ENGINEERING TRAINING INSTITUTE AUSTRALIA

www.etia.net.au
ABN 27 830 322 080

March 2021 Courses

LIVE STREAMED COURSE LIST

- Thu 4 March 2021 — Masonry Design Workshop
- Tue 9 + Wed 10 March 2021 — Structural Steel Design Workshop
- Thu 11 March 2021 — Forensic Engineering Workshop
- Tue 16 March 2021 — Industrial Process Heating with Thermal Fluids
- Wed 17 + Thu 18 March 2021 — Residential Slabs & Footings Design Workshop
- Tue 23 + Wed 24 March 2021 — Reinforced Concrete Design Workshop - Module One
- Thu 25 March 2021 — Accounting & Management for Engineers Course
- Tue 30 + Wed 31 March 2021 — Timber Design Workshop

Course Information

- All of the above courses commence at 9:00am AEDT.
- The Zoom invite link will be emailed at 8:30am on the morning of the course.
- Only registered attendees are permitted to view the online live stream.
- For accreditation purposes, participants MUST have their webcam on during the entire presentation in order to receive their Certificate of Attendance.
- Recording of any ETIA courses is strictly prohibited.

ENGINEERING TRAINING INSTITUTE AUSTRALIA

ACCOUNTING & MANAGEMENT FOR ENGINEERS COURSE

VINCENT UNO
BCom CPA JP
Tax Agent
- Director - Engineering Accountants and Advisors.

JOEL EDELMAN
- Director - Principal Edge Financial Services
- Helps clients to protect & build their wealth through succession planning, ownership & key-person protection.

RAOUL BASILE
- Woodina Underwriting Agency Pty Ltd
- Professional Lines Underwriting Manager.

Live streamed via zoom

Face-To-Face
Rydges Norwest (Sydney only)

WORKSHOP SUMMARY

This workshop has been specifically designed for engineering managers and consulting engineers, to assist them in running a more efficient and effective team or business.

After attending this course, you should have an understanding of:

- **Tax deductions** prescribed for the engineering profession.
- The pros and cons of various **trading structures**.
- Techniques and strategies for achieving **goals and objectives**.
- Insurance as a means of **risk mitigation**.
- **Policy and procedure** development to ensure quality control.
- How to read and understand **financial statements.**
- Setting employee **charge rates** to ensure a return on investment.

If you provide consulting services or have aspirations for senior management, then this is a must attend event.

PROGRAMME *(8.30am AEDT Zoom invite will be emailed)*

9.00 – 10.00 Session 1 *(Vincent Uno)*
- ATTRIBUTES OF SUCCESSFUL MANAGERS, TRADING STRUCTURES AND TAX PLANNING

- Attributes of a successful manager or consulting engineer.
- Engineers Australia's Code of Ethics and what it means for you.
- Maximise your tax refunds after reviewing the ATO's occupation specific deduction guidelines for the engineering profession.
- The pros and cons of the following trading structures, and whether a restructure should be considered.
  - Sole Trader
  - Partnership
  - Company
  - Trust

10.00 - 11.00 Session 2 *(Vincent Uno)*
- STRATEGIC AND BUSINESS PLANNING FOR MANAGERS AND CONSULTING ENGINEERS

- Preliminary planning process using S.W.O.T Analysis
- The 10 step strategic planning process
- Defining and achieving business goals and objectives using the S.M.A.R.T principle.
- Implementation and design of Action Plans
- Setting and monitoring Key Performance Indicators (KPIs).

11.00 - 11.15 Morning Break

11.15 – 1.00 Session 3 *(Vincent Uno)*
- MANAGEMENT POLICIES, PROCEDURES AND RISK MITIGATION

- Developing Policies and Procedures
- Client Engagement Letters
- Risk Mitigation in the areas of:
  - Human Resources
  - Information Technology and Cyber Security
  - Email Correspondence
- Key focus areas that all businesses should maintain quality control.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 4 *(Insurance Brokers)*
- INSURING AGAINST RISK AND TAX DEDUCTIBILITY OF PREMIUMS

- Different insurances to be considered:
  - Professional Indemnity
  - Public Liability
  - Workers Compensation
  - Income Protection
  - Total Permanent Disability
  - Life Cover
  - Critical Illness
  - Keyman
  - Business Continuity

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 5 *(Vincent Uno)*
- FINANCIAL STATEMENT ANALYSIS AND CHARGE RATES

- The Peter Principle
- Reading and understanding the components of financial statements:
  - Compilation Report
  - Directors Declaration
  - Balance Sheet
  - Profit and Loss Statement
  - Statement of Equity
- Practical application of ratio analysis to determine team/business's profitability, return on capital, liquidity, borrowing capacity and debtor collectability.
- Techniques to control cash flow and work in progress.
- The calculation charge rates and the salary cost multiplier to ensure that overall team/business profitability targets have the ability to be met and that employee output performance can be benchmarked.

