ENGINEERING TRAINING INSTITUTE AUSTRALIA

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

IMPORTANT NOTICE

- ALL COURSES WILL BE LIVE STREAMED (AEST).
- PLEASE REFER TO THE REGISTRATION FORM AT THE BACK OF THIS CATALOGUE (OR THE ETIA WEBSITE) FOR FURTHER DETAILS ON LIVE STREAMING.

November 2020 Courses

LIVE STREAMED COURSE LIST

- Tue 27 + Wed 28 Oct 2020 — Pile Foundations Design Geotechnical Workshop
- Thu 29 October 2020 — Wind Design Workshop: Low & Medium Rise Structures
- Wed 4 November 2020 — Wind Design Workshop: Dynamic & High Rise Structures
- Thu 5 November 2020 — Concrete Pools & Tanks Design Workshop
- Tue 10 November 2020 — Metallurgy Materials Workshop
- Thu 12 November 2020 — Shallow Foundations Design Workshop
- Tue 17 November 2020 — Retaining Walls Design Workshop
- Thu 19 November 2020 — Slope Stability Design Workshop
- Tue 24 November 2020 — Blast, Fire & Progressive Collapse Workshop
- Wed 25 + Thu 26 Nov 2020 — Glass & Aluminium Façade Design Workshop
- Tue 1 December 2020 — Value Engineering: Principles & Applications Course

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

BLAST, FIRE & PROGRESSIVE COLLAPSE WORKSHOP

(Structural Robustness for Extreme Events)

NEW COURSE

DR. FARSHAD REZVANI

BEng MEng PhD RPEQ NER MIEAust

- Senior structural engineer (RBG)
- 14 years of experience in civil and structural design.
- Extensive research in progressive collapse assessment of structures.

Live streamed via

zoom

WORKSHOP SUMMARY

This workshop is aimed at practicing civil and structural engineers, and consultants working in the areas of structural design, construction and remediation of reinforced concrete and post tensioned concrete buildings and bridges.

Structures may be subjected to various hazards during their service life, which may affect their overall structural response in an unfavourable manner. Most building codes only suggest general recommendations for mitigating the effect of progressive failure in structures that are overloaded beyond their design loads.

Robustness is a term used to describe the ability of a structure to withstand unforeseen events, without being damaged to an extent disproportionate to the original cause. A structure that is robust will not collapse in progressive manner. Blast, fire, vehicular collision, etc are the potential extreme hazards that may lead to this catastrophe.

This workshop will address progressive collapse resistant design of steel and concrete buildings subject to extreme events based on internationally accredited design codes.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1
- EXTREME EVENTS

- Background and challenges: review of some of the events that have led to collapse of structures and the changes in the design codes to mitigate the risk of progressive collapse.
- Extreme events and their effect on structural elements: physical expression of abnormal loading such as blast, fire, and impact and their effects on structural behaviour.
- Building codes and extreme events: review of design codes for progressive collapse resistant buildings.

11.00 - 11.15 Morning Break

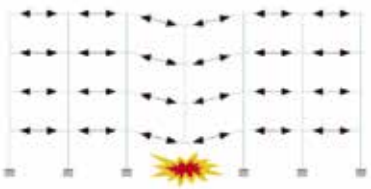
11.15 - 1.00 Session 2
- DESIGN APPROACHES

- Direct and indirect design approaches: Summary of explicit and implicit considerations of resistance to progressive collapse during the design process
- Tie Force Method: required tie strength, distribution, and location
- Alternate Path Method: Capability of the structure to bride over a missing structural element with the resulting extent of damage being localized
- Analysis procedure: linear static, nonlinear static, and nonlinear dynamic analyses to assess progressive collapse potential and design to mitigate the risk of it.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3
- PROGRESSIVE COLLAPSE RESISTANCE

- Force- and Deformation-controlled actions: definitions, examples, and classification for primary and secondary structural elements
- Structural Modelling and acceptance criteria: how to model structural elements and assess progressive collapse potential
- Alternate Path method requirements for structural steel and reinforced concrete: Design strength and rotational capacity of structural elements and connections

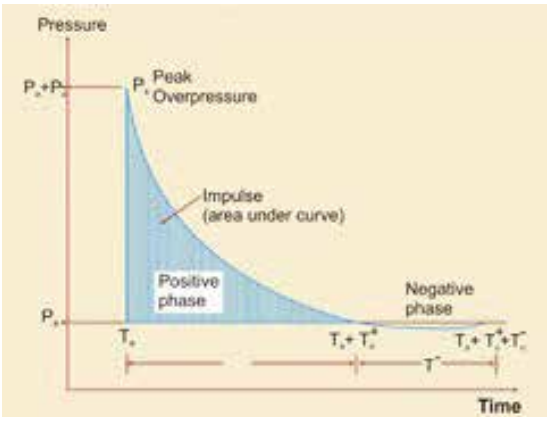


3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- DESIGN EXAMPLE

- Design and modelling assumption: description of the structure, baseline preliminary design, and modelling approach
- Analytical modelling: using computational analysis and design packages.
- Progressive collapse potential assessment and preliminary design modifications through various analysis and design procedures.

