



THE JOURNAL OF THE CONCRETE REPAIR ASSOCIATION

ISSUE NO. 28

Trade associations to join forces at the Concrete Show 2012



The UK Concrete Show 2012, to be held at the Ricoh Arena in Coventry from 22-23 February, will bring the industry together, under one roof, to see and hear about all that's new in concrete. It will also see the Concrete Repair Association (CRA), Sprayed Concrete Association (SCA) and Corrosion Prevention Association (CPA) working together to spread the concrete renovation message.

The associations have joined forces to create a Concrete Renovation Centre at the show. Members of each association will be exhibiting in this area, making it simple for visitors to get all the information they need about concrete repair and renovation methods, techniques and products.

The three associations have also developed a comprehensive seminar programme to educate visitors



about concrete renovation methods. The seminars, to be held throughout the two-day show, will include two of the the CRA's popular CPD roadshow presentations. Each presentation

is about 45 minutes in duration and is specifically designed to give an insight into concrete repair techniques and allied refurbishment procedures.

Aimed at specifiers, contractors and owners of structures/buildings containing concrete components, the presentations will provide an excellent introduction to the methods of concrete repair and the critical matters to be taken into account when looking at specific projects.

'The route to a successful concrete repair' emphasises the essential overall considerations to be taken into account when faced with the repair of reinforced concrete and provides a very useful guideline to the best approach to be adopted. The presentation does not deal in depth with specific types of repair product or system, the causes of concrete deterioration, nor the individual methods of carrying out concrete repair.

'Structural strengthening with composites' explains how this technology has evolved, the types of composites available, quality control testing and how they are installed. Since the early 90s the UK has witnessed an increasing requirement for the strengthening and upgrading of many

Continued on page 2



KEN DYKES ELECTED AS CRA CHAIRMAN

Ken Dykes of specialist civil engineering contractor Freyssinet has been elected as Chairman of the UK Concrete Repairs Association.

He is the fifteenth individual to chair the Association, having assumed the position

from David Burgess of specialist contractor, Concrete Repairs Ltd (CRL), at the Association's Annual General Meeting on 14 October.

Ken aims to further develop the Association during his two-year tenure as Chairman. His primary aim is to promote the CRA quality

ethos externally and ensure it is recognised and specified by government and private organisations alike. To meet this goal, he aims to maintain the already high standards of the Association and police them vigorously.

He aims to reach out to the wider industry and hopes to enter into dialogue with other trade associations and form alliances in areas of common conviction. He also plans to undertake a series of presentations around the UK to spread the CRA message and attract new members.

Looking internally, Ken hopes to promote greater inclusivity within the Association. He urges more members to take an active role in CRA activities and plans to encourage open discussions on issues that affect the concrete repair industry, as well as Association members.

INSIDE

▶ CRA green credentials

▶ Bribery & corruption

▶ BLT backhander

▶ Industry Developments

▶ Industry Grapevine

www.cra.org.uk

Concrete Show 2012

Continued from page 1

structures and commercial buildings. Concrete failure, inadequate design, poor quality construction, structural and fire damage, change of use and the need to accommodate increased loading, have all influenced the growing interest. This, in turn, has spawned the development of a number of new systems, with traditional methods such as additional reinforced concrete, or heavy steel plates, now being supplemented by fibre reinforced polymers (FRPs).

The Concrete Show provides an ideal opportunity for CRA members and visitors alike to network and view the latest innovations in concrete technology and use.

The event, which took place for the first time in February 2011 is on target to grow significantly for its second event, with 150 exhibitors expected to attend.

The 2012 show will feature a range of demonstrations, top class seminars and lively, hands on workshops alongside the latest products and services the industry has to offer.

"We've had a fantastic amount of support from the industry which enables us to run a truly comprehensive event covering all aspects of Concrete" says Show Director Steven Callaghan.

"Despite it still not being easy times for the construction industry a very high percentage of our 2011 exhibitors are returning, many having taken additional space, but we've also attracted many new exhibitors for 2012, providing the industry with a huge selection of concrete-related equipment, repair technology, chemicals, sealants, additives and services to provide that essential one-stop industry forum."