Certificate of Attendance will be emailed

ENGINEERING ACCOUNTANTS ◆ ADVISORS

- One day course – **$670 pp**

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.
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ENGINEERING TRAINING INSTITUTE AUSTRALIA

FORENSIC ENGINEERING WORKSHOP

PAUL DAVIS *BE(Civil) MIE(Aust) CPEng NPER*

- Principal Engineer - Project X Solutions
- 30 years of experience in civil and structural design and construction.
- Investigated and reported on approximately 2000 damaged or defective structures.

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

- Over 40 years of design and construction experience.
- Former Senior Lecturer – UNSW and The University of Sydney.

WORKSHOP SUMMARY

Structures fail. The investigations of these failures are a field of engineering in itself but is also something that many engineers dip in an out of in the course of their work. As another strand of this work an engineer can sometimes be called upon to help stabilise a structure that has been damaged by fire, impacts or some sort of structural failure.

An investigating engineer requires deep experience and a well-rounded understanding of the underlying physical phenomenon, engineering theory, standards, design methodologies and construction process as well as a rigorous approach to investigation and reporting.

By examining fascinating cases from national and international experience, this course will provide some of the tools necessary for an engineer to investigate failed or damaged structures.

Additionally, knowledge of the environments and situations that can lead to failure can help design and construction professionals avoid their own mistakes. This is a form of risk management; it's far better to learn from someone else's mistakes than your own!

PROGRAMME *(8.30am AEDT Zoom invite will be emailed)*

9.00 - 11.00 Session 1 *(Paul Davis)*
- INTRODUCTION, SYSTEMIC CAUSES OF FAILURE & THE PHYSICAL INVESTIGATION

After introductions, we examine the human and technical factors that can lead to a structural fault and then look at how we might go about the site investigation the failure or damage.

- Systematic Causes:
  - Education
  - Experience
  - Uncertainties
  - Design environment
  - Design processes
  - Chain of responsibility
  - Construction
- Investigation techniques:
  - Investigation team
  - Initial investigation
  - Dealing with emergency services, professionals, media and stakeholders.
  - Safe investigation methodology
  - Stabilisation – "make safes"
  - Recording methods
  - Gathering evidence

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 *(Paul Davis)*
- TECHNICAL REPORT WRITING

Technical report writing demands a clarity of approach and style which can be beneficial in fields beyond forensic engineering. The session includes:

- Language
- Layout
- Style
- Common mistakes
- Professional responsibilities
- Logical argument structures
- Practical exercise

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 *(Paul Davis)*
- CASE STUDIES: MATERIALS

The examination of real world failures helps us learn from the past and examine our own practices. With a focus on materials this session includes:

- Steel
  - Large portal frame roof collapse
  - Walkway collapse
  - Portal frame in cyclone
  - Floor dynamic failure
  - Bridge collapse
  - Arch collapse
- Concrete
  - Precast failures
  - Tilt Up wall collapses
  - Waterproofing
  - Ground slabs
  - Reinforced concrete failures
- Timber
  - Roof failures
  - Deflection Failures
  - Dynamic Failures
- Masonry
- Geotechnical
  - Retaining walls
  - Residential slabs
  - Bored pier failures
- Practical exercise

3.00 - 3.15 Afternoon Tea

3.15 - 5.00 Session 4 *(Paul Uno)*
- CASE STUDIES: ACTIONS

We continue our examination of real world failures with a focus on actions. This session includes:

- "Regular" actions:
  - Live loads
  - Wind
  - Snow
  - Earthquake
- "Exotic" actions
  - Fire
  - Water
  - Material deterioration
  - Impacts
- Practical exercise
- Course review

Certificate of Attendance will be emailed

Live streamed via zoom

- One day course – **$795 pp**

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

INDUSTRIAL PROCESS HEATING WITH THERMAL FLUIDS DESIGN WORKSHOP

GEOFF SENIOR

- Over 40 years' experience in industrial process heating with thermal fluid.
- He has successfully designed, supplied, manufactured, installed, commissioned and serviced almost 300 systems.
- Geoff is currently providing consulting services in this area.

Live streamed via zoom

NEW COURSE

WORKSHOP SUMMARY

This course addresses the basic parameters of what constitutes a "thermal fluid system". It explains the various types of examples e.g. Heaters, Pumps, Piping and Appliances where special heat transfer liquids are recirculated in a closed loop through a heater in conjunction with heat exchangers in industrial processes.

PROGRAMME *(8.30am AEDT Zoom invite will be emailed)*

9.00 – 11.00 Session 1 - WHAT IS A THERMAL FLUID

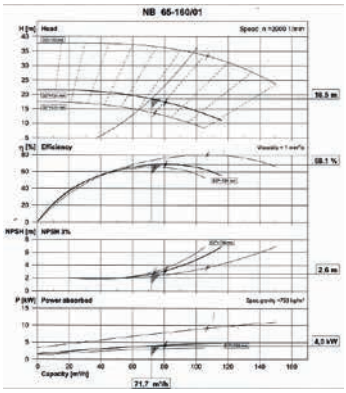
- Thermal fluids
- Thermal Fluid Systems
- HTO (Heat Temperature Oil)
- HTF (Heat Transfer Fluid)
- Water requirements
- Steam
- Mineral Oils
- Synthetic Fluids
- Velocity parameter
- Differential Temperature
- Pressures Drop
- Energy Input
- Surface Area parameter
- Specific Heats

11.00 - 11.15 Morning Break

11.15 – 1.00 Session 2 - ATTRIBUTES OF A THERMAL FLUID SYSTEM FOR GOOD DESIGN

This session will address the significant attributes of a thermal fluid system required for good design and how to structure a system design.

