CONCRETE REPAIR ASSOCIATION

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E-Bulletin

No. 6

*This news bulletin is brought to your desktop by the UK Concrete Repair Association (CRA).
It provides brief and easy-to-digest updates, supplied by CRA members on recent concrete repair developments, new advances and other initiatives occurring in the industry.*

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NEW ELECTROCHEMICAL REHABILITATION ROAD SHOW

To address the matter of steel reinforcement corrosion in concrete and to explain the various remedial options available, the **CRA** has just produced an entirely new Road Show presentation entitled 'Electrochemical rehabilitation of steel reinforced concrete structures'.

The environment provided by good quality concrete, in which steel reinforcement exists, is said to be 'passive'. If, however, the alkalinity of the surrounding concrete is reduced, corrosion of the reinforcement can occur.

The two primary reasons are carbonation (which leads to the loss of concrete alkalinity) and chloride attack primarily from de-icing agents or seawater (which break down the protective oxide film of the steel reinforcement). The presence of moisture and oxygen can cause expansive corrosion up to eight times greater than the original steel product. These expansive forces are sufficient to cause concrete cracking, delamination and eventually spalling.

The new CPD certificated audio-visual Road Show is specifically designed for specifiers, contractors and owners of structures/buildings containing concrete components, who need a brief explanation of the materials available, the methods of installation and the critical aspects to be taken into account when looking at specific projects.

The programme, about 45 minutes in duration, covers design considerations and outlines possible electrochemical remedial solutions, such as realkalisation, chloride extraction, cathodic protection/prevention and sacrificial systems.

Presentation is free-of-charge to professional organisations, at their offices, at a mutually convenient date and time, provided a minimum of four delegates are able to attend.

SEND AN E-MAIL: **initialcontacts@btinternet.com** **LINK TO WEBSITE:** **www.cra.org.uk**

ANYONE FOR A SWIM?

The 1930s-built art deco Uxbridge Lido has been restored to its former glory as a result of a team effort by CRA manufacturer member **Ronacrete Ltd** and specialist contractor, Cemplas Waterproofing & Concrete Repairs Ltd.

The lido, an elongated 12-sided star-shaped pool with two fountains at either end, had been closed in 1998 since when it had fallen into disrepair and become swathed in graffiti.

Its refurbishment, overseen by English Heritage, involved the restoration of the Lido's grade II-listed open air swimming pool and other distinctive features such as the grandstands, cascades and entrance, which had survived almost unchanged since the leisure facility opened.

A major part of the refurbishment works was to the Lido North Block.
The entire surface was grit blasted to remove old coatings, before cracked sections in the brickwork were chased out and a Helibar system installed to restore the original structural integrity. Following the structural repairs, all elevations were given a new surface finish with Ronacrete's BBA Certificated Ronafix modified polymer render.
The render was subsequently coated with Ronacrete's Joltec elastomeric protective/decorative coating.

A key objective of the brief was to keep the building exactly as it was, with all measurements accurately matching the existing.
To achieve this, Cemplas used laser levels to ensure the Ronafix render installation was totally precise.

The refurbishment of the Lido brings an important part of history back to life. It is possible that the British Olympic team may use the facility in preparation for London 2012, with many famous athletes having already pledged their support to train future up and coming champions.

SEND AN E-MAIL: **tech@ronacrete.co.uk** **LINK TO WEBSITE:** **www.ronacrete.co.uk**

AN OPTIMISTIC FUTURE FOR MODERNISM

One of the finest pieces of post-war college development in Cambridge is undergoing a major programme of repair and refurbishment by CRA contractor member, **Gunite (Eastern) Ltd.**

The Cripps building at St John's College, Cambridge, which was given a Grade II* listing last year, occupies an awkward site between two Grade I listed buildings. The zig-zag plan reinforced concrete building provides student accommodation based around eight separate staircases.

Gunite undertook concrete cleaning and restoration trials in spring 2008, using a cleaning system that employs super-heated water under pressure. Sample defects were broken out and reinstated using Remmers Betofix RM repair material to within 15mm of the concrete surface. The final layer of the repair was formed from a pre-matched mortar, mixed with a carefully selected range of crushed aggregate in the correct ratio, to replicate the texture and appearance of the surrounding concrete. In December 2009, Gunite commenced the main contract works.