For further information on the Concrete Show 2012, or to register or book a stand visit www.concreteshow.co.uk

The UK CONCRETE Show

**Ricoh Arena, Coventry
February 22 & 23, 2012**

CRA DEMONSTRATES GREEN CREDENTIALS



To meet clients' ever-growing environmental requirements, the Concrete Repair Association (CRA) now insists that all of its full members obtain Quality Assurance (QA) accreditation to environmental standard BS EN ISO 14001 as a fundamental requirement of membership.

Since the 30 June 2011, any contractor, manufacturer or distributor member without this accreditation has been excluded from CRA membership. As a result of this requirement the Association has suspended four of its members and new applications for membership will only be accepted from BS EN ISO 14001 accredited companies.

BS EN ISO 14001 provides a framework around which CRA members can control the environmental impact of their activities, products and services and continually improve environmental performance. It specifies the requirements for an environmental management system (EMS). Thus, it applies to those environmental aspects that the organisation can control and over which it can be expected to have an influence.

BS EN ISO 14001 is applicable to any organisation that wishes to implement, maintain and improve an environmental management system; assure itself of its conformance with its stated environmental policy; demonstrate such conformance to others; seek certification/registration of its environmental management system by an external organisation; and make a self-determination and self-declaration of conformance with this international standard.

This is a strong message from the Association, in line with its founding principle which is to set high standards of workmanship and technical competence within the concrete renovation sector of the construction industry.

The CRA believes that by setting such self-regulating standards and procedures, engineers, surveyors, authorities, clients and other specifiers are able to confidently select from established professional organisations for concrete repair and related projects.

In addition to demonstrating a proven track record and overall proven ability, as well as conforming to the Association's Codes of Practice and to its training requirements, each full specialist contractor and product manufacturer member is also obliged to be QA accredited to the quality standard BS EN ISO 9001 as an essential requirement of membership.

For further information on CRA membership and membership requirements visit www.cra.org.uk

NOT STRICTLY CONCRETE

Three simple steps to completing a satisfactory concrete repair:

1. Place the ladder safely
2. Pay careful regard to working at height procedures
3. Ensure the finish is aesthetically pleasing

...obviously, some people know better.



INDUSTRY Developments

CRL UPGRADES QUEENSGATE CAR PARK

CRL has been awarded a £6.3m contract by Hammersons to refurbish the four multi-storey car parks at Queensgate Shopping Centre in Peterborough over a four-year period. The work started in April this year and is due to be completed in September 2014.

CRL previously refurbished these car parks in 1998 and returns to upgrade the parking experience to meet the latest standards. The work involves concrete repairs, an upgrade to the cathode protection system, protective coatings, new signage, and replacement CCTV, lighting and fire alarm systems.

At the same time a new computer room and communications centre and number plate recognition system equipment will be installed.

E-MAIL: JDrewett@concrete-repairs.co.uk WEBSITE: www.concrete-repairs.co.uk



Bribery and corruption



By: Kirsty Gomersal, Ward Hadaway, Solicitors

The Bribery Act 2010, which came into force in the UK on 1 July 2011, establishes a modern framework

which criminalises the giving and receiving of bribes. It also requires commercial organisations to implement "adequate procedures" to prevent bribes being made on its behalf.

The risk to the construction industry is that many common practices could be interpreted as being "bribes" – despite being accepted and customary in the industry.

The Act prohibits "financial or other advantages" which are intended to induce or reward another person to improperly perform their role. What the person offering the advantage "intends" and what constitutes "improper performance" will be decided by a jury.

A bribe could be as blatant as a cash incentive, or the offer of shares. Or it could be more subtle in nature, for instance, through offers of corporate hospitality, free advice or services, discounts, payment of VAT and so on. The essential question is: "What was the intent behind offering the advantage"? There is a very fine line between what will be acceptable and what will be seen as a bribe. And it is for a jury to decide where that line is to be drawn.

The statutory guidance clearly states that corporate hospitality is not prohibited.