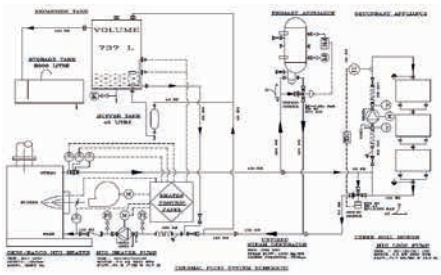
- Constant Fluid Flow
- Bypass Capacity
- Temperature Difference across the Appliance
- Primary and Secondary Circuits
- Control Valve Operations
- Pipe Sizing
- Drain Valves
- Unfired Steam Generators
- Roll Industrial Ironers
- Pressure Balance Compensation
- Secondary Loop Pipework
- Buffer Expansion Volumes
- Storage Vessels



1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 - DESIGN PROJECT - 'HOW TO STRUCTURE A GOOD DESIGN SYSTEM'

- Appliance verification
- Flows
- Circuits
- Control valves
- Heater selection
- Piping, pressure losses
- Pump requirements
- Expansion system
- Shell & Tube Heat Exchangers
- Resins parameters



A worked example will be covered in detail, addressing the following topics:

- Density
- Flow Rate
- Specific Heat
- Pressure Demand
- Insulations
- Pressure Differential
- Appliance Selection
- Use of appropriate nomographs where available
- Buffer Vessel Size
- Drain Valve requirements
- Paint protection
- ANSI Rating

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - INSTALLATION, COMMISSIONING & CHECKING

- Vibration monitoring
- Alignment
- Bunds around pumps
- Drainage of bunds for fire control
- Fire control in pump areas
- Location and Installation of Expansion Tanks
- Dangerous Vapours
- Location of Control Panels
- Access for Maintenance
- Vents and Personal Safety
- Commissioning (& Pre-commissioning) not being rushed
- Control valves
- Orifice Plates
- Bypass ports and Outlet ports
- Bearing Housings
- Electrical Sensor polarity
- Overload and Protection circuits
- Earth Leakage
- Air Testing
- Venting
- Burner compliance

Certificate of Attendance will be emailed

- One day course – **$825 pp**

FURTHER INFORMATION

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

MASONRY DESIGN WORKSHOP (to AS3700-2018)

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

- Over 40 years of experience in the design and construction industry.
- Former Senior Lecturer – UNSW and University of Sydney
- Inspected many concrete and clay masonry structures and written numerous reports on why masonry structures have failed.

Live streamed via zoom

PROGRAMME *(8.30am AEDT Zoom invite will be emailed)*

9.00 - 11.00 Session 1
- MASONRY MATERIALS
- CLAY, CONCRETE, AAC, MORTARS, RENDERS

Raw Materials

- Materials used to make clay, concrete and AAC masonry structures.
- Cement types (GP, GB and Masonry cement), lime, SCM's (eg flyash), sand types and grading (beach, brickies and river sand), aggregates (eg basalt, scoria), water thickeners, admixtures (eg air entraining agents).
- Requirements for grouts used in hollow core masonry construction.
- How these materials are manufactured (eg clay vs concrete vs calcium silicate vs AAC)

Masonry Units

- Types of masonry available, their function and code identification (eg 20.01 hollow blocks vs 20.42 Notch vs 20.48 H block).
- Extruded vs pressed clay bricks vs hollow unit clay bricks, concrete bricks and hollow core concrete masonry blocks (including the different types of units available in various Australian states).
- How masonry unit strength is different to masonry wall strength.

Mortars, Renders, Oxides

- Mortar mixes required to satisfy AS3700-2018 (ie M1, M2, M3, M4) and the factors affecting the choice of these mortar classifications.
- Factors such as exposure to the elements [protected, general purpose, exposure (Mild, Moderate, Marine, Industrial)]
- Recommended types of render mixes (eg CIA publication "Render Finishes")
- Problems that can occur when the incorrect mix is used especially under adverse dry weather conditions.
- Colour oxides used in mortars and renders (ie colour vs quantity).
- Methods for cleaning brickwork and mortar restoration (eg pointing)

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2
- DURABILITY, TESTING, CLEANING, JOINTS, WALL TIES, DPC, FLASHING, LINTELS

Durability & Moisture

- Exposure classifications (eg industrial, marine) and how they dictate the choice of mortar class used (eg M4), component class (eg R4) and cover to reinforcement (in accordance with Table 5.1 AS3700-2018).
- Masonry unit suction and moisture absorption plus salt crystallisation and attack, waterproofing and masonry cleaning.