Certificate of Attendance will be emailed



COURSE COST

- 1 day course – **$860 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

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

CONCRETE POOLS & TANKS DESIGN WORKSHOP

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

- Over 40 years of experience in specification, design & construction phases of tanks.
- Assessed other engineers' tank designs and reasons for cracks in concrete tanks.
- Devised the internationally recognised bleed water evaporation E formula $E = 5[(Tc+18)^{2.5} - r(Ta+18)^{2.5}](V+4)x10^{-6}$ which is used to determine the likelihood of Plastic Shrinkage Cracking.
- Part-time Senior Lecturer – UNSW and The University of Sydney.

Recommended Text:

Reinforced Concrete: The Designers Handbook
(2015 Revised Edition)

Beletich, Hymas, Reid and Uno

WORKSHOP SUMMARY

This full day workshop is primarily aimed at design engineers and anyone with a technical background needing to perform simple structural designs or design checks on any form of liquid retaining structure (eg reservoirs, water retaining structures and pools).

The interest in saving water has focussed attention on tank design, ensuring that tanks are designed and constructed correctly to address the needs of the community for years to come.

This workshop is particularly appropriate for swimming pool construction. This type of structure needs to be able to withstand the extremes of prolonged drying conditions, high evaporation rates and the need to empty and fill tanks without the problems of crack initiation, efflorescence and other durability issues during this period.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1 - CONCRETE PROPERTIES & DURABILITY ISSUES

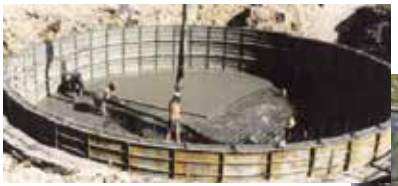
- Cement and concrete materials required to produce water tight & durable concrete structures. (ie low shrinkage cements, silica fume, flyash and slag blends, carbonation, chloride ingress and sorptivity effects in various concrete grades).
- Causes for concrete cracking, particular plastic shrinkage cracking, plastic settlement cracking and semi-plastic thermal cracking.
- Mix designs required for correct pumping or spraying of concrete (in accordance with Z12, EFNARC and ACI 506R).

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 - AUSTRALIAN & OVERSEAS DESIGN STANDARDS

- Australian and overseas Standards (including various State Water Authorities) e.g. AS3735 (Liquid Retaining Structures Code), AS2783 (Swimming Pool Code), CIRIA 91 and CIRIA C660 (Early Age Thermal Crack Control in Concrete), WSA (Water Services Association), BS8007 (previously incorporated in BS5337), Eurocode EN1992-3 (2006) and PCA-USA as well as the requirements for crack control according to AS3600-2018.
- Crack width criteria showing the reasons for certain maximum crack width sizes and the testing done to establish these values.
- Effects of surrounding materials and environment including the quantification of these effects via indices such as the Ryzner Index and Langelier Saturation Index (as referenced in AS3735).
- Typical mix designs and minimum w:c ratios for water retaining structures (including modern admixtures eg. polycarboxylate ethers)

1.00 - 1.30 Lunch Break



1.30 - 3.00 Session 3 - STRUCTURAL DESIGN

- Methods of simple design to check or carry out:
  - Simple structural design for a circular and rectangular tank wall
  - Floor design using H^2/Dt (shape factor) vs M charts and 'beam on elastic foundation' theory.
- Hoop stress and hoop reinforcement, vertical stress and vertical reinforcement, maximum crack width and crack control.
- Methods of quantifying crack width using crack width formulas.
- Cracking caused by excess heat differential in thick walls and floors (in accordance with the CIRIA C660-2007 and C766-2018).
- Tutorial exercises allow attendees to carry out quick hand checks on wall thickness and reinforcement required to satisfy tank actions (liquid loads), base conditions (rigid vs free) and soil conditions.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - CONSTRUCTION ISSUES

- Key areas that should be addressed on site to ensure that cracking does not occur due to construction oversights.
- Issues such as correct choice of formwork (timber vs steel), blowhole minimization, formwork removal timing permeable form-liners, correct choice of vibrator, evaporation control, concrete testing regime, water-stops (both hydrophilic and hydrophobic) and joints (including dowelled and key joints).
- Tank repair options if cracking does occur including material choices (epoxy, polyurethane, vinyl ester).

Certificate of Attendance will be emailed

CALCULATORS REQUIRED

Live streamed via zoom

COURSE COST
- 1 day course – **$700 pp**

DATES, VENUES & REGISTRATION
- *Registration form (back of catalogue)*
- *Visit our website* www.etia.net.au

FURTHER INFORMATION
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ENGINEERING TRAINING INSTITUTE AUSTRALIA

GLASS & ALUMINIUM FAÇADE DESIGN WORKSHOP

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

- Master's degree (University of Sydney) on the acoustic topic of '*Transmission Loss of Building Facades*'
- Provided structural design testing for many high-rise glazing curtain wall systems in Sydney including:
  - 20 Elizabeth St Martin Place (originally called The State Bank)
  - ABC Radio and Orchestra building at Ultimo
  - 338 Pitt St Sydney; 66 Clarence St, Sydney
  - 88-90 Arthur St North Sydney
  - 127-141 Walker St North Sydney
  - 32 Phillip St Parramatta
  - 875 Pacific Hwy Pymble
  - IBM Headquarters Frenchs Forest
  - Designed the steel rafter support system for the Triangular Glass Skylight (Area 6) Parliament House, Canberra.
- Previous employment: H.H. Robertson (taken over by Pilkington) as an Engineering Services Manager (Architectural Walls Division) and NATA approved laboratory signatory for a 9m x 11m x 2m x 6kPa test rig; Engineering Manager at Australco (curtain wall company).
- Since 2015, he has lectured on the topic of 'inferior aluminium cladding and its proven fire hazard to high-rise buildings' at UNSW and the ETIA Risk Management Workshop (e.g The Al Tayer Tower, Dubai 2013, and The Torch, Dubai 2015).