The requirement for en-suite bathrooms risked compromising the building's structural integrity. Carbon fibre plate bonding was therefore proposed for strengthening around the new service holes. Together with a specialist engineering practice, Gunite designed a scheme and installed carbon fibre plates using Sikadur 30 adhesive to bond them to the concrete.

The refurbishment programme has ensured that the Cripps building and the optimism of the 1960's, which it epitomises, remains a prime example of how ancient and modern can happily co-exist.

SEND AN E-MAIL: **nick.williams@gunite.co.uk** **LINK TO WEBSITE:** **www.gunite.co.uk**

EXTENSIVE TOWER BLOCK RENOVATIONS

In 2008, CRA member **Concrete Repairs Ltd (CRL)**, who specialise in the external refurbishment of residential property throughout the UK, successfully tendered to Bristol City Council for the £2.2m renovation of four 14-storey tower blocks at Barton Hill.

When complete in the autumn of 2010, all four blocks on this extensive project will exhibit an entirely new external envelope.

Twelve weeks are needed to erect scaffolding around each block and another three to four months is spent on upgrading the entire surface area. Work includes the window heads and reveals receiving a full two coat treatment, with extra mesh being laid into the base coat. Once cured, additional mechanical ties are drilled into the original substrate to ensure everything is securely anchored.

At ground level the treatment changes. The failing mid-nineties applied External Wall Insulation (EWI) system is being cut back and substituted with brick slips. Rather than attempting to return the brick slips around the window reveals, the specification switches to include a polyester powder coated aluminium extrusion which butts up to the frame.

Also, to ensure the future performance of the building envelope, the tower blocks are being re-roofed using a liquid applied membrane applied over the original roofing systems to provide a seamless waterproof covering.

Commenting on the project's progress, Paul Jermy, Senior Surveyor for Bristol City Council's Neighbourhood and Housing department said, "CRL is proving to be a very competent company and the project is moving along really well. We have had absolutely no issues during the contract".

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BELT AND BRACES JOB FOR JETTY ROADWAY

A major jetty at Holyhead, Anglesey, extending just short of one kilometre into the deep water harbour and used both to off-load raw materials for Anglesey Aluminium and as a berth for visiting cruise ships, has been extensively refurbished by CRA specialist contractor member, **Quadriga Ltd**.

The roadway structure leading to the jetty head is constructed on a series of circular steel piles set in the sea bed in pairs along the length of the structure, with each supporting a massive reinforced concrete cross beam. The deck consists of an in situ reinforced concrete slab cast onto pre-cast units that span between the cross beams on the piles.

Refurbishment involved the repair of damage to the reinforced concrete in the pre-cast deck units, which had arisen as a result of corrosion of the embedded steel reinforcement, leading to spalling and delamination of concrete at various locations.

Exposed steel reinforcement was blast cleaned and primed immediately prior to the hand placed application of cementitious concrete repair materials.

Due to the nature of damage and the high levels of external migratory chloride ions arising from contact with the sea-water, the only long-term remedial solution was to install a galvanic cathodic protection electrochemical system to negate the inevitable incipient anode effect that would ensue.

The system chosen is a revolutionary method that uses a wire comprised of an alloy of aluminium, zinc and indium, designed as a sacrificial anode which is spray applied on to the surface of the concrete using a thermal arc spray system. To complete the circuit, an electrical connection is made between the steel reinforcement and the applied anode using a bolted connection to the steel and a zinc plate at the surface.

SEND AN E-MAIL: **tdavies@quadrigaltd.com** **LINK TO WEBSITE:** **www.quadrigaltd.com**

CEMPLAS RECOMMENDATIONS PROVE A WINNER !

Constructed in the 1930s, the rear walkway balconies to Croydon's Victoria House had become extremely dilapidated and in urgent need of remedial repairs.

The initial refurbishment recommendations were to completely remove the existing balcony up-stands, construct entirely new ones in shuttered and poured concrete with entirely new steel reinforcement and to re-asphalt.

Such major works, however, were beyond the client's budget and the specialist contracting services of CRA member **Cemplas Waterproofing and Concrete Repairs Ltd** were called upon. Following a site survey and recommendations, Cemplas was appointed principle contractor.