Joints, Wall Ties & DPC

- Mortar joints (raked vs flush); brick bond patterns (eg stretcher vs stack bond), corbelling, perpends, articulation joints (in accordance with Table 4.3 AS3700-2018).
- Spacing and choice of wall ties (L, M, H) will be covered with respect to their strength and durability requirements to satisfy AS2699 and AS3700 (eg R1-R4 class, plain vs galvanised vs stainless).
- Damp Proof Course and Slip Joint materials (in accordance with AS/NZS 2904).

Testing & Failures

- Tests on mortar &masonry units eg scratch test (vs chemical analysis), masonry compression tests, bond wrench tests, modulus of rupture.
- Test results of concrete unit shrinkage vs clay unit expansion.

CALCULATORS REQUIRED

Lintels

- Steel and reinforced masonry lintels.
- Load distribution, arching, galvanising, safe load lintel tables, composite action, propping, angle vs T-beam vs flat bar choices, lintels for various construction systems.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3
- UNREINFORCED MASONRY DESIGN (including Masonry Veneer & Cavity Walls)

Structural Design

- Structural design of grouted and ungrouted masonry walls for vertical compressive loads, concentrated loading, one way bending (vertical and horizontal) and two-way bending, in plane and out of plane shear, and joint articulation.
- The effects of modes of failure, slenderness for walls for both 'simple rule' requirements and 'refined methods' as outlined in section 7 of AS3700-2018.
- Effective and minimum eccentricity, lateral instability and local crushing, perpend spacing, wall stiffening effects using engaged piers (in accordance with table 7.2 from AS3700-2018).

Masonry Veneer & Cavity Walls

- Masonry veneer and cavity (double brick) design and construction in the various Australian states including the relevant AS3700-2018 code requirements for these forms of construction.
- Tutorials will follow (with worked solutions).

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- REINFORCED MASONRY DESIGN

- Reinforced concrete design applied to reinforced masonry design.
- Explanation of all the formulas in the AS3700-2018 code (with worked examples).
  - This includes reinforced clay and concrete masonry subjected to Compression, Bending and Shear.
- Tutorial exercise on reinforced masonry design at the end of the session (with worked solutions).

Certificate of Attendance will be emailed

- One day course – **$760 pp**

FURTHER INFORMATION

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

RESIDENTIAL SLABS & FOOTINGS

PAUL UNO

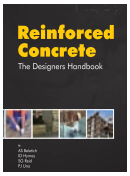
BE MBdgSc MIE(Aus) CPEng NER RPEQ APEC Engineer IntPE(Aus)

- Over 40 years' experience in the design & construction industry.
- Former Senior Lecturer – UNSW and University of Sydney.
- Inspected many concrete slabs and footings as well as written numerous reports on why slabs have failed.

Recommended Text:

Reinforced Concrete: The Designers Handbook
(2015 Revised Edition)

Beletich, Hymas, Reid and Uno



Live streamed via zoom

WORKSHOP SUMMARY

This course is aimed at civil and structural engineers in Australia and New Zealand who wish to design residential slabs and footings to either the current Australian Standard AS2870-2011 or NZ B1 Building Code, Structure NZ (inc Amdt 19) which is referenced in NZS 3604 Section 17, Expansive soils, or, by Basic Structural Engineering Principles.

This workshop will cover relevant topics relating to slabs and footings over the 2 day period and will also address FINE (GEO5) software.

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

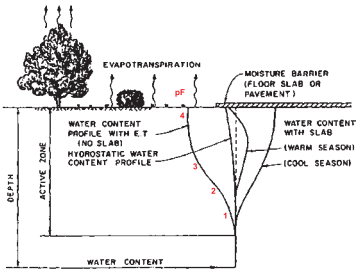
9.00 - 11.00 Session 1 - SOIL PROPERTIES AND SOIL SUCTION

- Clay mineralogy and swelling potential (Kaolinites, Illites, Montmorillonites)
- Clay cracking potential eg 2:1 vs 1:1 clay types
- Expansive clays distribution map for Australia
- Soil Salinity vs Soil Sodicity and its effect on Soil Swelling vs Concrete Degradation
- Soil Suction parameters (ie Matric vs Osmotic suction) vs Total Soil suction (pF scale)
- Effects of Sulphates in soil
- Soil Electrical Conductivity Extract (Ece in dS/m) vs Osmotic Suction values (kPa)
- Cation Exchange Capacity (CEC) & Activity ratio (AR) for various clays
- Thornthwaite Moisture Index (TMI) and its relationship to Soil Suction Change Design Depth (H_s)
- Atterberg Limit Tests vs Shrink vs Swell Tests (as per AS1289)
- Correlation regression: Shrink-Swell Tests vs Atterberg limits (eg LL, PL, PI and LS)
- Shrink-Swell Index (I_{ss}) Soil properties
- Soil Classifications (S, M, H1, H2, E)
- Site Classifications (including P sites)
- Tutorial 1 (Soil Properties)

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 - SITE CLASSIFICATION AND SWELLING POTENTIAL (including effect of Trees and Cut/Fill)