ANDREAS BOOMKAMP

MIEAust CPEng RPEQ CMEngNZ

- National Technical Manager for Ancon Building Products in Australia and NZ.
- Responsible for product compliance and custom designs of Ancon's products in Australia and New Zealand.
- Chartered structural Engineer with over 10 years of experience for anchorage in concrete, lifting of precast concrete and connecting concrete systems.

WORKSHOP SUMMARY

This two-day course will cover the topic of glass and aluminium facades (also known as Curtain Walls) for medium to high rise buildings. The Standards that will be highlighted include the Glass Standards AS1288 and AS4666, the Aluminium Standard AS1664 and the façade testing Standard AS4284 and AS 2047.

The structural design of glass panes in window frames as well as the structural design of the aluminium that contains the glazing will be addressed. There will be a primary focus on the design of these facades to wind loads (as per AS1170.2) and AS1288. The testing procedure for such facades according to Australian Standard AS4284 (Sirowet test) and AS2047 will be explained, along with real life examples.

All sessions provide worked examples, tutorial exercises and solutions.

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

9.00 - 11.00 Session 1 - GLASS PROPERTIES (incl. THERMAL)

Glass Types

- Annealed
- Laminated
- Heat Strengthened
- Toughened
- Double Glazing or Insulated Glazed Units (DGU or IGU)
- Pigments used to produce coloured glass
- Detrimental Nickel Sulphide inclusions in glass
- TUTORIAL

Thermal & Energy rating systems

- U value vs R value vs Low 'e' coatings
- SHGC formula and values
- T_{vw} value
- Air Infiltration value
- Thermal Cracking of Glass
- BASIX rating system
- TUTORIAL

11.00 - 11.15 Morning Break

11.15 – 1.00 Session 2 - GLASS ACOUSTICS

Sound Insulation

- Acoustic terminology: STL vs (R_w+ C_{tr}) vs STC and L_A or L_{eq}
- Double Glazing – Acoustics vs Condensation vs Heat Flow
- BCA (NCC) & Aust Standards eg AS1276, AS1191, AS2253
- TUTORIAL

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 - HIGH RISE WIND DESIGN TO AS1170.2

Medium to Tall Structure Wind Design to AS1170.2

- Terrain Categories
- Wind pressure derivations for medium to tall structures
- Direction Multipliers
- Local Pressure factors for Glazing and Cladding
- K factors for wind design in high rise
- Effects of Shielding from other buildings
- Shear loads on buildings from wind and earthquakes
- Drift and Façade Displacement
- TUTORIAL

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - GLASS PANEL WIND DESIGN TO AS1288

Wind Design for Glazing

- Wind Pressures vs Span Tables
- Two (2) edge vs Four (4) edge support
- Glass Aspect Ratio
- Glass Tensile Strength vs Membrane Action
- Linear vs Non Linear Analysis
- 'Edge' pressure vs 'Away from Edge' pressures
- Glass Fin Design
- Localised glass cracking (Butterfly effect)
- Safety Glass requirements
- Stress Concentrations
- TUTORIAL

Sealants, Gaskets and Tapes

- Silicone Sealants -Silicones vs Polyurethanes
- Other types of sealants
- Acetic vs Neutral cured sealants
- Bite Calculations
- Failure causes in Sealants
- Gaskets – Neoprene vs EPDM
- Shore A Hardness of Spacer blocks
- TUTORIAL

CALCULATORS REQUIRED

Live streamed via zoom

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— CURTAIN WALLS IN MEDIUM TO HIGH RISE STRUCTURES

DAY 2

9.00 - 11.00 Session 5
- ALUMINIUM PROPERTIES AND STRUCTURAL DESIGN

Aluminium design to AS1664

- Anodized Surfaces vs Coatings
- 6061 vs 6063 vs 6060
- Tempers eg T4 vs T5
- Hardenability Treatments
- Structural requirements and applications of AS1664
- Yield vs Tensile Strength
- Allowable vs Ultimate Stresses
- Bending vs Buckling
- High thermal expansion issues of aluminium
- Slotted holes in members and brackets
- Welding aluminium issues
- Corrosion – Stainless vs Aluminium vs Galvanised Steel
- Stainless Steel (to AS4673) vs Galv. Steel (to AS4680)
- TUTORIAL

Fire and Aluminium Panels

- Composite Panels Manufacture
- Fire Issues with Polyethylene Core
- Testing for fire in composite aluminium panels
- Real life examples around the World
- Issues in Australia (e.g. Lacrosse Building)
- TUTORIAL

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 6
- CURTAIN WALL DESIGN

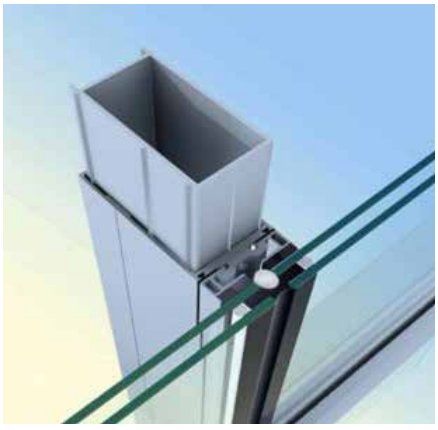
Systems and Terminology

- Stick System
- Panelised (or Unit) System
- Mullions, Transoms, Sills
- Design calculations using I_{xx} vs I_{yy} values
- TUTORIAL

