for seismic and wind forces
Introduction to post-tensioning, post-tensioning systems, applications and hardware
* Construction technology of post-tensioned structures; preferred construction practice
* Economics of post-tensioned construction and quantities
* What you need to know to design a post-tensioned floor; EC2; ACI
* Concrete Society’s TR43 background and application
* 10-Step design of post-tensioned floors; long-hand calculation
* Application of 2D strip method software for rapid design of post-tensioned floors
* Questions and discussion

Workshop Benefits:
* Obtain hands-on experience and exposure to the efficient design of post-tensioned buildings
* Become closely familiar with the latest design tools and methods
* Receive detailed information, literature and design examples of common post-tensioned buildings

Who Should Attend?
* Structural engineers engaged in concrete and/or post-tensioning design
* Contractors interested in the design of post-tensioned structures
* Engineers responsible for the review of post-tensioned designs
* Academics and students having an interest and background in concrete design
* Building officials and city plan checkers
* Engineers charged with retrofit of post-tensioned buildings
* Forensic engineers who deal with post-tensioned structures
Presenters

DR. BIJAN O. AALAMI, a Life Member of ASCE, is Professor Emeritus of San Francisco State University, Chartered Engineer, Legend, Fellow and Life Member of the Post-Tensioning Institute; and Founder and Principal of ADAPT Corporation - a structural engineering and concrete software development company in California, serving clients in over 70 countries. He is ACI recipient of the Design Award for application of advanced engineering to a notable concrete structure. He has published extensively on analysis and design of post-tensioned structures. A renowned educationalist, he has held courses on design of structural concrete and post-tensioning in over 35 countries worldwide. He is honorary member of the Argentine Structural Engineering Association, former Vice Chancellor and Professor at Arya Mehr (now Sharif) University.

DR. FLORIAN B. AALAMI is CEO of ADAPT Corporation, a structural engineering and software development company, specializing in analysis and design of concrete structures with extensive national and international activities. He is the winner of 2012 ACI Charles S. Whitney Medal for software used to design concrete structures. He received his PhD from Stanford University. He is an active member of the PTI DC-110 Building Information Modeling (BIM) Committee.

ROBIN WHITTLE MA(Cantab), MICE, CEn spent five years of design and site experience with Sir Alexander Gibb and Partners working on large power stations, jetties and dams. This was followed by four years design and development work with Dow Mac Concrete (precast concrete factory). Between 1968 and 2001 he provided specialist advice for reinforced, prestressed concrete and structural design within Arup Research and Development. Since then he has been a Consultant to the Arup Group Ltd. and the Concrete Centre. He has been involved with the development of Eurocode 2 since the mid 1980s and was the Technical Secretary for the Project Team which produced the final versions of Part 1 and Part 1.2. He is a member of the UK Structural Codes Committee for concrete and takes an active role in the development of handbooks and design aids. He was chairman of the working group that produced the second edition of The Concrete Society’s Technical Report No. 43: Post-tensioned concrete floors - Design Handbook.

Participating Organisations

Organisations that have been represented on previous courses include:

* Buro Happold * WSP Buildings * Bovis Lend Lease Ltd * ODIN Consulting Engineers Ltd
* JSA Consulting Engineers * CTT Stronghold * Atkins * Robinson Consulting Ltd
* FaberMaunsell * Finnmap Consulting * JLE Eng * Halcrow * Campbell Reith
* Jacobs GIBB Ltd * Nolan Associates * Alan Baxter & Associates * Cameron Taylor Bedford
* Appleby Group Ltd * Arab Enterprise * Esteyco * Elliott Wood Partnership * Skanska
* Bunyan Meyer & Partners Ltd * Clarke Nicholls & Marcel * Gyoury Self Partnership * MLM
* BBR * VSL * Freyssinet * MC4

organised by the Centre for Continuing Professional Development, Imperial College London, South Kensington Campus, SW7 2AZ

e: cpd@imperial.ac.uk t: 020 7594 6882 w: www.imperial.ac.uk/cpd/tension