



THE JOURNAL OF THE CONCRETE REPAIR ASSOCIATION

ISSUE NO. 21

# IMPLEMENTING EN 1504 FOR THE HIGHWAYS AGENCY

**Terry Higgins, Associate at Parsons Brinckerhoff and Colin George, Structures Team Leader at the Highways Agency, explain the Highways Agency's current position with regard to the new concrete repair standards**

## Background

One of the principal requirements for the Public Procurement Directives is that specifications must, wherever possible, refer to European Standards. However, provided that they remain within the framework of the European product Standards, EU member states (the public procurers) may set their own requirements for the performance of the particular works and products. The publication of EN 1504, covering products and systems for the protection and repair of concrete structures, means that the UK's public procurers must make the necessary changes to their own standards and regulations for concrete repairs to bring them in line with the new European Standard.

In the case of the Highways Agency, this effectively means that BD27 'Materials for the Repair of Concrete Highway Structures' and BA35 'Inspection and

Repair of Concrete Highway Structures' must be withdrawn and replaced by guidance on the implementation of EN 1504. In April 2007, the Highways Agency appointed Parsons Brinckerhoff (PB) to develop this guidance, under an existing framework agreement for technical consultancy services.

## Existing Situation

Currently, concrete repairs on Highways Agency schemes are regulated by BD27 and BA35 which form part of the Design Manual for Roads and Bridges (DMRB). BD27 was published in 1986 and includes concrete repair specification clauses, but these are out of date in many respects. As a result, designers currently submit detailed specification clauses for each scheme involving concrete repair. While there is a high degree of sharing of best practice, there are still differences between the requirements of different designers and a



tendency for the specifications to 'evolve' from one scheme to the next. The Highways Agency's approvals procedures require that these bespoke specifications are reviewed and approved for each scheme, which can be a time consuming process.

While, through the approvals process, the Highways Agency can encourage a degree of consistency across their schemes, this cannot completely eliminate all variation between schemes. This means that each time they receive a tender invitation, contractors and suppliers must carefully review the requirements to ensure that they are completely familiar with the specific requirements of that contract.

## EN 1504

EN 1504 is made up of 10 Parts. Part 1 covers the 'general scope and definitions'. Part 9 describes the 'general principles for the use of the various products and systems' covered by the Standard, including guidance on the selection of repair methods. Part 8 and Part 10 deal with the 'quality control and evaluation of conformity' and the 'application of products and systems and quality control of the works'.

The remaining parts cover the specification of each of the various

- repair products and systems as follows:
- Part 2: Surface protection systems
  - Part 3: Structural and non-structural repair
  - Part 4: Structural bonding
  - Part 5: Concrete injection
  - Part 6: Grouting to anchor reinforcement or to fill external voids
  - Part 7: Reinforcement corrosion prevention.

The techniques and systems covered by Parts 2, 4 and 6 are outside what is typically regarded as concrete repair in the UK and were therefore excluded from PB's commission. It is expected that work to implement these parts of EN 1504 will be commissioned separately by the Highways Agency.

## Highways Agency's Objectives

In commissioning PB, the Highways Agency's main objectives were to prepare a new series of specification clauses and associated notes for guidance for concrete repairs, which can be included in the Specification for Highway Works (SHW) and the Notes for Guidance on the Specification for Highway Works (NGSHW) respectively.

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## TREVOR BOX WINS CRA KEVIN COULMAN AWARD

**T**revor Box (left), of Birmingham City Laboratories, has become the eighth recipient of the Concrete Repair Association's Kevin Coulman Award. He was presented with the accolade by CRA Chairman Tony Hansard immediately following the Association's AGM.

The Kevin Coulman Award is presented to an individual member of the CRA who has given outstanding service either to the Association, or to the concrete repair industry as a whole.

"For the past three years, Trevor has acted as the point of contact for concrete repair technical enquiries emanating via the Association's Technical Advisory Service hotline", commented Tony Hansard. "He voluntarily gives his time to provide advice without charge and as such, is a valuable asset both to the Association and to the industry in general".