Serviceability

- Serviceability deflection limits
- Support conditions (Edge vs Central)
- Vertical Differential Deflection limits
- Member tolerances
- Column member shortening
- Building sway and inter-storey drift
- Steel cast-in insert anchorage capacity in concrete
- TUTORIAL

1.00 - 1.30 Lunch Break



1.30 - 3.00 Session 7
- CONNECTIONS, DEFLECTIONS, MOVEMENT, TOLERANCES AND ERECTION

Steel Connections

- Steel to Concrete connections e.g. uni-struts
- Steel to Aluminium Member connections
- Connection pull-out capacity in concrete
- Allowance for connection expansion and contraction
- Slotted Hole patterns
- Common Errors
- TUTORIAL

Deflections, Movement, Tolerances

- Panel differential movement
- Inter-storey Drift
- Edge beam deflection
- Thermal movement effects
- Column shortening due to creep and shrinkage
- Allowable Movement Limits and Tolerances
- TUTORIAL

Erection Processes

- Panel installation
- Panel placement - From inside or from outside building
- TUTORIAL

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 8
- CURTAIN WALL FAÇADE TESTING

Façade Testing (Mock Ups) to AS2047 and AS4284

- Positive and Negative Wind pressure tests
- Air infiltration
- Proof Testing
- Water penetration testing requirements
- Real life case studies of façade testing
- Pendulum Lead Shot test vs Twin Tyre test
- TUTORIAL

Certificate of Attendance will be emailed

Live streamed via zoom

COURSE COST

- 2 day course – **$1,540 pp**

DATES, VENUES & REGISTRATION

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

FURTHER INFORMATION

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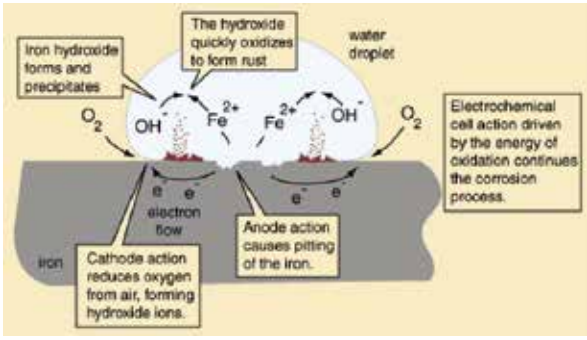
ENGINEERING TRAINING INSTITUTE AUSTRALIA

METALLURGY MATERIALS WORKSHOP

DR. GWÉNAËLLE PROUST *BE(Fr) ME(USA) PhD(USA)*

- Senior Lecturer, Faculty of Engineering and IT, at the University of Sydney.
- Gwénaëlle has written numerous journal articles on various metals and the mechanics of materials.



WORKSHOP SUMMARY

The construction industry in Australia today is going through major changes especially in light of imported building products. Engineers are therefore not only having to design structures but also now be aware of the potential variance in material properties of the construction materials used in their design. In particular, structural steels being imported into the country often vary in their chemistry and material properties compared to Australian steels.

This workshop will allow both structural and mechanical engineers to fully understand the chemical, physical and structural properties of steels and the alloys that are included within them. The course will then address the potential failure of these metals with regards to fatigue, fracture and corrosion.

Tutorial exercises (and solutions) will follow at the end of each session.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1
- IRON, CAST IRON AND STEEL PROPERTIES

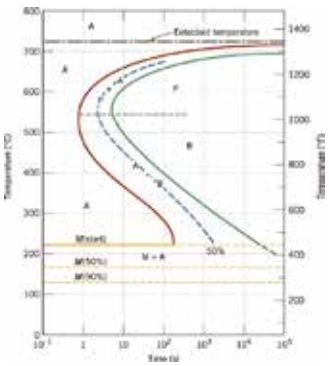
- Stages of the production of iron and cast iron and how these differ from the production of steel
- Atomic and crystalline structure of metals (including the effects of atom position and bonding), BCC vs FCC
- Typical stress strain curves for various steel types
- Elastic Modulus, Yield Strength, Strain Hardening, Ultimate Tensile strength, Ductility, Necking and Fracture.
- Tutorial

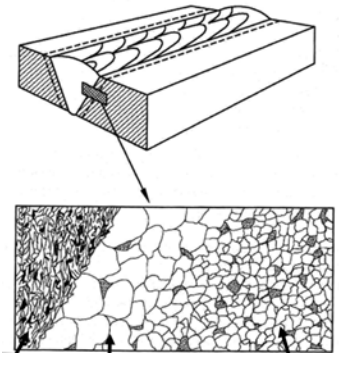
11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2
- PHASE DIAGRAMS, SOLIDIFICATIONS AND DEFECTS AND TEMPERATURE TREATMENTS

- Phases that constitute steel (eg austenite, ferrite, cementite, bainite, martensite) and the different types of microstructure components that can be present (pearlite, bainite)
- Types and effects of various alloys (eg Mn, Ni, Cr V, Co, Si)
- Effect of temperature treatments eg Annealing, Quenching and Tempering (which achieve specific types of phases and microstructure constituents such as martensite, bainite etc) which produce steels such as Q & T steels (eg Bisalloy) or outer core tempered reinforcing bars (N bars vs mesh).
- The properties and effects of defects, vacancies, grain boundaries, interstitial and substitutional atoms.
- Tutorial

