pt news

NEWSLETTER No 3 – 2009

POST-TENSIONING INSTITUTE OF AUSTRALIA LIMITED

PTIA CREATES STATE BRANCHES

To support its growing activities and engagement with industry, PTIA has formed branches in Queensland and Victoria. NSW activities are managed through the Board and its Executive Committee. The Branches are developing mailing lists for distribution of the PTIA Newsletter and for keeping industry informed of local events, and they will be conducting PT seminars in their states in the future. Queensland Branch recently invited many of the non-member PT contracting companies in Queensland to their meeting to discuss the objectives, actions and achievements of PTIA and the benefits to all PT contracting companies. Those who attended were impressed with the benefits offered by PTIA membership. Branch news and activities will be included in future Newsletters.

Contacts for these branches are:

QUEENSLAND – msimovic@freyssinet.com.au | **VICTORIA –** bradp@qld.structural.com.au | **NSW –** info@ptia.org.au

President's Report

The Building Education Revolution (BER) is a Rudd Government initiative to provide a $14.7 billion boost to schools over the next three years. All of Australia's 9,540 schools will benefit from major and minor infrastructure projects. These projects are in design phase with construction of the first school in Minto NSW recently commenced by Hansen Yuncken. Although this rollout has limited opportunity for post-tensioning, these projects have been a timely boost to many of our Consultant and Supplier Associate Members

Following from our comments last month, significant infrastructure projects are being rolled out nationally. This work will bring significant opportunities to all our members in QLD, VIC and NSW.

At the recent RTA briefing held in June, details were provided on the following:

- F3 to Branxton Freeway – Hunter Expressway- The project is 40km of dual carriageway with 56 bridges, and is due to commence in 2010 with completion in 2013. The contribution from Infrastructure Australia is $1.451 billion.
- Kempsey Bypass – The project is 14.5km of highway upgrade with major bridge crossings over Macleay River and floodplain.

Both of these projects will be let as a combination of an Alliance and Design and Construct contracts.

Our DVD presentation entitled "Stress Safe, Work Safe" is now complete and is available to the construction industry. The DVD forms a part of our ongoing training and re-certification of stressing operatives and we are encouraging all Contractors to use this DVD as part of their site inductions.

To purchase your copy, please email us at: info@ptia.org.au

Best wishes,

DAVID PASH | President

PROJECT REPORT

Catagunya Dam Permanent Ground Anchors

Catagunya Dam is located in central Tasmania, and is owned and operated by Hydro Tasmania. This dam, completed in the early 1960's, is one of a series of eight hydro-electric power stations on the Derwent River. The dam has significant engineering heritage as it was the first prestressed dam constructed in Australia and only the second in the world. Catagunya Dam, has a width of 365m and is 48 metres high. The central spillway is 126m wide and 42 metres high. The two electricity generating turbines can pass 120,000 litres of water per second.

The anchors installed when the dam was originally constructed are believed to be suffering corrosion, and have reached the end of their service life. As these anchors are inaccessible and cannot be monitored, Hydro Tasmania has decided to install new, replacement anchors to remove any uncertainty about the original anchors' performance.

Structural Systems, with their extensive experience in large capacity permanent ground anchors, was engaged to fabricate, install, grout and stress the 90 new anchors required.

Each of the new permanent anchors, consists of 91 No. 15.7mm strands individually greased and sheathed over the free length allowing the strand to extend unrestrained when stressed. The lowest 11m of the anchor is bare strand allowing load transfer from the anchor to the rock when grouted to provide the bond zone. The entire anchor assembly is protected from corrosion by a corrugated and smooth sheath system utilizing HDPE. The anchors are up to 78m in length with a mass of some 10 Tonnes each and are embedded up to 30m into the rock substrate beneath the dam. The vertical anchors will be installed in both abutments and some 8.5m below the spillway on the 56 degree slope.

The anchors are fabricated on site in the original quarry area and transported to the dam on specially designed trolleys. Installation of the anchors is achieved with the use of a custom installation frame that elevates and bends the anchor over a series of rollers into a vertical position to be lowered into its hole. Lowering of the anchor into the hole is controlled with a braking winch. The critical grouting process which follows is completed in three stages using Class G Oilwell cement to the bond length and GP cement to the free length.

To date, four of the anchors have been installed and stressed using a 2,200 Tonne hydraulic jack purposely built for the project. These completed anchors now hold the world record

for permanent ground anchors with the largest minimum breaking load of 25,389kN (2,589 Tonnes), largest lock off load of 17,772kN (1,812 Tonnes) and largest test load of 19,415kN (1,980 Tonnes).

All of the new replacement anchors are able to be monitored and restressed throughout their 100 plus year design life.

Whilst anchoring works on the project are still in their early stage, the Structural Systems team is confident that the works will be successfully completed on time and within budget.

Location: Central Tasmania

Client: Hydro Tasmania

Dates: January 2009 to July 2010

Contractor: Structural Systems (Civil) Pty Ltd

Scope: Supply, fabrication, installation and stressing of permanent ground anchors

Post-Tensioning & Structures

The development of pre-stressing and in particular post-tensioning techniques has enabled a spectacular extension of the physical capabilities now achievable in structures. Long span bridges and the towering highrises of our cities are typical of “megastructures” that have benefitted from the applications of post-tensioning techniques.

With ever improving materials (for example higher tensile lower relaxation steels, carbon fibres etc) prestressing enables the effective utilisation of lower cost materials (e.g. concrete) to be used both in compression and tensile elements. As a result, we can now design and construct elements that are of a low cost, high structural effectiveness, water tight, in a durable and fire resistant material.

