

# REINFORCED CONCRETE DESIGN WORKSHOP – MODULE ONE



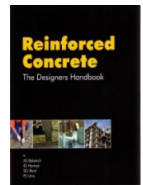
**PAUL UNO** BE MBdgSc MIE(Aus) CPEng NER RPEQ APEC Engineer IntPE(Aus)

- Over 40 years of experience in the design and construction industry.
- Former Part-Time Senior Lecturer – UNSW, UTS and University of Sydney.
- Chairman of the Australian Standards committee BD-066 for the Precast & Tilt Up (Prefabricated) Concrete Standard AS3850.

Recommended Text:

**Reinforced Concrete:  
The Designers Handbook**  
(2015 Revised Edition)

*Beletich, Hymas, Reid and Uno*



## WORKSHOP SUMMARY **16 hours of CPD**

Civil and Structural engineers use the Concrete Structures Standard AS3600-2018 to design a multitude of concrete structures. This workshop is designed for engineers wanting to hone their skills with reinforced concrete design, gain a better understanding of the Code clauses and equations or just refresh the structural design principles learnt at university.

With the advent of computers, many engineers have forgotten basic structural design and thus need to carry out simple structural checks by hand or quick estimates of size and reinforcement requirements. The use of simple charts can also often provide the preliminary structural sizing required for beams, slabs or footings.

Sessions will provide worked examples, tutorial exercises and solutions.

### DAY 1 (8.30am Zoom invite will be emailed)

#### 9.00 - 11.00 Session 1

##### - BASIC MATERIAL PROPERTIES

- New  $\phi$  factors explanation
- Load Combinations to AS/NZS 1170.0
- Material Properties eg. Concrete Modulus E, Creep & Shrinkage
- Flexural Strength  $f'_{cr}$ , Tensile Strength  $f'_{ct}$ , Mean Strength  $f_{cm}$
- Durability Issues

#### 11.00 - 11.15 Morning Break

#### 11.15 - 1.00 Session 2

##### - DESIGN STRENGTH

- Bending Strength by hand calculations
- Design Charts
- Ductility Requirements using 500 MPa & 250 MPa grade steel
- Singly & Doubly Reinforced Beam Design

#### 1.00 - 1.30 Lunch Break

#### 1.30 - 3.00 Session 3

##### - BEAM DEFLECTION

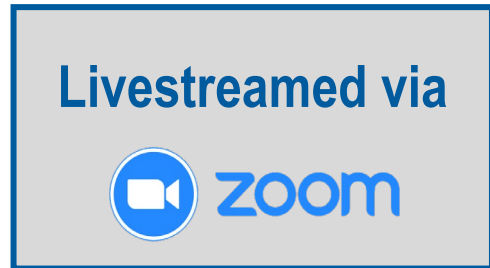
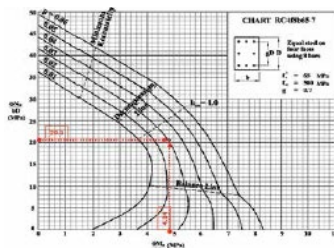
- Allowable Deflections to AS1170.0, AS3600-2018
- Crack Control in Beams & Slabs to AS3600-2018
- Beam Deflection (Deemed to comply method)
- Serviceability criteria
- New Bischoff I value formula (replacing Branson)

#### 3.00 - 3.15 Afternoon Break

#### 3.15 - 5.00 Session 4

##### - SLAB DEFLECTION

- Deemed to Comply (L/D) Deflection Method
- One Way Slab (single and continuous) Deflections
- Four-Sided Slab Supported Deflections
- Shrinkage Reinforcement



### DAY 2

#### 9.00 - 11.00 Session 5

##### - COLUMN DESIGN

- Short & Slender Column Design using AS3600-2018
- Axial Load-Moment Interaction Graph - Derivation and use
- End Stiffness - Restraint Factors Chart
- Euler Buckling Load

#### 11.00 - 11.15 Morning Break

#### 11.15 - 1.00 Session 6

##### - WALL DESIGN & SHEAR DESIGN

- Wall Design – Axial, Moment & Shear Strength
- Beam and Slab – Shear Design to AS3600-2018
- Modified Compression Field Theory for Shear Design
- Mohr Circle – Principal and Shear Stress

#### 1.00 - 1.30 Lunch Break

#### 1.30 - 3.00 Session 7

##### - FOOTING DESIGN

- Simple Square & Rectangular Pad Footing Design
- Soil Pressure Basics – ultimate vs allowable
- Use of Footing Design Charts
- One-way Bending, One-way Shear and Two-way (Punching) Shear
- Straight vs Cogged Reinforcement
- Comparison of hand calculations vs FINE GEO5 Software

#### 3.00 - 3.15 Afternoon Break

#### 3.15 - 5.00 Session 8

##### - DEVELOPMENT LENGTHS & DETAILING OF REINFORCEMENT

- Development length  $L_{sy}$  in tension and compression
- Deemed to comply steel reinforcing detailing requirements
- Beam width vs Area of Steel
- Curtailing reinforcement

**Certificate of Attendance will be emailed**

### CALCULATORS REQUIRED

• Two day course – **\$1,490**

#### 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.

