ENGINEERING TRAINING INSTITUTE AUSTRALIA

STRUCTURAL STEEL DESIGN WORKSHOP

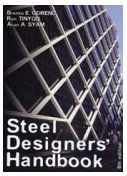
PAUL UNO *BE MBdgSc MIE(Aust) CPEng NER RPEQ APEC Engineer IntPE(Aus)*

- Over 40 years of experience in the design and construction industry.
- Part-time Senior Lecturer – UNSW and University of Sydney.
- Previously Structural Steel Design Engineer for *Transfield* & for *H.H Robertson.*
- Development Engineer for AISC (now Australian Steel Institute).

Recommended Text:

Steel Designers' Handbook
(8th Ed. 2012)

Gorenc, Tinyou and Syam



WORKSHOP SUMMARY

This two-day online workshop is a back to basics course which addresses the key areas of steel design with particular reference to NZS3404-2009, AS4100-1998 and AS3990-1993 (mech) the 'Structural Design Handbook' by Gorenc, Tinyou and Syam. This text is invaluable to engineers wishing to design steel structures.

Sessions provide worked examples, tutorial exercises and solutions.

DAY 1 (8.30 - 9.00 Zoom link invite will be emailed)

9.00 - 11.00 Session 1 - MATERIALS

- Basic terms and properties of structural steel.
- Loading parameters required for steel design.
- Terms & processes in producing Hot/Cold rolled sections, CHS, RHS.
- Parallel flange sections, Welded beams and residual stress relieving.
- Temperature effects on steel (hot, cold and transition temperatures), welding, hydrogen cracking, HAZ, quenched & tempered (Bisalloy), brittle fractures, and ductility.
- Creep, fatigue & hardness.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 - DESIGN CODES

- Design aspects such as building height vs. terrain, wind velocity vs. region and wind speeds.
- Basic aspects of loading including capacity reduction factors, deflection limits and relevant design codes, bulk material properties and imposed actions as per AS/NZS 1170.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 - STRUCTURAL ANALYSIS

- Structural framing (isolated beams, braced & unbraced frames FS1 to FS7), and minimum eccentricities.
- First and second order effects in columns via moment amplification methods, effective lengths, joint rigidity, buckled shapes, restraint stiffness, sway stiffness ratios, unequal end moment factors.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - BEAMS & GIRDERS

- Member vs. Section capacity, slenderness reduction factors, lateral restraint (& the respective categories of lateral restraint F, P, L & U).
- Flexural torsional buckling, k values, slenderness α_s and moment α_m factors, moment magnification factors, compactness vs. slenderness for plate elements, buckling and shear capacity of webs (both stiffened and unstiffened).

CALCULATORS REQUIRED

DAY 2

9.00 - 11.00 Session 5 - WEB STIFFENERS/TENSION MEMBERS

- Requirements for the use of transverse and longitudinal web stiffeners in beams and columns. Especially critical in beams with high shear due concentrated loads and in portal frame column-rafter connections.
- Tension members e.g. UB & UC's as support columns or Angles (equal and unequal) in bracing.
- Both bolted and welded tension members are covered and the failure modes of 'fracture vs yield' are covered.

11.00 - 11.15 Morning Tea

11.15 - 1.00 Session 6 - COMPRESSION MEMBERS & BEAM COLUMNS

- Compression members and beam columns both with concentric and eccentric loading.
- Form factors (k_f), compression member constants, axial member capacities and design bending moments.
- Euler buckling loads, unequal moment factors and amplification factors allowing for reduced section capacities and biaxial effects.
- In plane and out of plane moment capacities.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 7 - CONNECTIONS

- Types of bolts, i.e. snug, tensioned bearing and tensioned friction (4.6 S, 8.8 TB and 8.8 TF).
- Slip loads, minimum design actions on connections, tensile and shear strength (threaded vs. shank).
- Welding including the two main metal arc electrode categories E41XX and E48XX (alternatively W40X and W50X), fillet and butt welds, maximum and minimum fillet weld sizes, weld throat size, weld shrinkage cracking.
- Standardised connections e.g. angle seat, flexible end plate and base plate connections.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 8 - FRAMING SYSTEMS & FAILURES

- Structural framing systems available including rigid frames, longitudinal bracing, roof trusses, open and closed sections, steel frames for low rise buildings, purlins and girts.
- Deflection limits, fatigue, fire and corrosion requirements.

Certificate of Attendance will be emailed

Live streamed via zoom

COURSE COST

- 2 day course – **AUD$1,520 pp**

DATES, VENUES & REGISTRATION

- *Registration form (back of catalogue)*
- *Visit our website* www.etia.net.au

FURTHER INFORMATION

- *Office* (02) 9899 7447
- *Mobile* 0413 998 031
- *Email* registrations@etia.net.au

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.