



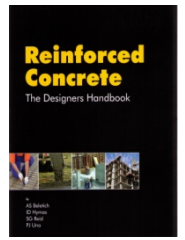
**PAUL UNO** BE MBdgSc MIE(Aust) CPEng NER RPEQ APEC Engineer IntPE(Aus)

- Over 40 years of experience in the design and construction industry.
- Part-time Senior Lecturer – UNSW and University of Sydney.
- Designed many concrete foundations ranging from pad and strip foundations for domestic construction, to pad footings and piers for mining structures, to large piles for electricity transmission towers and other such structures.

Recommended Text:

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

*Beletich, Hymas, Reid and Uno*



## WORKSHOP SUMMARY

This course provides an opportunity for structural/civil/mechanical engineers to understand the geotechnical parameters that relate to foundation footings in various types of soils and then properly design various types of shallow foundations for medium to large scale projects. Tut Solutions will be analysed then compared to FINE (GEO5) software.

## PROGRAMME (8.30 - 9.00 Registration)

### 9.00 - 10.45 Session 1

#### - GEOTECHNICAL SOIL PROPERTIES AND SOIL MECHANICS

- Soil Classifications (as per AS1726 and ASTM2487)
- Proctor Density tests vs HILF Density Ratio
- Atterberg Limits (eg LL, PL, PI)
- SPT vs DCP vs CBR vs CPT vs k Correlations
- Soil Density vs Roller Passes Correlations
- Triaxial, Shear Box and Oedometer Tests
- Unsaturated vs Saturated vs Submerged Soils
- Shear strength, Cohesion and Angle of Internal Friction
- Soil Void Ratio vs Water Content
- Expansive Soils (S, M, H1, H2, E, P) as per AS2870

### 10.45 - 11.00 Morning Tea

### 11.00 - 12.30 Session 2

#### - SOIL STRESS DISTRIBUTIONS DUE TO APPLIED LOADS

- Uniform vs Non Uniform Soil Pressures
- Rigid vs Flexible Shallow Foundations
- Maximum Eccentricities for Foundations (Kern limits)
- Coulomb vs Rankine Pressures in Soils
- Active ( $K_a$ ) vs Passive ( $K_p$ ) Pressures on Soils
- Boussinesq vs Westergaard Soil Stress Distributions
- Winkler Beam on Elastic Foundations method
- Soil stresses under strip, circular and rectangular footings
- Trapezoidal '2 : 1' Pressure Distribution method
- Embankment Loads vs Vertical Stress Distribution in Soils

### 12.30 - 1.30 Lunch (Provided at Venue)

Download **FINE GEO5** demo version via the link

[www.etia.net.au/geo5-demo-version](http://www.etia.net.au/geo5-demo-version)



**Shallow Foundations**  
Bearing capacity and settlement of spread footing, strip footing and slabs



**Settlement Analysis**  
Analysis of settlement and consolidation of foundation soil



Slab



Abutment



Spread Footing



Ground Loss



Settlement



Beam



Spread Footing CPT



FEM



FEM - Consolidation

### 1.30 - 3.15 Session 3

#### - ALLOWABLE vs ULTIMATE BEARING CAPACITY vs SETTLEMENT

- Ultimate Bearing Capacity Formulas vs FINE (Geo5) Software
- Terzaghi vs Meyerhof vs Vesic vs Hansen vs Skempton formulas
- General Shear vs Local Shear vs Punching Shear Failure
- Shape Factor vs Depth factor vs Load Angle factor
- Foundation Bearing Capacity – Dry vs Wet Soils
- Footing capacity – Strip vs Circular vs Rectangular
- Bearing Capacity – Cohesive vs Cohesionless Soils
- Preconsolidation Stress  $\sigma'_c$
- Immediate Soil Settlement vs Consolidation vs Creep
- Compression Index  $C_c$  vs Volume Compress. Coeff.  $m_v$
- Normally Consolidated vs Over-Consolidated Soils
- Foundation Rate of Consolidation (U) vs Drainage
- Foundation Settlement Calculations vs Fine (GEO5) Software
- Factor of Safety – Ultimate vs Allowable Bearing
- Tutorials by hand then compared to FINE (Geo5) Software

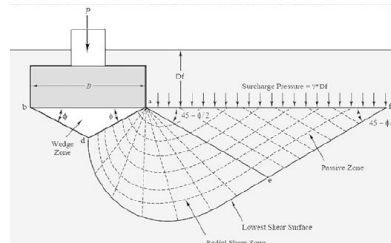
### 3.15 - 3.30 Afternoon Tea

### 3.30 - 5.00 Session 4

#### - STRUCTURAL DESIGN OF SHALLOW FOUNDATIONS

- Soil Allowable Bearing Capacities – Clay vs Sand
- Foundation Structural Design using AS3600-2018
- Foundation Sizing based on Allowable Bearing Capacity
- Modes of Failure: Bending vs One Way Shear vs Punching Shear
- Square Pad vs Rectangular Pad Footings
- Design for Combined Footings
- Reinforcement Requirements
- Reinforcement Detailing – Cogged vs Straight Bars
- Reinforced vs Unreinforced Footings
- Use of Footing Design Charts

### 5.00 - 5.15 Certificate of Attendance & Feedback sheets



**CALCULATORS REQUIRED**

#### COURSE COST

- 1 day course – \$775 pp

#### DATES, VENUES & REGISTRATION

- Registration form (back of catalogue)
- Visit our website [www.etia.net.au](http://www.etia.net.au)

#### FURTHER INFORMATION

- Office (02) 9899 7447
- Mobile 0413 998 031
- Email [registrations@etia.net.au](mailto:registrations@etia.net.au)