ENGINEERING TRAINING INSTITUTE AUSTRALIA

REPAIR & PROTECTION WORKSHOP –

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

- Over 40 years of experience in engineering design and construction and in the area of repair materials.
- Engaged by legal and insurance companies to assess damaged structures and various repair materials.
- Former Part-Time Senior Lecturer – UNSW, UTS & The University of Sydney.
- Chairman of the Australian Standards committee BD-066 for the Tilt-Up & Precast (Prefabricated) Concrete Standard AS3850.

Livestreamed via zoom

WORKSHOP SUMMARY 8 hours of CPD

This course addresses the theory behind the processes of steel corrosion, concrete cracking and masonry failure. It then focuses on the preparation of concrete and steel surfaces (both reinforcement and structural steel) before protection systems are applied. Each session will be followed by a tutorial exercise (and solutions) to ensure participants have fully understood the concepts presented in this workshop. The final session comprises three practical presentations on the products that are available in the marketplace and how they provide the necessary protection systems to the building and construction industry.

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

9.00 - 11.00 Session 1 *(Paul Uno)*
- DURABILITY THEORY

- ACI Aggressive Chemicals for Concrete List
- Alkali Aggregate Reaction
- Australian Standards Durability Requirements eg AS3600, AS2870, AS2159, AS4100
- Cement and Epoxy Exothermic Reactions
- Cement Types GP vs GB vs HE vs SR vs CAC's
- Coating Breathability vs Vapour Diffusion vs Blistering
- Concrete Abrasion (eg Forklifts vs Trucks)
- Concrete Carbonation (to AS4548.5) and Klopfer Criteria
- Concrete Chloride Diffusion (inc. Ficks 2nd Law of Diffusion)
- Concrete Conductivity and Resistivity values
- Concrete Cracking (eg Early Age/Plastic, Settlement, Shrinkage, Thermal, Chemical, AAR)
- Concrete Porosity vs Permeability
- Concrete Sulphate Attack
- Corrosion of Steel (10 Main Classes) eg Pitting, Crevice, Uniform, Stress, Embrittlement etc
- Dusting vs Surface Hardeners (eg Fluoro-Silicates)
- Fire Damage
- Iron Pyrite Aggregate in Concrete and Masonry
- Magnesite Floor Topping Issues
- Masonry Rising Damp vs Salt Crystallisation
- Plastic Shrinkage Cracking, APPS and Environmental Factors
- Supplementary Cementitious Materials for Repair (eg Flyash, Slag and Silica Fume)
- Water Corporation - Six Classes of Steel Rebar corrosion.
- TUTORIAL

11.00 - 11.15 Morning Break

11.00 – 1.00 Session 2 *(Paul Uno)*
- SURFACE PREPARATION
- TESTING METHODS & EVALUATION CRITERIA

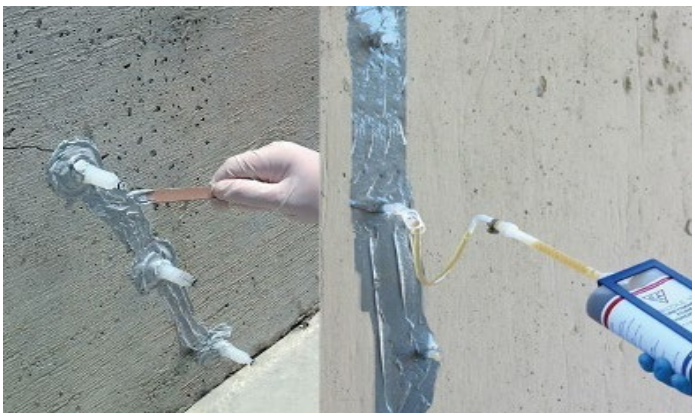
Surface Preparation

- Peening
- Pressure Water Blasting
- Scabbling
- Scarifying
- Shot Blasting
- Slag (Sand) Blasting – Concrete and Steel
- Concrete Surface Profile (CSP1 to CSP9)
- TUTORIAL

Testing Methods & Evaluation Criteria

- Concrete Core Testing
- Concrete Resistivity
- Corrosion Rates and Mass Loss (inc Faraday's Law)
- Cover Meters (for Steel)
- Film Thickness Testing –Dry (DFT) and Wet (DFT)
- Half Cell Mapping
- Klopfer CO_2 Diffusion Tests
- Langelier Saturation Index and Ryznar Stability Index
- Linear Polarization
- Moisture Meters
- Petrographic Analysis
- Phenolphthalein tests
- Pull off Tension Adhesion Test (using an Elcometer)
- Schmidt Hammer (Rebound Impact)
- Slip Resistance (Pendulum test)
- Swimming Pools vs Lime Scaling vs Pipe Corrosion
- Water Balance Tests (eg Pools)
- TUTORIAL

1.00 - 1.30 Lunch Break



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.

CONCRETE, STEEL & MASONRY STRUCTURES

ENGINEERING TRAINING INSTITUTE AUSTRALIA

STEPHEN WAITE *MSc (Str. Eng) BSC(Hons) RPEQ*

- Director - Structural Waterproof Consulting (SW Consult)
- Structural Engineer specialising in remediation, structural repairs and rectification including waterproofing of existing structures (mainly high-rise structures).

1.30 - 3.30 Session 3 *(Paul Uno)* - PROTECTION MATERIALS & REPAIR METHODS

- Bentonite (waterproofing) Clays
- Corrosion Inhibitors (eg Nitrites)
- Crack Injection
- Crystalline Technology
- Curing Agents (and removal)
- Epoxies (Part A) and Diamines (Part B - Hardener)
- FRP sheeting
- Galvanising to AS4680
- Grouts Non-Shrink (Type A vs C vs Z)
- Inorganic Zinc Silicates for structural steels
- Paints –Water vs Oil Based
- Polyurethane Polymers
- Self-Levelling compounds (using CAC's)
- Shrinkage Reducing Admixtures (SRA's)
- Silanes vs Siloxanes
- Stainless Steel (304 vs 316 vs Duplex)
- Weathering Steels (ie Structural Steels)
- Zinc Coatings (Applied Coatings vs Galvanised)
- TUTORIAL

3.30 - 4.00 Afternoon Break

CALCULATORS REQUIRED

4.00 - 5.00 Session 4 *(Stephen Waite* – SW Consult*)* - CONSULTING ENGINEER'S REPAIR EXPERIENCES

- This session is presented by a consulting engineer who has specialised in the repair of concrete structures over 20 years.
- Stephen Waite will share his valuable experiences from the many projects he has been involved with around Australia.
- He will address case studies and outline the pros and cons of the various approaches to the remediation of these structures.

Certificate of Attendance will be emailed

- One day course – **$810 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.*

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