Post-tensioning gives two additional enormous benefits particularly relevant to infrastructure: that is the ability to profile tendons and to provide a means to secure and extend full continuity of forces through precast elements. Because we can design and profile tendons, the prestress is located exactly where it provides the most structural and or in service benefits. The resulting structure is more efficiently and effectively pre-stressed to maximise performance.

Safety, quality and time are typical drivers in modern infrastructure construction. Post-tensioning enables the safe and rapid assembly and connection of structural pre-cast or prefabricate elements. Elements can be pre-made off site, in controlled factory like conditions, off the critical path. Through

post-tensioning, these elements can be assembled, stressed and incorporated into the permanent structure. The end result is the ability to create an almost infinite array of efficient, cost effective, durable and aesthetically pleasing structures.

As in all pre-stressing applications, post-tensioning needs to be designed, detailed, installed, stressed and grouted with the appropriate materials and systems, by suitably trained and skilled operatives.

PTIA welcomes Arup

Arup has joined the Post-Tensioning Institute of Australia (PTIA) as an associate member, demonstrating the firm’s commitment to working with the Institute to improve standards of design and construction in the post-tensioning industry. As a member, Arup will collaborate with the PTIA to offer design services for post-tension projects.

Arup's multidisciplinary design and consultancy team has been involved in a number of significant projects in Queensland featuring post-tensioning design, including the Macintosh Island Pedestrian Bridge on the Gold Coast, the Parrerra Canal Pedestrian Bridge, and the Kurilpa Bridge in Brisbane – the world’s first tensegrity pedestrian bridge.

The Kurilpa Bridge will provide a much needed pedestrian and cycle crossing of the Brisbane River. On the northern side it will soar over the CBD expressway, linking pedestrians to Roma Street Parklands and Brisbane’s justice precinct.

The north approach spans utilise post-tensioned concrete beams. Post-tensioned beams were selected as the optimal

solution which allowed the depth of deck below the walkway to be minimised. Being precast and post-tensioned off site, they also had the advantage of minimising on site erection time, reducing the duration and number of night closures required. The post-tensioned beams used coloured concrete and a custom section was developed to meet the highly architectural design requirements.

Arup is a professional services firm providing engineering, design, planning, project management and consulting services across all aspects of the built environment. Globally, they are 10,000 strong, operating out of 92 offices in more than 37 countries.

COURSES AND EVENTS 2009

PRESTRESSED CONCRETE DESIGN WORKSHOPS

PTIA sponsored Prestressed Concrete Design workshops are presented by Cement and Concrete Services (CCS). For consulting engineering firms who are Associate Members of the PTIA, there are significant subsidies on the fees for these workshops – details are available from CCS at www.cementandconcrete.com. Registrations for workshops are to be made through CCS.

These two day workshops are developed for engineers who are familiar with reinforced concrete but who have little experience with prestressed concrete and who wish to gain an understanding of the principles of analysing and designing statically determinate prestressed beams. An optional third day workshop on computer aided design for prestressed concrete is also available.

City	Venue	Dates
Sydney	Stamford Grand Hotel, North Ryde	14, 15 & 16 October
Brisbane	Mercure Hotel	4, 5 & 6 November
Melbourne	Hotel Grand Chancellor	25, 26 & 27 November

SEMINARS AND OTHER EVENTS SCHEDULE

PTIA will not be conducting a seminar series with Concrete Institute in 2009 but hopes to have a number of papers accepted for presentation at *Concrete 09* in Sydney from 17-19 September.

Some PTIA seminars may be held in regional locations and details will be announced in future newsletters and on the PTIA website.

PTIA SKILLS TRAINING COURSES SCHEDULE

PTIA offers Corporate Member companies a comprehensive Skills Training course which is presented by a dedicated and fully accredited training manager. The courses are offered in all states of Australia, subject to sufficient numbers. The course offers five modules, with modules 1 & 2 (General Safety & Installation) as a one day course, and modules 3 & 4 (Stressing & Grouting) as a second day, advanced course. A new module 5 (Multi-strand) has now been added to the training program.

On successful completion, course attendees are provided with a Skill Training Course card which is current for 12 months. Annual reassessment is required after that.

For details about course dates and locations, or to book a course for your workforce, contact the PTIA Training Manager, Brad Parkinson on 03 9296 8100 or mobile 0437 439 573, or by email to bradp@structural.com.au.

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Member Companies

Corporate Members
Australian Prestressing Services Pty Ltd (founding member)
Austress Freyssinet Pty Ltd (founding member)
Structural Systems Pty Ltd (founding member)
VSL Australia Pty Ltd (founding member)

Associate Members - suppliers
Ajax Foundry Pty Ltd
Bluescope Lysaght
Cement Australia Pty Ltd
Cemex Pty Ltd
Haggie Reid Pty Ltd
OneSteel Wire Pty Ltd
Refobar Australia
Sanwa Pty Ltd
Severs Technical Systems Pty Ltd
Usha Martin Australia Pty Ltd

Associate Members – consulting engineers
Arup
Bentley Systems Pty Ltd
Costin Roe Consulting Pty Ltd
Hyder Consulting Pty Ltd
McVeigh Consultants Pty Ltd
Taylor Thomson Whitting

PTIA welcomes the following new Associate Member
- Arup

PTIA welcomes the following new Student Members
- Khin Tandar Soe (ADFA, UNSW)
- Kerstan Nolan (QUT)

Please visit the PTIA web site **www.ptia.org.au** for details about membership, membership benefits and membership application forms. If you have questions about membership, please contact PTIA through this web site and our office will contact you to discuss your questions.

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