- Determination of Site Classifications (including P sites), Soil Suction Change Design Depth (H_s), and Characteristic Surface Movement (y_s)
- Example on calculating the surface movement y_s using soil shrinkage index values, suction values, soil layer thicknesses to then achieve a site classification (eg M, H1, H2, E)
- Determination of Surface Movement and Suction Design Depth due to Trees ie (y_t) and (H_t)
- Design suction change profiles
- Determination of Crack Depths
- Effect of Cut and Fill
- Effect of Trees on y_s and H_s
- Tutorial Exercise 1 (Soil suction only)
- Tutorial Exercise 2 (Soil suction including effect of trees)
- Tutorial Exercise 3 (Soil suction including cut and fill effects)



1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 - DOMESTIC CONSTRUCTION CONSIDERATIONS (as per AS2870)

- Clad frame vs articulated masonry veneer vs masonry veneer, vs articulated masonry full vs full masonry (ie double brick), and the footing systems that are appropriate for those construction types
- Requirements of articulation in masonry walls (as per CCAA TN61)
- Footing systems include raft slab, footing slab (ie SOG), waffle slab, stiffened slab and strip footing
- Compaction of fill (rolled, controlled, sand and non-sand) in accordance with AS2870
- Drainage issues eg leaking pipes, poor drainage, pavement slope
- Incorrect usage of waffle pod system and potential litigation
- Properties of the polystyrene pods including proper disposal
- Pros and cons of using a waffle pod slab system
- Requirements of Steel Reinforcement
- Other void systems (eg domes)
- Measures to provide effective site drainage
- Tutorial Exercise

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - CONCRETE MIX DESIGN AND ON-SITE CONCRETE PLACEMENT ISSUES (eg Cracking)

- Materials used in concrete mixes for house slabs and footings (including flyash blends and market branding eg builders cement)
- Effect of Sulphates on Concrete used in domestic construction
- Polythene (ie polyethylene) VPM and DPM underlay requirements (as per AS4347.6)
- Water to cement ratios (including effects of slumps 80mm, 100mm and above)
- Typical Concrete Mix designs used in residential concrete.
- Types of cracking common to residential slabs (eg plastic shrinkage cracking, plastic settlement cracking and longer-term drying shrinkage) and use of trimmer bars
- Minimization of cracking on slabs by attention to weather conditions (ie temperature, humidity and wind speed) to be able to quantify the potential for plastic shrinkage cracking
- Use of admixtures, evaporative retarders and curing compounds (to assist in cracking minimization)
- Non-structural crack issues (ie crazing, dusting, durability and corrosion control points, especially in saline soils)
- Proper joint saw cutting techniques (where required)
- Effects of deteriorated wall ties and omission of slip joint material
- Effects of using low ductility mesh in suspended concrete slabs
- Relationship between concrete slab crack size and termite entry

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DESIGN WORKSHOP

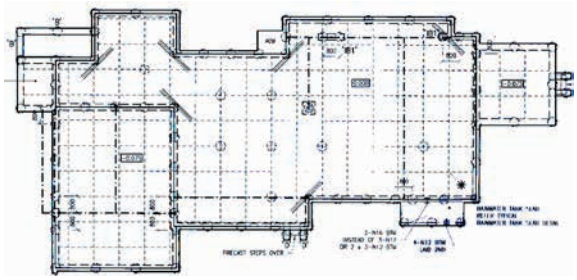
ENGINEERING TRAINING INSTITUTE AUSTRALIA

DAY 2

9.00 - 11.00 Session 5
- SOIL CAPACITY, APPLIED LOADS, ULTIMATE vs ALLOWABLE BEARING CAPACITY

- Soil Cohesion (C_u) and (C') vs Soil Angle of Internal Friction (ϕ)
- Drained vs Undrained Soils
- Soil Test Correlations DCP vs SPT vs y_s
- Typical dead loads on domestic slabs and footings (eg roof tiles, studs, frames)
- General Applied Loads (and Pressures) as per AS/NZS 1170.1
- Soil Bearing Capacity - Allowable vs Ultimate
- Basic Terzaghi (and Vesic) formulas to determine ultimate bearing capacities for rectangular, strip and circular footings.
- Tutorial Exercise (referenced in NCC (Aust) and NZS 3604 Section 17, Expansive Soils, Building Code B1).

11.00 - 11.15 Morning Break



11.15 - 1.00 Session 6
- SLAB DESIGN: Standard (Deemed to Comply) Method #3.0-AS2870 vs Chart 4.1

- Use of Chart 4.1 in Section 4.0 of AS2870 (and its derivation) in order to determine the footing beam depth
- Effective Slab Widths applicable to slabs in domestic construction
- Uncracked vs Cracked Second Moment of Area calculations (ie MOI)
- Beam depth, spacing and minimum reinforcement, trimmer bars
- Suspended slab design in domestic construction
- Tutorial Exercise

1.00 - 1.30 Lunch Break

CALCULATORS REQUIRED

Differential mound movement (mm), $y_m = 0.7\, y_s$

Edge distance from centre-heave (m), $e = \frac{H_s}{8} + \frac{y_m}{0.036}$

Edge distance from edge-heave (m), $e = 0.2\, L \quad \leq 0.6 + \frac{y_m}{0.025}$