But it also recognises that such activities can be used as a façade for bribery. If there is a legitimate business purpose behind making the offer, then there will be no unlawful activity.

Legitimate business purposes could include networking, cementing relationships, better presentation of products or a business etc. So, taking clients or contacts for lunch (even to the Cup Final), business courtesies (such as paying for standard travel) or offering discounts or incentives is permissible, provided that there is a genuine intent behind the offer and what is being offered is proportionate.

As "intent" is essentially a question for a jury, there may be situations where a jury is more likely to infer that what is being offered is really a bribe. Therefore, lavish or disproportionate hospitality or incentives are more likely to be viewed as bribes. Timing, as ever, is everything – so hospitality given during a tender process, or incentives given to decision-makers are more likely to be viewed as bribes.

Giving or receiving bribes can lead to an unlimited fine; individuals can also be sentenced to up to 10 years of imprisonment; or have other penalties imposed. The first conviction under the Act was achieved on 14 October 2011.

The Defendant, Munir Patel, admitted the charge of bribery and also a charge of misconduct in a public office and was warned that he could be sent to prison.

An organisation can also be found guilty of an additional offence if a bribe is made by an "Associated Person" to obtain or retain business for the organisation. An Associated Person performs services on behalf of an organisation and can therefore be an employee, agent or any other third party.

Avoiding prosecution

There is a defence if the organisation has "Adequate Procedures" in place to prevent such conduct occurring. Such procedures could include:

- Conducting a risk assessment which demonstrates an understanding of the risks an organisation faces from bribery.
- Displaying top-down commitment that the company will not to participate in an activity that could be construed as bribery.

- Ensuring anti-bribery and corruption policies and procedures are in place

- Conducting a due diligence investigation on those who carry out services for an organisation

- Implementing anti-bribery and corruption policies; and

- Keeping all such procedures under audit and review

The "acid test" for any organisation contemplating offering an incentive is to ask, "Would I be happy to advertise what I'm proposing in a national newspaper – or on the CRA website?"

If the answer is yes, then the incentive is probably unlikely to lead to an adverse inference. However, all organisations are strongly advised to formalise that "acid test" in the form of considered and written procedures.

Creating a culture of suspicion – the BLT backhander?!

Allen's observations

Picture the scene, Lord's Cricket Ground 2012 – a one-day International against Australia. Sports' reporter Henry Blofeld interviews the Rt. Hon David Cameron MP.

HB: "What ho Prime Minister! Lovely day for cricket"

DC: "Certainly is Henry, never mind the fact that Europe is now technically owned by the Chinese and Richard Branson – it's the game that matters!"

HB: "My dear old thing, you never spoke a truer word – now before we start can I just see your ticket and the receipt showing where you paid for it?"

DC: "Well actually I'm a guest of the sponsors"

HB: "The sponsors – Nat West – one of the culprits for the mess we find ourselves in?"

DC: "Well – yes!"

HB: "I think we've heard enough!

Aggers – fetch the handcuffs – this is a citizen's arrest!"

Well maybe not, but the Bribery Act, like all laws that lean towards "zero tolerance" stands to create a situation where reasonable behaviour is cracked down on, while doing nothing to deter criminal behaviour. The Bribery Act will not stop corruption any more than the Theft Act prevents robbery. What it is in danger of doing is creating a culture of suspicion, which assumes guilt and requires proof of innocence.

Recently, I met an employee of one of the London Boroughs. Concluding our site visit we headed to the local sandwich bar for lunch. She made a fairly obvious performance of making sure that a couple of people got between us in the payment queue, to the extent that I somewhat testily

asked if she would prefer separate tables and a shouted conversation.

We have known each other for some considerable time, so I appreciated her response that, in the 21st century we should converse at a distance by text. I was amazed to find that this highly professional and dedicated Local Government Officer was in fact seriously concerned that some malicious individual might report her for alleged misconduct – possibly a "BLT backhander".

As she said, with retirement on the horizon she could live without a period of suspension while an investigation was undertaken and, with luck, common sense broke out.

