

ALUMNI ASSOCIATION OF SHARIF
UNIVERSITY OF TECHNOLOGY
KHANSAR PRESTRESSED INDUSTRIES
TEHRAN

Post-Tensioning

Design and Construction

A 2 day programme 18 - 19 April 2015

Optional Hands-on Computer Workshop 20 April 2015

Course Director

Dr Bijan O. Aalami

Professor Emeritus of San Francisco State University

TRAINING PARTNER:

808 INSTITUTE OF EDUCATIONAL AND ENGINEERING

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, and covers the practical design concepts and design procedures for 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
- * Latest design code provisions for design of post-tensioned structures (EC2, ACI 318-2014, International Building Code)
- * Overview and application of TR43 Report
- * Short and long-term deflections; cracked deflection
- * 10-Step design of post-tensioned floors
- * 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. They will receive the certificate of attendance with sign of Dr Alami, 808 Institute of Association and Engineering and Khansar prestressed industries.

- * Find out about the latest developments in post-tensioning systems, its construction practice, and economical 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 evaluate the potential of cracking and measures for crack mitigation
- * Learn how to integrate effectively the wind and earthquake analysis of buildings with the gravity design of their floors

Content

Day 1 - 18 April 2015

- Introduction to post-tensioning, post-tensioning systems, and post-tensioning 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
- Building Code Requirements of EC2, ACI, IBC and TR43 Report, and their impact on design of post-tensioned structures
- 10-Step design of post-tensioned floors; long-hand
- Application of 2D strip method software for rapid design of post-tensioned floors
- Questions and discussion

Day 2 - 19 April 2015

- Shortening estimate of post-tensioned floors, cracking and crack mitigation schemes
- 3D finite element design of post-tensioned floor systems using ADAPT-Floor Pro; a case study of a flat slab floor system; efficient use of AutoCad drawings and Revit Structure ©
- Modelling and design of multi-story post-tensioned buildings for lateral and gravity loads
- Immediate and long-term deflections of floors, cracked deflection
- Evaluation of concrete floors for vibration and vibration design
- Application and design of temperature loads
- Design of post-tensioned floor systems in high seismic and wind regions
- Questions and discussion

Day 3 - 20 April 2015 (Optional Hands-On Computer Workshop)

Purpose and Format

The workshop is for those interested in hands-on training in design of post-tensioned buildings. Each participant will be working on their own laptop, in which a full version time-limited copy of the ADAPT program will be installed. Starting with an architect's drawing, participants will be guided through the design process to the creation of the construction and fabrication drawings. They will learn how to start and in a short time conclude, with an efficient design. In Addition, each participant will receive a CD with the educational versions of ADAPT software.

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 the Post-Tensioning Institute and ASCE, is Professor Emeritus of San Francisco State University, Chartered Engineer, and Founder of ADAPT Corporation - a structural engineering firm in California specialising in the design of concrete structures. He has been actively engaged in the design and construction of numerous notable post-tensioned buildings, bridges and special structures. A renowned world leader and teacher in the design of concrete buildings, bridges, special structures and post-tensioning, through his worldwide educational seminars, Dr. Aalami has enriched the practice of many engineers in North and Latin America, Far East, Europe and the Middle East. His extensive publications on concrete design, in particular post-tensioning, are regarded as primary resources for practical design of post-tensioned buildings and bridges. For over twenty years, Dr. Aalami was the project leader of the ADAPT software suite of programs that are serving concrete design engineers in over 75 countries worldwide.



DR. FLORIAN AALAMI is an expert in AEC software development and the design and construction of post-tensioned concrete structures. As President & CEO of ADAPT Corporation, he is responsible for the overall operation of the company including its software development, sales and consulting divisions. Florian has taken specific interest in leading the company's international expansion efforts. He is also driving ADAPT's strategic initiative to develop a fully integrated design solution for reinforced and post-tensioned concrete buildings and bridges. Dr. Aalami earned a bachelor's degree in civil engineering from the University of California, Berkeley and both a master's degree in structural engineering and a doctoral degree from Stanford University's Center for Integrated Facility Engineering (CIFE), a leading think tank on Building Information Modeling (BIM).

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

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