Download *FINE GEO5* demo version via the link
www.etia.net.au/geo5-demo-version

Settlement

Spread Footing

1.30 - 3.00 Session 7
- ENGINEERED DESIGN (#4.0 AS2870) plus Steel Screw & Bored Concrete Piers Design

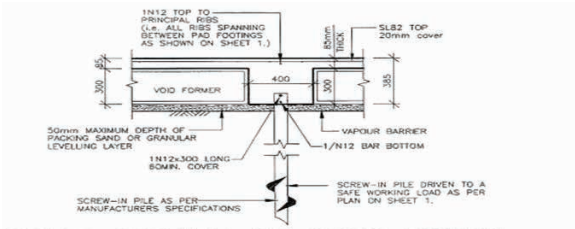
- Centre Heave (sometimes referred to as Hogging or as Edge Drop)
- Edge Heave (sometimes referred to as Sagging or as Edge Lift)
- Structural Design of Concrete Piers/Piles
- Structural Design of Steel Screw Piers for domestic beam and slab construction (using Individual Bearing method vs Cylindrical Shear method) and accounting for potential punching shear failure according to IPENZ Note 28 document and overseas documents
- Winkler method vs Walsh Method vs Mitchell Method
- Use of FINE (GEO5) Beams and Slabs on Elastic Foundations software
- Tutorial Exercise

3.00 - 3.15 Afternoon Break

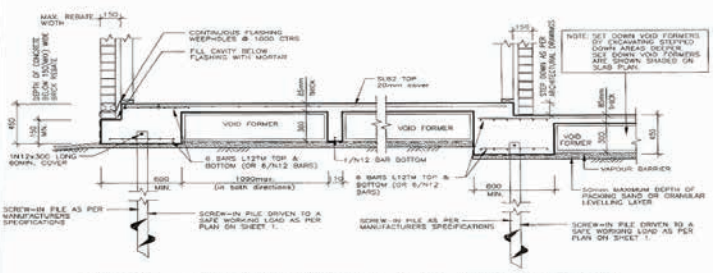
3.15 - 5.00 Session 8
- HOUSE SLAB DESIGN EXAMPLES

- Estimation of Wall loads, Roof loads and Floor loads (as per AS1170.1 and AS2870)
- Structural design of various concrete slabs using house plans from start to finish using both Stiffened Raft (conventional method) and Waffle Pod (Rib Raft) methods for various soil types eg M, H, E (incl. effect of trees) in various combinations, for example:
  - Single Storey home – Rectangular house plan – SOG Design
  - Single Storey home – Non-Rectangular house plan – Slab on Ground (SOG) Design
  - Double Storey home -Rectangular house slab plan + Suspended concrete slab

Certificate of Attendance will be emailed



TYPICAL PRINCIPAL RIB CROSS SECTION SCALE 1:20



TYPICAL SUSPENDED WAFFLE SLAB CROSS SECTION
(DOUBLE STOREY AREA)

Live streamed via zoom

- Two day course – **$1,590**

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.*

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

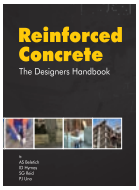
REINFORCED CONCRETE DESIGN WORKSHOP – MODULE ONE

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 Senior Lecturer – UNSW and University of Sydney.
- Chairman of the Australian Standards committee BD-066 for the Tilt-Up & Precast (Prefabricated) Concrete Standard AS3850.

Recommended Text:

Reinforced Concrete: The Designers Handbook
(2015 Revised Edition)
Beletich, Hymas, Reid and Uno

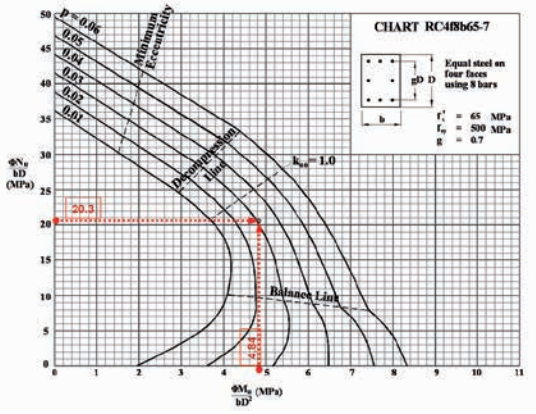


WORKSHOP SUMMARY

Civil and Structural engineers will be using 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 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 basic structural checks by hand or quick estimates of size and reinforcement requirements.
The use of simple charts can 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 AEDT Zoom invite will be emailed)*

9.00 - 11.00 Session 1 - BASICS OF AS3600-2018

- New ϕ factors explanation
- Load Combinations to AS/NZS 1170.0
- Material Properties eg. Concrete Modulus E, Creep & Shrinkage
- Flexural Strength f'_{cf}, 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
- Design Charts
- Ductility Requirements using 500 MPa steel
- Rectangular beams, T beams
- 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

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

CALCULATORS REQUIRED

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
- New Bischoff I value formula (replacing Branson)

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

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 as per AS3600-2018
- Curtailing reinforcement

Certificate of Attendance will be emailed

Live streamed via zoom

- Two day course – **$1,470**

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.*

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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.
- Former 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 *(8.30am AEDT Zoom 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

- Two day course – **$1,520**

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.*

Live streamed via zoom

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

TIMBER DESIGN WORKSHOP

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

- Over 40 years' experience in design & construction.
- Former Senior Lecturer University of Sydney
- Lectured on Timber Materials at UNSW.