Grit blasting was employed to remove existing coatings. Damaged reinforcement was treated and repaired and the extensive repairs to the concrete soffits and walls were undertaken. Concrete repairs were completed using Ronacrete's High Build HB40 Acrylic polymer repair mortar and to provide increased protective cover to the steel reinforcement. Ronacrete's Cover Plus 150 was also applied to extend the life of all the concrete surfaces. Finally, Ronacrete's Zolpacryl Anti-carbonation coating was applied to protect the concrete from water ingress and to create an effective barrier against carbon dioxide, possible future steel corrosion and subsequent spalling.

Rather than remove the asphalt on the balcony walkways, following localised repairs the surfaces were treated with liquid applied elastomeric waterproofing membrane, include a non-slip quartz aggregate finish.

To the delight of the client, costs were considerably less than the original proposals, the work was completed in a far shorter contract period and with minimal disruption to the building's occupants.

SEND AN E-MAIL: **info@cemplas.co.uk** **LINK TO WEBSITE:** **www.cemplas.co.uk**

18001 BY 2011

Hot on the heels of declaring that its full members must comply with Environmental Standard ISO 14001 by the end of 2010, the **CRA** has followed up by announcing that it is targeting the end of 2011 for full members to also be accredited to BS OHSAS 18001 (Occupational Health & Safety Assessment Series).

The initiative illustrates the Association's commitment to improving standards, even given the current difficult trading conditions.

ISO (OHSAS) 18001 is the internationally recognised assessment specification for occupational health and safety management systems. It was developed by a group of leading trade bodies, together with ISO, to address the lack of a viable third-party certifiable international standard and is designed to work alongside ISO 9001 (Quality) and ISO 14001 (Environmental). ISO (OHSAS) 18001 allows a business to constantly identify and manage its health & safety risks, reducing the potential for accidents and to aid compliance with legislation, thus improving overall performance and promoting a safe and healthy working environment.

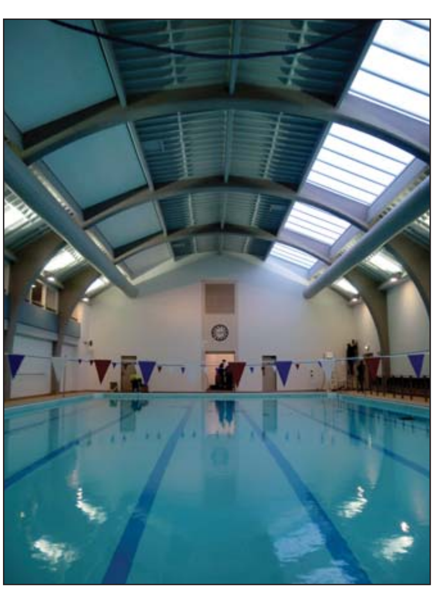
"The CRA is committed to 'raising the bar' in its sector, which is why it is in the interests of clients and engineers to specify a CRA member for such specialist construction work", commented CRA Chairman, David Burgess. "In today's uncertain and highly competitive marketplace, every company needs to demonstrate that it is managed efficiently and responsibly and that it is able to provide a dependable service without unnecessary downtime caused by work-related ill-health, injury and incidents; hence the emergence of BS (OHSAS) 18001".

Compliance to ISO 9001 has been mandatory for CRA full members for a number of years now. As from the end of next year, all three ISO standards will become a fundamental requirement of Association membership.

The vast majority of contractor members are also ConstructionLine, CHAS and Exor accredited, whilst all manufacturer members products are BBA approved and comply with BS EN1504.

SEND AN E-MAIL: **admin@cra.org.uk** **LINK TO WEBSITE:** **www.cra.org.uk**

REBECCA ADLINGTON SWIMMING CENTRE AS GOOD AS NEW



The Rebecca Adlington Swimming Centre in Mansfield has been protected from costly future deterioration through the use of **Sika Ltd's** concrete repair system.

The CRA manufacturer member's complete repair and protection system was applied as part of the centre's recent £4.5m refurbishment. The work was part of Mansfield District Council's plans to renovate the existing Sherwood Baths and rename it in honour of Rebecca Adlington - the British Olympic gold medallist.