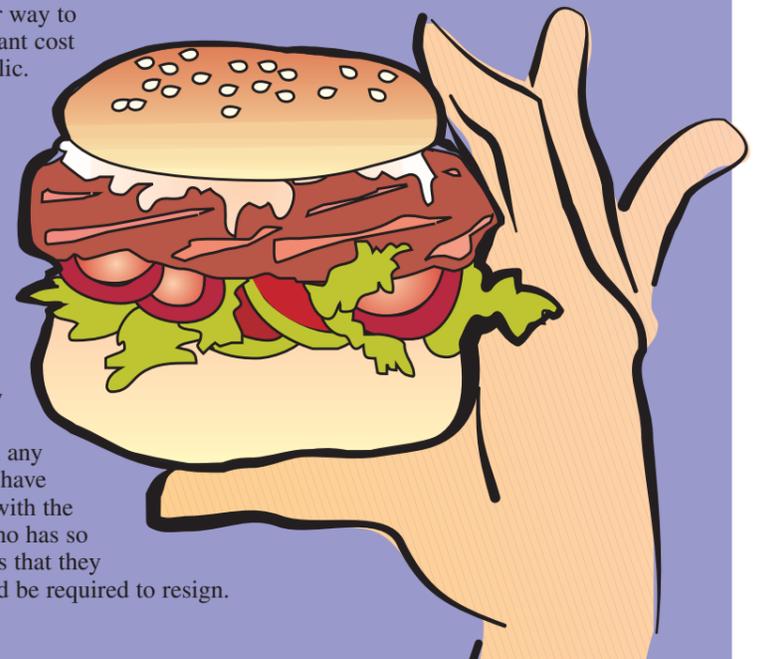
This made me wonder – is making a person work in climate of suspicion an infringement of their Human Rights? I would imagine so, and tend to the view that we will not be long in seeing the first cases come to Court, and no doubt trundle their way to Strasbourg at significant cost to the tax-paying public.

So can I propose a common sense solution based on one that has worked perfectly well in Parliament for years? Anyone in public life who accepts anything, from a sandwich to a trip to Lord's, should simply declare it. Then they can be excluded from any decisions where they have declared an interest, with the caveat that anyone who has so many outside interests that they cannot function would be required to resign.

So, for example, a Head of Procurement who accepted a two-week holiday in Barbados would be unable to function credibly, whereas they would hardly be deemed to have sold their soul for a bacon sandwich.

This is no different to the situation pertaining to outside interests and second jobs that currently exists. By all means, sit on the Board of a Housing Association (and claim the allowances) if you are a Director of Housing for a Local Authority – just tell your employer (and HMRC) you are doing it so they can avoid conflicts of interest and keep the books straight.

There will of course be losers if this method is adopted – those Human Rights lawyers who are already opting for ceramic brakes on their next Porsche in anticipation of the bounty to come!



TLY REPAIR ...!



SIKA CARES FOR LOVELESS HOUSE



Designed by renowned architect Berthold Lubetkin, George Loveless House and the neighbouring James Hammett House were two of the first high level blocks to use reinforced concrete. But these two twelve-storey residential buildings in the London Borough of Tower Hamlets have suffered significant structural damage due to chloride penetration and the subsequent corrosion of the steel reinforcement.

Following a careful assessment of the properties, consulting engineers Global Engineering Design Associates specified a range of concrete repair products from CRA member **Sika Ltd** to provide a proven means of repairing the damage and protecting the steel reinforcement.

Sika's Armocrete, a cementitious micro-concrete repair system, was used to repair large sections of the building columns, while all the exposed concrete and brick surfaces on the building were protected by SikaGard 702W, a water-repellent silicone coating. SikaGard 675W was used on soffits and parapet walls to offer protection against weathering and ageing.

Smaller repairs to soffits, columns, decks and aggregate panels were completed using the Sika Monotop Concrete Repair system. This cementitious one part system comprising polymer-modified mortars, offers excellent resistance to water and chloride penetration. Sikaflex AT Connection was used to seal all joint repairs on the blocks, while the Sikafloor Pronto was used to repair the balcony decks.