1.00 - 1.30 Lunch Break





1.30 - 3.00 Session 3
- FRACTURE AND FATIGUE FAILURE OF METALS

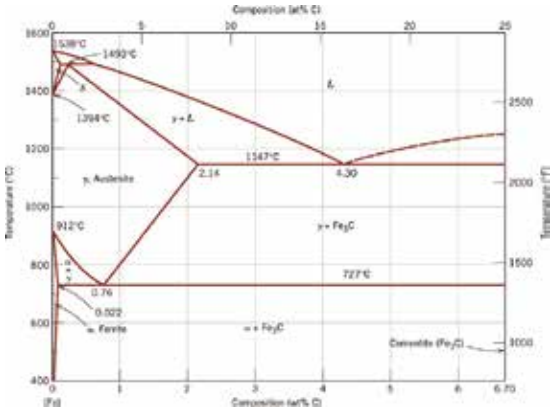
- Elastic vs Plastic failure of steel with respect to deformation
- Fracture mechanics of metals (and how to measure it experimentally)
- Importance and determination of crack widths
- Interpretation of fatigue strength vs no of cycles graphs
- Methods of improving fatigue life in structures
- Determination of steel failure (ie yielding vs fracture)
- Tell tales signs of impending failure
- Tutorial

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- CORROSION OF METALS

- Ten corrosion mechanisms
- Anode vs cathode reactions
- Electron transfer processes, Faraday Law concepts
- Formation of ferrous hydroxides to ferrous oxide transformation
- Galvanic vs Cathodic protection of steels
- Passivation of steel
- Life expectancy of ferrous alloyed steels (marine vs non marine environments)
- Tutorial

Certificate of Attendances will be emailed



Live streamed via zoom

CALCULATORS REQUIRED

COURSE COST

- 1 day course – **$735 pp**

DATES, VENUES & REGISTRATION

- *Registration form (back of catalogue)*
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FURTHER INFORMATION

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

RETAINING WALLS DESIGN WORKSHOP

PAUL UNO

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

- Over 40 years of experience in design & construction.
- Part-time Senior Lecturer – UNSW & The University of Sydney.
- Inspected structures and written reports on why structures have failed.

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

Live streamed via zoom

WORKSHOP SUMMARY

This one-day workshop is primarily aimed at civil and structural engineers who wish to design retaining walls. These can be either gravity walls (eg solid block, crib wall, hollow core or concrete filled masonry block) or reinforced walls (eg reinforced concrete cantilever, reinforced masonry and/or soil reinforced geo-fabric). The software ***FINE GEO5*** will be addressed.

Australian Design Standards such as AS3700, AS3600 and AS4678 and their requirements as well as Eurocode provisions will be addressed.

All sessions provide worked examples, tutorial exercises and solutions.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1
- SOIL CLASSIFICATIONS, TESTS & SOIL MECHANICS

- Soil Basics – Bulk vs Dry vs Saturated vs Submerged Density
- Angle of Repose vs Angle of Internal Friction
- Cohesion vs Shear Strength
- Proctor Density Test vs HILF Density Classification
- Clay vs Sand Basic Soil Type Classification to AS1726
- Shear Box Test vs Oedometer Test vs Triaxial Test
- Soil Parameters in AS4678 (Earth Retaining Structures)
- Unit Weights of Various Soils
- Cracked vs Uncracked Soils
- Australian Standards vs Eurocode
- Active vs Passive Pressure
- Coulomb vs Rankine Theory
- Pore Pressures
- Drained vs Undrained Soils
- Friction Angle vs Grading vs SPT values
- Atterberg Limits (LL PL PI) vs Friction Angle
- Factors of Safety – Ultimate vs Serviceability
- AS4678 Six (6) Retaining Wall Failure Modes
- Tutorial

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2
- RETAINING WALL DESIGN I (Mass/Gravity Structures)

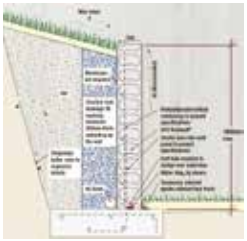
- Types of Gravity Structures eg Hollow vs Solid Masonry, Woven Mesh and Gabion walls
- Crib Block Wall Design Principles
- Timber Retaining Walls Design Principles
- Australian and Overseas Examples of Gravity Retaining Wall Failures
- Modes of Failure eg toe vs base vs slope
- Causes of Retaining Wall Failures eg Rainfall, Incorrect Drainage, Soil Properties, Wall Slope
- Applied Bearing Pressure vs Ultimate Bearing Capacity
- Bearing Capacity Theories eg Terzaghi vs Meyerhof vs Vesic vs Hansen
- Design Methods addressing Bearing Capacity and Failure by Overturning, Slip and Rotation
- Tutorial

CALCULATORS REQUIRED

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3
- RETAINING WALL DESIGN AND DETAILING II (Reinforced Structures)

