

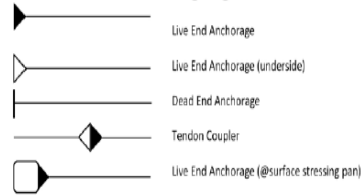


## PAUL UNO

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 & University of Sydney
- Engineers Australia 2011 article “Prestressing in Cold Weather”.
- Inspected many PT jobs over 20 years.

### Prestressing Legend



Live streamed  
via



## 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:

- presentation by the course leader
- 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 AEST 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

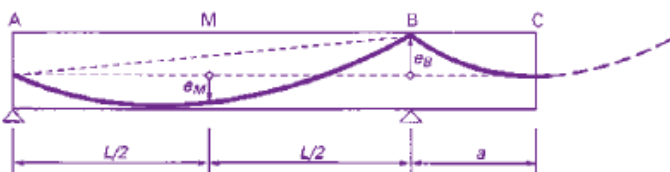
- Calculating ultimate moment for sections using prestressing strand plus reinforcing steel.
- Designing and checking for ductility
- Calculation of total strain in prestressing steel.
- Calculating additional reinforcement for the required moment capacity.

### 3.00 - 3.15 Afternoon Break

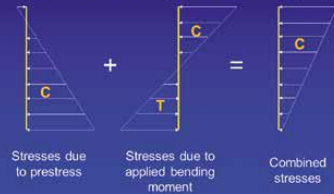
### 3.15 - 5.00 Session 4

#### - 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.



### Stresses due to prestress plus applied loads (incl self-weight)



## 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 – **\$1,430**

#### FURTHER INFORMATION

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

• To register,  
visit our website  
[www.etia.net.au](http://www.etia.net.au)  
OR scan the QR  
Code.