SIKA LIMITED: 01707 363866

EARLY COMPLETION FOR CRL BRIDGE REFURBISHMENT



CRA member, **Concrete Repairs Ltd (CRL)** has completed major refurbishment of the Kyle of Tongue Bridge in Scotland six weeks ahead of schedule.

The 184m long, 18 span bridge carries the A838 over the Tongue estuary. The Highland Council awarded CRL a £1.2m contract to repair the substructure, re-waterproof the deck and install new vehicular barriers. AECOM provided the engineering services.

CRL repaired the pre-stressed concrete longitudinal beams and in situ concrete crossheads, where there was corrosion to the steel reinforcement due to high chloride levels. To enhance the durability of the concrete a hybrid cathodic protection system was installed in the pre-stressed longitudinal beams and a galvanic system in the cross head beams. This is the first time that a hybrid CP system has been used in pre-stressed concrete beams.

The supporting steel piles were cleaned, repainted and an impressed current cathodic protection system installed to protect the steel below the waterline.

This was a very challenging contract in a remote and environmentally-sensitive region, involving three distinct corrosion management systems developed by AECOM and a unique suspended access system.

Working in partnership with Highland Council and AECOM, CRL were able to deliver the project 6 weeks early and on budget.

CONCRETE REPAIRS LTD: 020 8288 4848

PAREX PRODUCTS PERFORM ON PROM



High performance grouts from CRA member **Parex** have played a crucial role in a new £2m "Comedy Carpet" feature for Blackpool seafront, which celebrates comedy greats who have appeared in the Lancashire resort.

The "Comedy Carpet", which was "rolled out" by king of comedy Ken Dodd, forms a dance floor for a new outdoor arena at the Tower Festival Headland site.

Parex supplied its 100 Newton Grout in three bespoke colours to set in the granite letters that make up the names and catchphrases of some of the world's most celebrated comedians. A special white variant of CS Grout was also used.

The high strength Parex grouts were selected for their ability to withstand wear in the same way that the letters will. Three colours of "Comedy Carpet Grout", two whites and a blue, were specially developed following exhaustive trials, led by the Parex technical team.

The "carpet" was designed and manufactured by Comedy Carpets Ltd, of Humberstone, with the individual components of the complex hard landscaping jigsaw pieced together opposite Blackpool's famous tower. More than 200 tonnes of Parex grouts were used to create the 320 individual slabs which have been joined together to create the 2,200m² feature.

The Comedy Carpet, one of the largest public artwork projects in the UK, was commissioned by Blackpool Council with part of a £4m grant from the Commission for Architecture and the Built Environment (CABE) Sea Change programme. It was created by Artist Gordon Young - in association with design agency Why Not Associates. More than 850 writers and comedians are represented - with more than 160,000 individual letters ranging in size from a few centimetres to almost a metre tall.

PAREX LTD: 01827 711755

SAINT-GOBAIN WEBER RENOVATES RIVER SLUICE



Technical mortars from CRA member **Saint-Gobain Weber** have been used in a £2.7m Environment Agency project to renovate an ageing river sluice facility.

Constructed in 1937, the Allington Sluice lock gate is the last on the River Medway before it becomes tidal. Areas of failed surface concrete had spalled, due to 70 years of weathering. These were repaired sympathetically to match the existing finishes using weber Five Star* repair concrete and weber.cem HB30 mortar.

The major repair areas required shuttering before pouring in the flowing recasting concrete. The weber Five Star* repair concrete is a pre-blended cementitious material that contains non-reactive aggregates and has a low alkali content. It is a shrinkage-compensated, high-strength flowing repair concrete specifically designed for permanent structural repairs, and delivers a compressive strength of 65N/mm² after 28 days.

Additional smaller damaged areas of the sluice structure have been improved with weber.cem HB30 repair mortar which is ideal for façade repairs where high compressive strength is not required. weber.cem HB30 is an acrylic-polymer modified, high-build façade repair mortar that complies with BS EN 1504: 3 as an R3 mortar.