- Types of Reinforced Retaining Wall Structures eg In-situ Concrete, Reinforced Masonry Block
- Australian and Overseas Examples of Reinforced Retaining Wall Failures
- Australian Standards vs Eurocode requirements for Reinforced Retaining Walls
- Full Design of Cantilever Wall Systems including Stability Checks
- Estimating Dimensions of Reinforced Concrete Retaining Walls & Footings (Rules of Thumb)
- Curtailment of Reinforcement (where needed)
- PVC formwork systems (eg CSR Rediwall)
- Shear Key Design (if required)
- Retaining Wall design using *FINE Software*
- Tutorial



3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- RETAINING WALL DESIGN AND DETAILING III (Reinforced Walls using Geofabrics)

- Types of Geofabric materials used in Reinforced Retaining Wall Structures
- Use of Geofabrics as Horizontal Wall Reinforcement
- Australian and Overseas Examples of Reinforced Retaining Wall Failures using Geofabrics
- Australian Standards vs Eurocode requirements for Geofabric Reinforced Retaining Walls
- Full Design of Cantilever Wall Systems using Geofabrics including Stability Checks
- Estimating Dimensions of Geofabrics for Reinforced Concrete Retaining Walls
- Wedge vs Pullout Failure using Geofabrics
- Geofabric reinforcement layout
- Tutorial

Certificate of Attendance will be emailed

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

COURSE COST
- 1 day course – **$820 pp**

DATES, VENUES & REGISTRATION
- *Registration form (back of catalogue)*
- *Visit our website* www.etia.net.au

FURTHER INFORMATION
- *Office* (02) 9899 7447
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ENGINEERING TRAINING INSTITUTE AUSTRALIA

SHALLOW FOUNDATIONS DESIGN WORKSHOP

PAUL UNO

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

- Over 40 years of experience in design & construction.
- Part-time Senior Lecturer – UNSW and University of Sydney.
- Designed many concrete foundations including pad & strip foundations for domestic construction; pad footings & piers for mining structures; 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

Live streamed via zoom

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.

Tutorial solutions analysed then compared to FINE (GEO5) software.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 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

11.00 - 11.15 Morning Break

11.15 - 1.00 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

1.00 - 1.30 Lunch Break

Download *FINE GEO5* demo version via the link

www.etia.net.au/geo5-demo-version

1.30 - 3.00 Session 3 - ALLOWABLE vs ULTIMATE BEARING CAPACITY vs SETTLEMENT

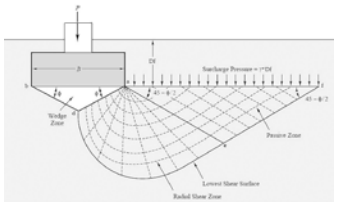
- Ultimate Bearing Capacity Formulas vs FINE (Geo5) Software
- Terzaghi vs Meyerhof vs Vesic vs Hansen vs Skempton formulas
- General Shear vs Local Shear vs Punching Shear Failure
- Shape Factor vs Depth factor vs Load Angle factor
- Foundation Bearing Capacity –Dry vs Wet Soils
- Footing capacity – Strip vs Circular vs Rectangular
- Bearing Capacity – Cohesive vs Cohesionless Soils
- Preconsolidation Stress σ'_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

3.00 - 3.15 Afternoon Break

3.15 - 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

Certificate of Attendance will be emailed



CALCULATORS REQUIRED

COURSE COST

- 1 day course – **$775 pp**

DATES, VENUES & REGISTRATION

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

FURTHER INFORMATION

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ENGINEERING TRAINING INSTITUTE AUSTRALIA

SLOPE STABILITY 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.
- Designed many foundations and addressed soil slope issues for mining developments, electricity transmission towers & other such structures.

Recommended Text:

Reinforced Concrete: The Designers Handbook
(2015 Revised Edition)

Beletich, Hymas, Reid & Uno

Live streamed via zoom

WORKSHOP SUMMARY

This one-day workshop is primarily aimed at civil and structural engineers who wish to design against the potential failure of sloping sites. This can be done by determining the likelihood of failure of the existing soils and slopes on site or designing retaining walls to resist any potential soil slope failures. The software ***FINE GEO5*** will be addressed.

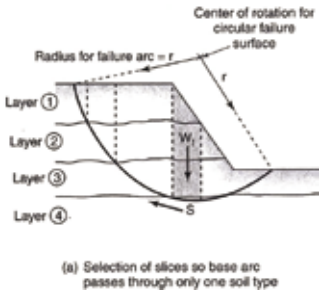
Australian Design Standards AS4678 (applicable in New Zealand) and their requirements as well as Eurocode provisions will be addressed. A series of slope stability methods will be addressed and compared.

All sessions provide worked examples, tutorial exercises and solutions.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1
- SOIL CLASSIFICATIONS, TESTS & SOIL MECHANICS

- Soil Basics – Bulk vs Dry vs Saturated vs Submerged Density
- Angle of Repose vs Angle of Internal Friction
- Cohesion vs Shear Strength
- Proctor Density Test and Unit Weights of Various Soils
- Clay vs Sand Basic Soil Type Classification to AS1726/NZS4402
- Shear Box Test vs Oedometer Test vs Triaxial Test
- Factors of Safety – Ultimate vs Serviceability
- HILF Density Classification
- Cracked vs Uncracked Soils
- Active vs Passive Pressure
- Coulomb vs Rankine Theory
- Pore Pressures
- Drained vs Undrained Soils
- Atterberg Limits (LL PL PI)
- Tutorial



(a) Selection of slices so base arc passes through only one soil type

11.00 - 11.15 Morning Break

11.15 – 1.00 Session 2
- SLOPE STABILITY I (Basic Principles)