PAUL DAVIS

BE(Civil) MIE(Aust) CPEng NPER

- Director - Project X Solutions
- Monthly columnist in a timber industry news magazine.

Live streamed via zoom

WORKSHOP SUMMARY

This workshop addresses the engineering behind timber design as well as the requirements of AS1720 – Timber Structures.

Wood science, wood exposure and durability, insect attack, moisture and shrinkage of wood will be addressed. The limit state design and analysis process for the various modes of failure (eg bending, tension, compression, shear) are explained in relation to dealing with timber.

The workshop addresses in detail the design of connections. Limit state flow charts are used for the design process for both strength limit state, and serviceability states. Various timber products including sawn timber, softwood and hardwood sections, LVL, GLULAM and CLT are addressed. Engineered products and their low variability including advantages, disadvantages and recommended uses are explained. Examples where good design ideas coming horribly unstuck due to a lack of basic understanding of timber are shown.

All sessions provide worked examples, tutorial exercises and solutions.

*Free 200 pg **Timber Design Guide #50 – Mid Rise Timber Building Structural Engineering**. Download from* https://woodsolutions.com.au/publications?page=5

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

9.00 - 11.00 Session 1
- WOOD & TIMBER MATERIALS

- Properties of wood before it becomes structural timber.
- Softwoods vs hardwoods, timber growth and shrinkage, plywood and its manufacture, Laminated Veneer Lumber (LVL), GLULAM, including the advantages of timber charring in fires.
- Resources from organisations such as the EWPAA will be utilized.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2
- LIMIT STATE DESIGN INTRODUCTION FOR TIMBER

- Standards AS1720 and procedures with respect to Limit State Design.
- Comparison of Limit State Design with the earlier design methods and member selection.
- Strength limit states.
- Spread sheets, hand methods and design charts.

1.00 - 1.30 Lunch (Provided at Venue)

1.30 - 3.00 Session 3
- TIMBER DESIGN FOR TENSION & COMPRESSION

- Design process for timber members subjected to 'tension' failure and then 'compression' failure.
- Buckling capacity of various timber elements.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- TIMBER DESIGN FOR BENDING, SHEAR & BEARING

- Design of bending timber members for strength. (Using hand methods, spread sheets and design charts).
- Shear loads and bearing actions on timber elements and the requirements of the Australian Standard.
- Importance of each action in the design process.
- Problems encountered if designer does not understand basic principles.

DAY 2

9.00 - 11.00 Session 5
- TIMBER DESIGN & DURABILITY FOR SERVICEABILITY

- Structural timber members may be able to withstand large applied loads without failing but this may result in unsightly deflections.
- Members may satisfy short term deflections but the long-term actions of creep may result in extreme deflections and warping.
- Short and long term actions are addressed with respect to AS1720.
- Issues regarding durability of timber.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 6
- CONNECTIONS FOR TIMBER DESIGN
- NAILS & SCREWS

- Connections design using various types of nails and screws that are available and are used in the timber marketplace.
- Timber connections requirements of AS1720, with respect to nails and screws.

1.00 - 1.30 Lunch Break

CALCULATORS REQUIRED

1.30 - 3.00 Session 7
- CONNECTIONS (CONTINUED)
- BOLTS, DOWELS, RIVETS, SPECIAL CONNECTIONS

- Connections session examines the use of Bolts, Dowels and Rivets in Timber members.
  - Various formulas and requirements of AS1720 that govern connection design and how to use these formulas.
- 'Special connections' available in the marketplace and why they need to be used.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 8
- NEW METHODS IN TIMBER ENGINEERING

- New products and timber software in the marketplace.
- Cross-laminated timber slabs, columns and shear walls, Epoxy dowel injected connections, hidden plate and dowel pin connections.
- Future in timber engineering.
- New technology in timber design.

Certificate of Attendance will be emailed

- Two day course – **$1,460**

FURTHER INFORMATION

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

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

PO Box 913 Baulkham Hills NSW 1755 Ph: (02) 9899 7447 Mob: 0413 998 031 Email: registrations@etia.net.au Website: www.etia.net.au