Damaged areas were cut away and any steel reinforcement was cleaned and coated with weber.cem keycoat prior to the application of the weber.cem HB30. It has a unique shrinkage compensation system that ensures long-term dimensional stability. weber.cem HB30 is easy to apply with low permeability to water, carbon dioxide and chlorides.

SAINT-GOBAIN WEBER: 08703 330070

CEMPAS REPAIRS NORTHMINSTER MULTI-STOREY CAR PARK



Working as the main contractor for Peterborough Council, CRA member **Cemplas Waterproofing and Concrete Repairs Ltd** has undertaken a range of remedial work at Northminster Multi-storey Car Park. Works included concrete repairs, brick wall ties, and car park surface repair and coating.

Scaffolding was erected to all elevations and concrete repairs were carried out using Sika Monotop 610. The external concrete beam face and concrete soffits were repaired with Sika Monotop 615, while Sika Set 45 Rapid Concrete Repair Mortar was used on the concrete floor slabs. Certain isolated areas of the existing top deck coating were removed, and Sika Proto surface coating applied.

Following a survey to test the structural integrity of the parapet walls, Cemplas operatives were tasked with installing in excess of 10,000 new Helifix RetroTie brick ties to the parapet walls on all the car park levels.

Dust extraction units were fitted and clearance holes drilled through the outer skin of brickwork, ensuring the hole was in the solid part of the brick. This was followed by pilot holes drilled into the inner leaf, a RetroTie was then placed into the support tool, positioned and filled with resin.

Following the installation, all ties were tested to establish that the required pull out strength was achieved and, once passed by the Council, the drill holes were filled using Easipoint plug, which was colour-matched to the existing bricks, and finished flush to the brick face.

CEMPAS WATERPROOFING & CONCRETE REPAIRS LTD: 020 8654 3149

USL HALTS DETERIORATION AT HALTON



Halton Lea Multi Storey Car Park near Runcorn has undergone extensive refurbishment works to provide a more-user friendly parking experience and to improve the structural serviceability of the car park as part of its long term maintenance strategy.

Many of the materials used were manufactured and supplied in house by USL StructureCare's sister company Nufins. Structural repairs were carried out using Deck Repair Rapid and Nucem HB Mortar, both rapid setting materials which are designed for the repair and restoration of spalled or damaged concrete.

The concrete throughout the car park was coated with Covercrete - a high quality, environmentally friendly, light-reflective coating that protects against carbonation and chloride attack. The coating was applied in white, to significantly enhance the level of light in the car park and provide an aesthetic upgrade.

To arrest deterioration of the reinforcing bar and provide future protection, a Migrating Corrosion Inhibitor was applied to the whole deck area. Protectosil CIT by BASF was chosen due to its ease of application and compatibility with the deck coatings.

All decks and ramps were prepared, made good and coated with products from BASF's Conideck Range to provide protection against chloride and water ingress. The fully elastomeric Conideck 2205 was used on the exposed roof decks and the Conideck 2257 fast curing system was used as an intermediate deck coating on covered levels.

The refurbishment project has made a radical difference to the visual appeal, efficiency and safety of the car park, leaving a bright, clean and inviting place to park.

UNIVERSAL SEALANTS (UK) LIMITED: 0191 416 1530

COMMUNITY CAR PARK RESTORED IN CHELMSFORD TOWN CENTRE



Work to repair a multi-storey car park in Chelmsford, which had been closed for more than six months due to safety concerns, is now nearing completion. High Chelmer Car Park was closed in March after spalling concrete highlighted serious problems with the ageing structure.

CRA member, **Gunite (Eastern) Ltd**, was appointed as main contractor by Chelmsford Borough Council after structural engineers J P Chick & Partners had carried out extensive tests on the reinforced concrete ramps, decks and supports. The sixteen-week, £1.6m project, began in July and is on target to fully reopen in November.

Large areas of the concrete decks and ramps, some in excess of 50m², were cut out by hydro-demolition (ultra-high pressure water jets at up to 3000bar) for both speed and reduced vibration. These areas were then reinstated with Sika Armocrete, a flowable micro-concrete repair mortar.