- Australian and Overseas Examples of Wall and Soil Failures
- Soil Pressure Theory – active vs passive
- Causes of slope failures eg rainfall, inadequate drainage, poor construction, soil properties
- Modes of Slip Failure eg toe, base, slope
- AS4678 information regarding Slope Stability Failure
- Australian Standards vs Eurocode
- Tutorials - worked example by hand vs use of FINE (Geo5) software

1.00 - 1.30 Lunch Break

CALCULATORS REQUIRED

COURSE COST

- 1 day course – **$765 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

1.30 - 3.00 Session 3
- SLOPE STABILITY II (Basic Design Methods)

- Method of Slices
- Swedish (Fellenius) Method
- Determination of Safety Factor
- Drained vs Undrained
- Water Table effects on Slope Stability
- Phreatic Water line effects
- Tutorials using worked examples, as well as FINE GEO5 Software

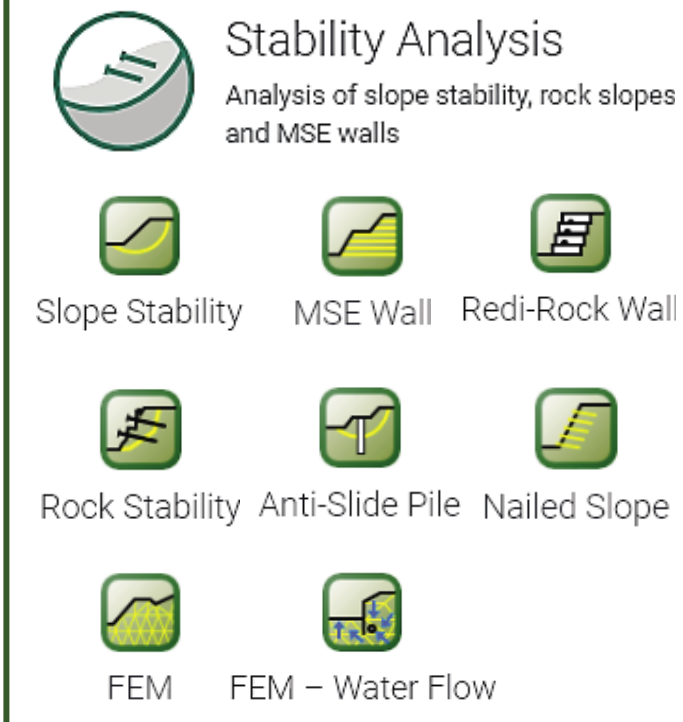
3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4
- SLOPE STABILITY III (Advanced Design Methods & Software)

- Slope Stability Method Comparisons
- Morgenstern-Price method
- Soil over Rock situation
- Taylor Charts
- Eurocode provisions
- Effects of Water Table
- Total vs Effective Stresses vs Pore Pressures
- Stability Charts and Friction Circle Method
- Force Equilibrium vs Moment Equilibrium
- Soil Vertical Cuts vs Tension Cracks in Soils
- Bishop method vs Janbu method vs Spencer Method
- Slope Stability Software packages – FINE Software vs Plaxis
- Tutorials using worked examples, as well as FINE GEO5 Software

Certificate of Attendance will be emailed

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



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ENGINEERING TRAINING INSTITUTE AUSTRALIA

WIND DESIGN WORKSHOP - DYNAMIC & HIGH RISE STRUCTURES

DR GRAEME WOOD *BEng PhD(UK) MIE(Aust)*

- Associate Principal, ARUP.
- Over 20 years of experience in wind engineering and dynamics research and consultancy.
- Lectures a Master's degree at the University of Sydney.

Recommended Text:

Wind Loading Handbook for Australia & New Zealand (2012)

WORKSHOP SUMMARY

This workshop will address key aspects of wind design related to dynamic and high rise structures and thus dynamic forces and effects as per AS/NZS1170.2-2011.

This course is designed for engineers who wish to analyse dynamic and high rise structures that are subjected to dynamic loading (ie frequency < 1 Hz, cross wind responses, turbulence intensity and damping).

The Engineering Training Institute Australia also offer a basic course on Wind Design titled "Wind Design Workshop – Low & Medium Rise Structures".

Attendees are advised to bring their Wind Code to this workshop.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1 - WIND DYNAMICS THEORY

- Wind is by far the most crucial loading in Australia (once dead and live loads have been addressed). Its complexities and unusual behaviour require a more detailed analysis than that required for permanent and imposed actions.
- Advanced principles of dynamics (eg simple harmonic motion, natural frequency, modes of vibration, spring stiffness vs mass effects) and how they relate to wind design as per well as AS/NZS1170.2-2011 and other Standards and test results from Wind Tunnel testing.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2 - MEDIUM AND HIGH RISE BUILDINGS: WIND DESIGN

- Steps for designing either a medium height office building (eg 50m high) or a tall tower office building (eg 200m high) are outlined.
- The medium height building example is a 16 storey (48m high) building located in a city such as Darwin. It is a concrete framed building with glazed window panels, typical within any Australian capital city.
  - Standard wind input parameters would still be: Location, Terrain, Topography, Building Dimensions, Building Orientation, Regional Wind Speed and Aerodynamic Shape Factor, however tall structures require the calculation of Dynamics effects, Base Moments and Sway Frequencies.
- The tall building example is located in Brisbane QLD (but applies equally to all Australian states). The building is a 60 storey building (183m) with ultimate wind velocities of 60 m/s (for average recurrence interval R = 1/1000 ie return period = 1000 years) as per Region B. Design wind speeds are also calculated for special cases, namely: (A) Acceleration checks (using Vdes,θ = 30 m/s); (B) Cladding checks (using Vdes,θ = 73.8 m/s); (C) Main Structure Checks (using Vdes,θ = 70.1 m/s).
  - Specialised parameters such as 'Along' Wind Response and 'Cross' Wind Response are calculated as are Base Moments and Torsion contribution.

