CONCRETE LIQUID RETAINING STRUCTURES DESIGN WORKSHOP
TO AS 3735, AS 2783, CIRIA C660, BS 8007 AND AS3600-2009

OUTLINE
This full day workshop is primarily aimed at design engineers and anyone with a technical background who needs to be able to either perform simple structural designs or design checks on any form of liquid retaining structure whether it be reservoirs, water retaining structures or otherwise. The interest in saving water has focussed attention on tank design and ensuring that tanks are designed and constructed correctly so that the needs of the community will be addressed for years to come.

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

PROGRAMME
8.30 – 9.00 Registration
9.00 – 10.30 Concrete Properties & Durability Issues

This session deals with the various cement and concrete materials that are required to produce water tight & durable concrete structures. Materials such as low shrinkage cements, silica fume, flyash and slag blends, carbonation and chloride ingress into various concrete grades are all addressed. Causes for concrete cracking will be addressed in particular plastic shrinkage, plastic settlement cracking and semi-plastic thermal cracking. Mix designs required for correct pumping or spraying of concrete (in accordance with C12, ENFARAC and ACI 506R) will also be addressed.

10.30 – 11.00 Morning Tea
11.00 – 12.30 Australian and Overseas Design Standards

The appropriate Australian and overseas Standards (including various State Water Authorities for example, the Water retail industry, AS2373 (Liquid Retaining Structures Code), AS 2783 (Swimming Pool Code), CIRIA 91 and CIRIA C660 (Early Age Thermal Crack Control in Concrete), WSA (Water Services Association), BS1090 (previously incorporated in BS5337) and PCA-USA as well as the requirements for crack control according to AS3600-2009. Crack width criteria will be addressed in particular showing the reasons for certain maximum crack width sizes and the testing that has been done to establish these values. The effects of surrounding materials and environment will be considered including the quantification of these effects via indices such as the Ryzner Index and Lancaster Saturation Index (as referenced in AS3735).

Typical mix designs and minimum w/c ratios for water retaining structures will be covered (including state of the art admixtures e.g. polycarboxylate ethers)

12.30 – 1.30 Lunch (Provided at venue)

1.30 – 3.00 Structural Design

This session will primarily address the methods of simple design to either hand check or carry out a simple structural design for circular and rectangular tank wall and floor design using h2/d ratio and “beam on elastic foundation” theory. Details such as hoop stress and hoop reinforcement, vertical stress and vertical reinforcement as well as maximum crack width and crack control will be explained. Methods of quantifying crack width using appropriate crack width formulae will be addressed as well as looking at cracking caused by excessive heat differential in thick walls and floors (in accordance with the new CIRIA C660-2007 publication). Tutorial exercises will 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 soils.

3.00 – 3.30 Afternoon Tea

3.30 – 5.00 Construction issues

This session will focus on 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), bleedwater minimization, formwork removal timing, permeable form-liners, correct choice of vibrator, evaporation control, concrete testing regime, water-stops (both hydraulic and hydrophobic) and joints (including dowelled and key joints) will all be addressed. Tank repair options if cracking does occur will be addressed including material choices (epoxy, polyurethane, vinyl ester).

5.00 Certificates of Attendance / Feedback Sheets

Calculators Required

SPEAKER
Paul J Uno BE MEngSc MIE(Aust) CPEng

Engineering Training Institute Australia

Paul Uno has over 35 years experience in the design and construction industry. He has worked for companies such as CSR Readymix, Transfield, Boral, Dept of Housing, Australian Institute of Steel Construction, IH Robertson and the Cement and Concrete Association of Australia.

He was involved with structural design of water tanks whilst engaged with Boral Everlast Tanks and then with Transfield during his early design years. In the past 30 years he has been involved in design checking other engineer’s tank designs as well as assessing the reasons for cracks in many existing or partially constructed concrete tanks. Construction companies in this area often engage him as an outside consultant to review all aspects of the specification, design and construction phases of tank construction.

He has been a member of the American Concrete Institute since 1992 and a member of the Concrete Institute of Australia since 1982. At present he is a consultant, a presenter for Engineering Training Institute Australia as well as a University lecturer.

He currently lectures in Properties of Materials (Concrete) at Civil Engineering, Sydney University as well as lecturing at UNSW in the faculty of Built Environment in both Construction Science (Materials) and in Building Structures (Concrete & Structural Steel Design).

Darren Smith
National Technical & Major Projects Manager

Paul Darren Smith has been in the construction products supply industry for over 18 years.

He has worked in Sydney, Melbourne and Auckland servicing commercial, civil and infrastructure projects throughout Australia and New Zealand.

His experience lies with Crystalline Growth materials, concrete repair products, concrete admixtures, grinding aids for cement as well as cement free historic masonry repair products and various coatings.

Darren is currently working in a National Technical and Major Projects role with Penetron Australia.

CANCELLATIONS
Cancellations made more than 5 working days prior to a course will incur a 20% processing fee of the full registration amount.

Registrations made 5 working days or less will incur forfeiture of the full registration fee.

REGISTRATION FORM
Please return to:
Engineering Training Institute Australia (Attn: Vincent)
PO Box 913 Baulkham Hills NSW 1755
Tel: 02 9699 7447 Fax: 02 9699 5995 Mobile: 0413 998 031
Email: registrations@etia.net.au

One Day Workshop

$510 pp

Recommended Text
Reinforced Concrete - The Designers Handbook
$170

Total Payment

(please print)

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