

# PRESTRESSED CONCRETE 101

Presented by Concrete NZ – Learned Society



## WHY YOU & YOUR EMPLOYEES SHOULD ATTEND THIS SEMINAR

**Prestressing of concrete, through pre-tensioning or post-tensioning techniques, emphasises the advantages of concrete to enable the design and construction of elements with longer spans, slimmer profiles and enhanced serviceability performance.**

The use of prestressed concrete in New Zealand grew throughout the second half of the 20th Century, and is one of the most common construction practices for building floors and lateral load systems, bridges, and civil infrastructure projects.

The design principles and construction methods for prestressed concrete elements differ substantially from reinforced concrete. The seminar will introduce the key learnings underpinning prestressed concrete, the key differences and similarities between reinforced concrete and prestressed concrete, and how these concepts are applied in design and construction.

## THIS SEMINAR WILL COVER

- Materials & prestressing technology
- Fundamentals of pre-tensioned and post-tensioned concrete members including load balancing concepts
- Design and checks for SLS including stresses, deformation at different stages and short/long term losses
- Design and checks for ULS flexure design
- Design and checks for ULS shear design
- Worked example

## OTHER BENEFITS

- Comprehensive resource through the seminar notes
- Knowledgeable experienced speakers with good platform skills
- The opportunity to network with industry peers

## WHO SHOULD ATTEND

Graduate Engineers, Consulting Engineers, Site Engineers, Project Managers, Contractors, Specifiers, Building Certifiers, Local Authorities.

## INVESTMENT DETAILS

- **CNZ-LS members \$500** (GST exclusive) per person
- **Non CNZ-LS members \$600** (GST exclusive) per person (includes complimentary CNZ-LS membership until 30 June 2022)

## SEMINAR FEES INCLUDE

- Tea and coffee on arrival
- Morning tea, lunch & Afternoon tea
- Comprehensive seminar notes

## PROGRAMME

**8.30 - 9.00am** Registration

**9.00 - 10.30am**

### Session 1: Introduction & Materials

- History and benefits of prestressing
- Pre-tensioning vs Post-tensioning
- Materials and hardware
- Recent NZ applications

**10.30 - 10.45am** Coffee break

**10.45am - 12.30pm**

### Session 2: Stress concept & load balancing

- Stress concept
- Equivalent loads and load balancing
- Worked example

**12.30 - 1.15pm** Lunch break

**1.15 - 3.15pm**

### Session 3: Prestressing & losses

- Prestressing process: pre-tensioning & post-tensioning
- Instantaneous & short-term losses
- Long term losses
- Cases to consider in design
- Worked example

**3.15 - 3.45pm** Coffee break

**3.45-5.30pm**

### Session 4: ULS Behaviour

- ULS flexure
  - Differences from reinforced concrete
  - Effective tendon stress
- ULS shear
  - Mechanisms of shear transfer
  - Draped tendon contribution
  - NZS3101 approach
  - Non-3101 approaches (MCFT, AASHTO)
- Worked example

## VENUES

Christchurch **Thursday 17 June 2021**  
Riccarton Park, 165 Racecourse Road,  
Christchurch 8042

Auckland **Thursday 24 June 2021**  
Ellerslie Event Centre  
80-100 Ascot Avenue (Ellerslie  
Racecourse), Greenlane, Auckland

Wellington **Wednesday 30 June 2021**  
James Cook Hotel Grand Chancellor  
147 The Terrace, Wellington

## SPEAKERS PROFILES

### Alessandro Palermo

Dr. Alessandro Palermo is a professor of structural engineering at the University of Canterbury and Director of the Research Postgraduate Students at the Department of Civil and Natural Resources Engineering. He is actively involved in research related to seismic response of low damage post-tensioned concrete bridges and buildings and the use of smart sustainable materials and construction technologies. His early career research covered temperature, creep and shrinkage interaction in post-tensioned concrete bridges. Alessandro is the recipient of several national/international research awards, published over 350 conference/journal papers and is co-inventor of 3 patents. Alessandro currently teaches prestressed concrete in the undergraduate programme and bridge engineering at both undergraduate/postgraduate level. He loves teaching and his enthusiasm and dedication to teaching has meant a number of awards, including five University Student Union (UCSA) Awards and a University of Canterbury teaching award. Alessandro has recently been awarded Engineering NZ and NZSEE fellowships. He is currently the Vice-President of the Concrete NZ Learned Society and New Zealand fib Head delegate.

### Moustafa Al-Ani

Dr. Moustafa Al-Ani is a structural engineer at CompuSoft Engineering with interests in bridge and civil structures, concrete structures and material, seismic analysis and design, and soil-structure interaction. Moustafa has experience in the analysis, design and management of bridge and civil infrastructure projects in New Zealand and overseas, as well as experience in the seismic analysis of multi-storey building structures. Moustafa's research interests include concrete structures, the seismic performance of bridge structures, and seismic isolation of bridges. He maintains an interest and participation in associated research. Moustafa is a Chartered Professional Engineer and an active member of the engineering community, currently serving as a member of the Concrete NZ Learned Society Council and convener of the SESOC Auckland Bridge Group.

## PRESENTERS

**The Concrete NZ - Learned Society acknowledges the following supporting organisations for making this seminar series possible:**



**Dr. Alessandro Palermo**, Courtesy of University of Canterbury, Department of Civil and Natural Resources Engineering & Agora Lab Ltd

**Dr. Moustafa Al-Ani** Courtesy of CompuSoft Engineering

# REGISTRATION FORM

Tax Invoice: GST Registration Number 122-984-249

Name(s):

Company:

Postal Address:

Postcode:

Phone:

Mobile:

Email:

Dietary Requirements:

## PLEASE INDICATE WHICH SEMINAR AND VENUE:

- Christchurch** Thursday 17 June 2021
- Auckland** Thursday 24 June 2021
- Wellington** Wednesday 30 June 2021

## PAYMENT DETAILS:

No. of member registrants [ ] at \$575.00 GST inclusive = \$

No. of non-member registrants [ ] at \$690.00 GST inclusive = \$

Total= \$

Credit card payment:  Visa  MasterCard

Card No:

Expiry Date:

Cardholders Name:

**Please complete this form, take a copy for your records and email to [concrete@bluepacificevents.com](mailto:concrete@bluepacificevents.com).**

For all enquiries phone (09) 536 5410

NOTE: Full payment must be received prior to each seminar.