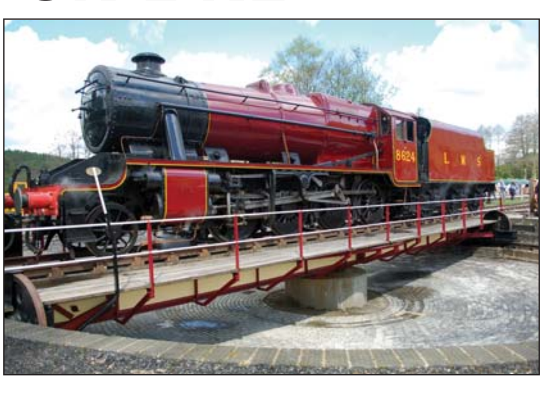
Having succumbed to disrepair, it was important that once the centre's concrete soffits and column features were repaired, that they remained in good condition in order to prevent costly repairs in years to come.

Refurbishment therefore included the application of Sika FerroGard corrosion inhibitor, which permeates the steel reinforced concrete surfaces to provide effective protection from the high volumes of carbon and chloride commonly found within humid structures such as swimming pools. Easy and economic to apply, it was simply applied to the surface without changing its appearance, thus providing invisible, yet effective protection.

This was followed by the application of a bonding layer of SikaTop, before Sika MonoTop cement based lightweight repair mortar was used to reinstate damaged overhead areas in the roof soffits. Finally, a coating of SikaGard was applied to provide high levels of weather resistance and crack-bridging properties. Its application also enhanced the overall aesthetic appearance of the concrete areas.

SEND AN E-MAIL: **parkerwray.kerry@uk.sika.com** **LINK TO WEBSITE:** **www.sikaconstruction.co.uk**

HISTORIC TURNTABLE BACK ON LINE WITH HELP FROM TECROC



A Victorian railway turntable has been restored to its former glory with the help of technical advice and three specialist products from CRA manufacturer member **Tecroc Products Ltd**.

Peak Rail has fully restored the turntable at Rowsley South Station, near Matlock, with the help of a team of volunteers, including members of the Peak Railways Association, many of whom are construction industry professionals.

During the project they used cartridge-applied polyester-based TecGrip CAS high strength resin anchor material for fixing the starter bars to areas requiring new concrete.

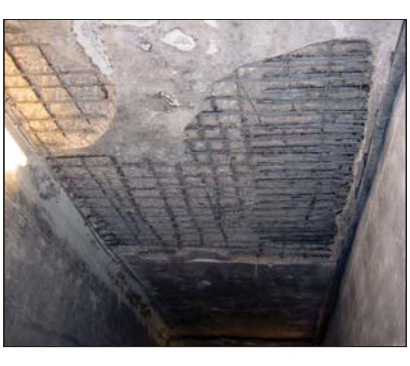
TECROC's E33 epoxy grout was used to provide support for the main central pivot of the turntable and to grout each of the base plates supporting the ring rail, which runs around the circumference of the turntable well. This provides the support for the turntable unit to rotate, powered by vacuum from the locomotive, or via hand winding.

Finally, TECROC Dry Pack C, a general purpose packing mortar was used to fix the blue pavers in the bottom of the turntable well in order to prevent weed growth in the future.

The newly-refurbished turntable was re-introduced to service after a gap of more than 40 years at a ceremony performed by Coventry-born pop industry mogul and steam buff, Pete Waterman.

SEND AN E-MAIL: **enquiries@tecroc.co.uk** **LINK TO WEBSITE:** **www.tecroc.co.uk**

AMMUNITION DUMP REPAIRED



The old ammunition station at Harpur Hill, Buxton, has a significant history. But having been built in an old quarry in the 1940s and recently used as a mushroom farm, the concrete structure was exhibiting its age.

The three-storey reinforced concrete structure consists of four curved interconnecting tunnels, each 3.3m wide x 4.3m high, with flat slab bridging the walls. As would be expected, the 170mm thick slab has a heavily reinforced soffit, with around 80mm cover to the steel reinforcing.

Due to cast-in chloride content (in excess of 1%) during the original construction, the concrete soffit was suffering extensive spalling (see pic), causing a significant health and safety issue for its current owner - haulage Company Norbert Dentressangle.

CRA specialist contractor member, **Makers Construction**, was engaged to carry out traditional concrete repairs utilising sprayed concrete. Fosroc polymer modified repair mortars were selected for the process.

The works demanded extensive air extraction and tenting in order to prevent dust and smells from travelling throughout the facility, which now stores fine bottled water and even finer, private wine collections; a far cry from its previous usage!

The project represents an interesting usage of modern concrete repair techniques in enhancing the life of historical structures

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