Sacrificial anodes were installed in the repairs to combat the high levels of chloride present in the concrete. Coloured deck coatings and white anti-carbonation coatings to the ceilings and columns will help to stabilise the concrete and brighten up the car park, making it more user friendly.

The 1,000 space car park is being repaired from the bottom up to allow the Council to reopen the car park in phases. 106 market traders, who had to be moved from the ground floor Retail Market for the first eight weeks of the contract, are now trading again.

GUNITE (EASTERN) LTD: 01480 466880

VOLKERLASER RAISES CASH FOR MACMILLAN CANCER SUPPORT



VolkerLaser staff from its offices in Worcester, Glasgow, Enfield, Runcorn and Aylesbury, have raised over £1,200 for Macmillan Cancer Support.

The money was raised in a variety of ways. Staff clubbed together via a raffle to win prizes kindly donated by suppliers. In addition, Dave Machin, Plant Manager at VolkerLaser's Worcester Head Office volunteered to have his hair shaved off for this wonderful cause.

Macmillan Cancer Support is one of the largest British charities and provides specialist health care, information and financial support to people affected by cancer. As well as helping with the medical needs of people affected by cancer, Macmillan also looks at the social, emotional and practical impact cancer can have, and campaigns for better cancer care.

The money raised is enough to help 40 cancer support groups hold their first meeting.

VOLKERLASER LTD: 0844 800 4560

CURRENT CRA MEMBERS

Contractors:	Telephone:
AMBER CONSTRUCTION SERVICES LTD	020 8592 5699
APA CONCRETE REPAIRS LTD.....	01422 379640
ALFRED BAGNALL & SONS (RESTORATION) LTD	020 8311 3910
BALVAC LTD	01606 333036
CEMPAS WATERPROOFING & CONCRETE REPAIRS LTD ..	020 8654 3149
CONCRETE REPAIRS LIMITED	020 8288 4848
CONCRETE RESTORATION LTD	020 8994 8860
FREYSSINET LTD	01952 201901
GUNITE (EASTERN) LTD	01480 466880
JB SPECIALIST REFURBISHMENTS LTD.....	01733 233259
MACKENZIE CONSTRUCTION LTD	0141 633 5555
MAKERS CONSTRUCTION LTD	0845 899 4444
MANSELL CONCRETE REPAIR	01977 520070
MATRIX SOLUTIONS UK LTD	01454 616170
PRESTEC UK LTD	0121 308 8001
RENOCON LTD	020 7538 5492
REPEX LTD	01435 866666
RSS CONSTRUCTION PROJECTS LTD	0845 612 3293
SEALABILITY LTD	0870 405 0001
SOUTH WEST CONCRETE REPAIRS LTD	01752 561300
UNIVERSAL SEALANTS (UK) LTD	0191 416 1530
VOLKERLASER LTD.....	0844 800 4560

Manufacturers:	Telephone:
FOSROC LTD.....	01827 262222
PAREX LTD	01827 711755
REMMERS (UK) LTD	0845 373 0103
SIKA LTD	01707 394444
WEBER.....	01525 718877

Distributors:	Telephone:
EPMS SUPPLIES	01132 760037
RESAPOL LTD	01942 609001
SIG CONSTRUCTION ACCESSORIES	0845 863 0819

Associates:	Telephone:
BIRMINGHAM CITY LABORATORY	0121 303 9300
THE CONCRETE CONSULTANCY 2000 LTD	01707 268034
MARTECH TECHNICAL SERVICES LTD.....	01487 832288

'CRACKING MATTERS' is published by the Concrete Repair Association (CRA), Kingsley House, Ganders Business Park, Kingsley, Bordon, Hampshire GU35 9LU. Tel: 01420 471615 Fax: 01420 471611 Email: admin@cra.org.uk Website: www.cra.org.uk Comments and opinions expressed in the articles provided are those of the Author and not necessarily of the CRA. Rights reserved. No part of this publication may be reproduced or transmitted in any form, without prior written consent of the publishers. Twenty eighth edition: 30. 11. 11