REGISTRATION DETAILS

1	**ACCOUNTING & MANAGEMENT FOR ENGINEERS COURSE**	**One-day course - $670 pp**
	ZOOM – Thu 25 March 2021 FACE-TO-FACE – Thu 25 March 2021 *(Rydges Norwest, 1 Columbia Court Baulkham Hills NSW)*	
2	**FORENSIC ENGINEERING WORKSHOP**	**One-day course - $795 pp**
	ZOOM – Thu 11 March 2021	
3	**INDUSTRIAL PROCESS HEATING WITH THERMAL FLUIDS DESIGN WORKSHOP**	**One-day course - $825 pp**
	ZOOM – Tue 16 March 2021	
4	**MASONRY DESIGN WORKSHOP**	**One-day course - $760 pp**
	ZOOM – Thu 4 March 2021	
5	**REINFORCED CONCRETE DESIGN WORKSHOP - MODULE ONE**	**Two-day course - $1,470 pp**
	ZOOM – Tue 23 + Wed 24 March 2021	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
6	**RESIDENTIAL SLABS & FOOTINGS DESIGN WORKSHOP**	**Two-day course - $1,590 pp**
	ZOOM – Wed 17 + Thu 18 March 2021	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
7	**STRUCTURAL STEEL DESIGN WORKSHOP**	**Two-day course - $1,520 pp**
	ZOOM – Tue 9 + Wed 10 March 2021	**RECOMMENDED: Steel Designers Handbook (8th Edition 2012) - $90**
8	**TIMBER DESIGN WORKSHOP**	**Two-day course - $1,460 pp**
	ZOOM – Tue 30 + Wed 31 March 2021	

BOOKING INFORMATION

- Register online www.etia.net.au
  - *'Events' tab --> 'Course List' --> Select the course you would like to attend by clicking on the course date --> Follow the prompts*
  - *You will be redirected to our online booking platform TryBooking.*
  - *You will receive an immediate tax invoice receipt & confirmation from Trybooking. Please retain for future reference.*
  - *Company group bookings of 5 or more will be eligible to receive a discount at the time of their booking. Please contact the office for further information.*

- Registrations must be received at least **five (5) working days before** the workshop, for course notes to be express posted. Registrations received after this period may result in a later delivery of course notes. Course notes are hard copy only.

ZOOM LIVE STREAMING DETAILS

- Please ensure the attendee provides their *own personal/work email* upon registration.
- Attendees will be emailed a Zoom link at 8:30am on the day of the course, to join the live stream.

TERMS & CONDITIONS

- Only registered attendees are permitted to view the online live stream.
- For accreditation purposes, participants MUST have their webcam on during the entire presentation in order to receive their *Certificate of Attendance*.
- Recording of any ETIA courses is strictly prohibited.
- Cancellations made more than 5 working days prior to a course will incur a 20% processing fee of the full registration amount.
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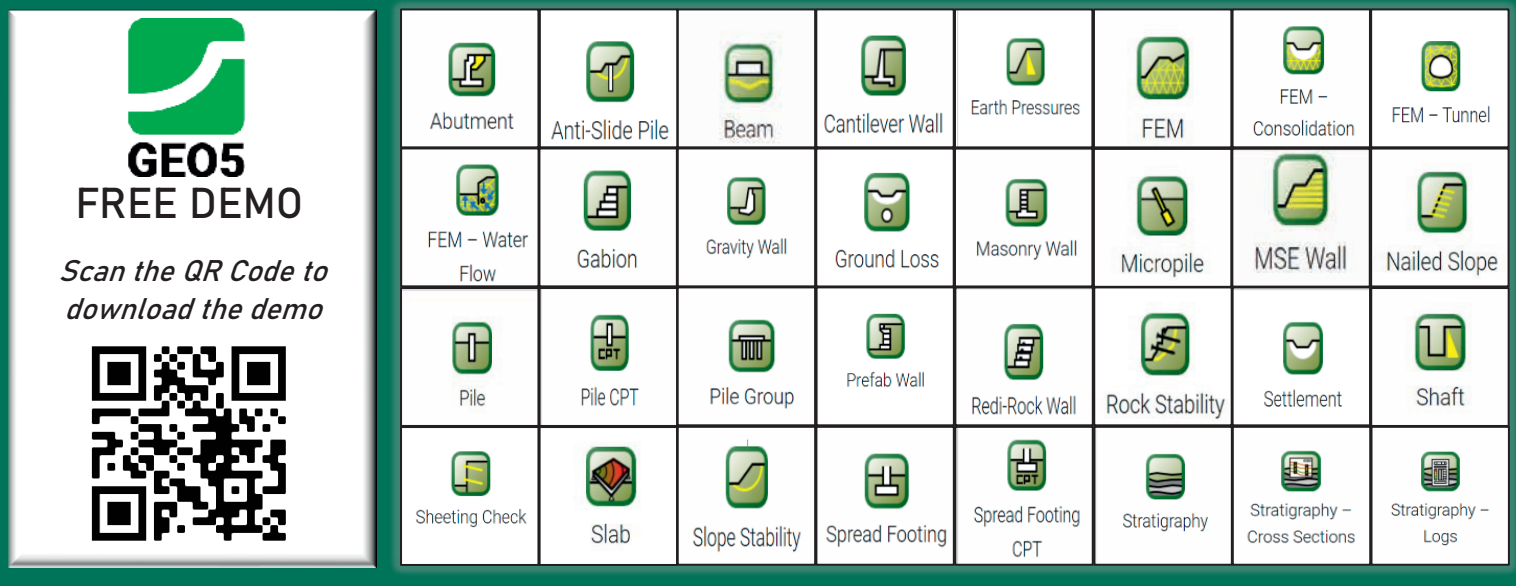
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