1.00 - 1.30 Lunch Break

1.30 - 3.00 Session 3 - LATTICE TOWERS AND CIRCULAR STACKS: WIND DESIGN

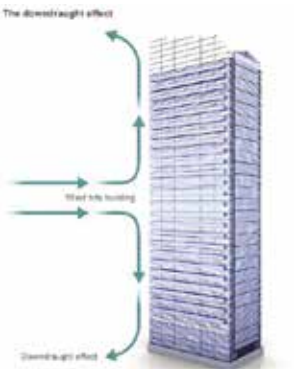
- Design of wind on a range of miscellaneous structures such as steel lattice towers and steel chimney stacks. It is imperative to allow for dynamic effects on these structures (cross wind response being a critical element of this process) as well as factors such as their solidity ratio, sway frequency, surface roughness, drag force coefficients and amplitude of movement under wind loads.
- Lattice towers (typical examples include communication towers), and chimney stacks (or even tall circular concrete or steel light poles) all require a static and dynamic analysis to allow for all potential loads that can be imposed on these structures so the C_{dyn} calculation is a key parameter to be quantified in this process.

3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - WIND TUNNEL TESTING FOR DYNAMIC EFFECTS ON STRUCTURES

- Pros and cons of conducting wind tunnel testing. (Graeme Wood operates a very large wind tunnel in Sydney and thus has first-hand experience in this area).
- Explain the various aspects of wind tunnel testing and how it can most times benefit the designer by showing exactly where the major pressures zones are on a complicated structure and where savings can be made in materials and design.
- Examples will be given as to where wind tunnel testing can reveal areas on a structure that are actually worse than predicted, by simple static design and reference to AS/NZS 1170.2-2011. This is where changes can be made in construction before major flaws are built into a structure.

Certificate of Attendance will be emailed



Live streamed via zoom

COURSE COST

- 1 day course – **$830 pp**

DATES, VENUES & REGISTRATION

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

FURTHER INFORMATION

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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 FORM

1	**BLAST, FIRE & PROGRESSIVE COLLAPSE WORKSHOP**	**One-day course - $860 pp**
	ZOOM – Tue 24 November 2020	
2	**CONCRETE POOLS & TANKS DESIGN WORKSHOP**	**One-day course - $700 pp**
	ZOOM – Thu 5 November 2020	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
3	**GLASS & ALUMINIUM FAÇADE DESIGN WORKSHOP**	**Two-day course - $1,540 pp**
	ZOOM – Wed 25 + Thu 26 November 2020	
4	**METALLURGY MATERIALS WORKSHOP**	**One-day course - $735 pp**
	ZOOM – Tue 10 November 2020	
5	**RETAINING WALLS DESIGN WORKSHOP**	**One-day course - $820 pp**
	ZOOM – Tue 17 November 2020	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
6	**SHALLOW FOUNDATIONS DESIGN WORKSHOP**	**One-day course - $775 pp**
	ZOOM – Thu 12 November 2020	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
7	**SLOPE STABILITY DESIGN WORKSHOP**	**One-day course - $765 pp**
	ZOOM – Thu 19 November 2020	**RECOMMENDED: Reinforced Concrete: The Designers Handbook (2015) - $170**
8	**VALUE ENGINEERING: PRINCIPLES & APPLICATIONS COURSE**	**One-day course - $850 pp**
	ZOOM – Tue 1 December 2020	
9	**WIND DESIGN WORKSHOP – DYNAMIC & HIGH RISE STRUCTURES**	**One-day course - $830 pp**
	ZOOM – Wed 4 November 2020	**RECOMMENDED: Wind Loading Handbook (Australia/New Zealand 2012) - $95**

Option 1: Register online www.etia.net.au *(Receive immediate tax invoice receipt & confirmation)*

Option 2: Fill in this form and email to registrations@etia.net.au *(Allow 3 – 5 business days for tax invoice receipt & confirmation)*

Title of Workshop _____

Attendee Name _____ Company _____

Attendee Email _____ Attendee Mobile _____

Postal Address _____ Suburb _____ State _____ Postcode _____

☐ VISA* ☐ MASTERCARD* ☐ AMEX*(additional 1.3% surcharge) ** All credit cards are charged a merchant fee of $0.50 per course*

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ZOOM LIVE STREAMING DETAILS

1. Registrations must be received at least **three (3) working days before** the workshop, for course notes to be express posted. Course notes are hard copy only. Registrations received after this period will result in a later delivery of course notes.
2. Only registered attendees are permitted to view the online live stream. Online participants MUST have their webcam on during the presentation. Failure to do so will result in the attendee being denied access to the live stream.
3. Please ensure the attendee provides their *own personal/work email* upon registration.
4. Attendees will be emailed a Zoom link between 8:30am - 9:00am on the day of the course, to join the live stream.

NB: 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.

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