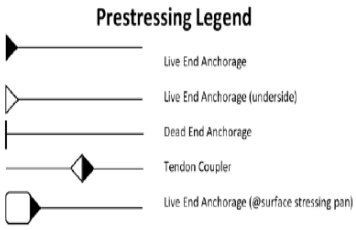
ENGINEERING TRAINING INSTITUTE AUSTRALIA

PRESTRESSED CONCRETE DESIGN WORKSHOP
(TO AS3600-2018)

PAUL UNO

BE MBdgSc MIE(Aust) CPEng NER RPEQ APEC Engineer IntPE(Aus)

- Over 40 years of experience in the design & construction industry.
- Former Senior Part-Time Lecturer – UNSW, UTS and USyd.
- Engineers Australia 2011 article "Prestressing in Cold Weather".
- Inspected many PT jobs over 20 years.



Livestreamed via zoom

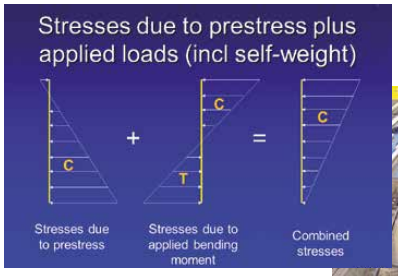
WORKSHOP SUMMARY 16 hours of CPD

This course concentrates on the fundamentals of prestressed concrete. It explains the essential simplicity of prestressed concrete flexural theory.

Both Pre-tensioned and Post-tensioned concrete (PT) will be covered. Each 90 minute session will consist of two parts:

(a) presentation by the course leader
(b) workshop tutorial segment.

The participants will work on a structured series of exercises aimed at understanding the essential principles and procedures.



DAY 1 *(8.30am - Zoom invite will be emailed)*

9.00 - 11.00 Session 1 - INTRODUCTION

- Reasons for and effect of prestressing concrete beams.
- Properties of concrete and prestressed strand.
- Pre-tensioning vs post-tensioning.
- Full vs partial prestressing.
- Calculation of stresses in uncracked sections.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 - LOAD BALANCING, LOSSES & UNCRACKED SECTIONS

- Equivalent load concept. Straight vs kinked vs parabolic cables.
- Load balancing and its applications in analysis and design.
- Losses that occur in pre-tensioned and post-tensioned concrete.

1.00 - 1.30 Lunch Break

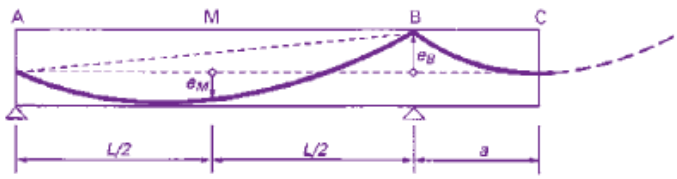
1.30 - 3.00 Session 3 - FLEXURAL STRENGTH

- Calculating ultimate moment for sections using prestressing strand plus reinforcing steel.
- Designing and checking for ductility
- Calculation of total strain in prestressing steel.
- Calculating additional reinforcement for the required moment capacity.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - STRENGTH AT TRANSFER & ELASTIC CRACKED SECTION ANALYSIS

- Possibility of failure during prestressing procedure.
- Calculating the strength at transfer; conditions when it may be important in design.
- Elastic analysis of cracked prestressed concrete sections.
- Checking for serviceability.
- Software solutions and how to check them.



DAY 2

9.00 - 11.00 Session 5 - PSC SHEAR STRENGTH

- Effect of prestress on shear capacity.
- Determination of ultimate strength using shear formulas (AS3600-2009 vs AS3600-2018)
- Web crushing failure.
- Design of shear reinforcement.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 6 - ANCHORAGE OF PT CABLES

- Stress contours in end blocks of prestressed beams.
- Analysis for simple cases.
- Importance of end block design.
- Spalling and Bursting Moments.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 7 - PSC DESIGN EXAMPLES BY HAND

- Calculating elastic and long-term deflections for cracked and uncracked prestressed beams.
- Use of prestress to control deflection.
- Design preliminaries - choice of section - trial section dimensions.
- Choosing the appropriate level of prestress.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 8 - PRACTICAL DESIGN & ISSUES

- Practical examples of prestressed beams with different levels of prestress.
- Comparisons of the designs for economy, strength & serviceability.
- Rules of Thumb in PSC.
- Quick introduction to RAPT software.

Certificate of Attendance will be emailed

CALCULATORS REQUIRED

- Two day course – **$1,450**

FURTHER INFORMATION

- (02) 9899 7447
- +61 413 998 031
- registrations@etia.net.au

- *To register, visit our website* www.etia.net.au ***OR*** *scan the QR Code.*

Cancellations made more than 5 working days prior to a course will incur a 20% processing fee of the full registration amount.
Cancellations made 5 working days or less will incur forfeiture of the full registration fee.