Readers can access the CRA's Technical Advisory Service on 01252 357835



**INSIDE** ▶ New Act now in place ▶ Environmental concerns growing ▶ CRA members detailed ▶ Industry Developments ▶ Industry Grapevine

[www.cra.org.uk](http://www.cra.org.uk)

# IMPLEMENTING EN 1504 FOR THE HIGHWAYS AGENCY

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These clauses must be technically robust for use on highway structures and be fully consistent with the requirements of EN 1504. The Highways Agency recognised that the full range of materials and systems covered by EN 1504 would cover a wide range of structural and non-structural applications. Compliance with EN 1504 would therefore not of itself mean that a material or system would be acceptable. The Highways Agency and the concrete repair industry have generally invested a substantial amount of money in developing and proving the methods, materials and systems currently in use and it is essential that this experience and best practice is retained in the new specification clauses.

The newly drafted specification clauses

are to deal directly with the provisions of Parts 1, 3, 5, 7, 8 and 10, covering the requirements for materials, and the associated construction methods and quality assurance procedures. Part 9 describes the general principles associated with selecting an appropriate repair method and the performance characteristics required in particular applications. To implement Part 9, the Highways Agency included in the commission the preparation of a new DMRB document to replace BA35 and those aspects of BD27 which are not covered in the new specification clauses and notes for guidance.

The new DMRB document defines how EN 1504 Part 9 should be used and includes advice on how the generic

solution should be selected in accordance with the guidance given in that Part. It also includes advice on inspections, testing and repair, updating that contained in BA35 and complementing the Inspection Manual for Highway Structures, published in 2007.

## Development of the new Highways Agency documents

The new Highways Agency documents were developed by integrating PB's in-house expertise and experience with a comprehensive literature search and consultation with the Highways Agency, other Overseeing Organisations and maintaining authorities, as well as the wider concrete repair industry.

A workshop, hosted by the Highways Agency and PB in London in July 2007, was attended by representatives of concrete repair contractors, material suppliers and specifiers.

The draft specification clauses and notes for guidance have been developed to be consistent with the Series 1700 of the SHW, which covers structural concrete. They capture the experience and best practice developed over the past 20 years (since the publication of BD27) and align these with the performance characteristics, testing requirements and quality assurance procedures set out in EN 1504. The current draft includes clauses covering:

- particular requirements for repair concrete including those in respect of

- the constituent materials and approvals
- additional requirements for the testing, supply and storage of material
- particular requirements for carrying out concrete repairs including concrete removal, surface preparation, formwork, reinforcement, site mixing, placing and curing
- additional requirements for flowable concrete, repair mortar and sprayed concrete as well as for repairs to receive cathodic protection
- particular requirements for crack injection.

The new DMRB document gives guidance on how the general principles of EN 1504 for the selection of repair systems and materials, set out in Part 9, should be interpreted and implemented for Highways Agency structures. In particular the document sets concrete repair within the context of a structure maintenance strategy including the identification and assessment of defects and their causes, the choice of protection and repair systems and the role of post-repair and preventative maintenance.

## What Next?

The draft documents prepared by PB (which include specification clauses for inclusion in the SHW, associated guidance notes for inclusion in the NGS HW and a replacement for DMRB Advice Note BA35) are currently being reviewed by the Highways Agency. Once this review is complete and any changes to the draft have been made, it is intended that further consultation will take place with the various sectors of the industry before the final version is published.

## IT'S FINALLY ARRIVED *Are you ready?*

By: Paul Verrico, Regulatory Group Solicitor, Eversheds LLP

**A** new era of health and safety regulation for businesses came into force on Sunday April 6th. The new Corporate Manslaughter and Corporate Homicide Act is now in force.

### What is the new law and why was it brought into operation?

For more than ten years, since a labour manifesto election promise, there has been significant political impetus to reforming the law in relation to workplace deaths. Successive high profile accidents such as the Herald of Free Enterprise, Ladbroke Grove and Hatfield train crashes, Piper Alpha and the Marchioness, have led to renewed calls for changes in the law following failed prosecutions against large companies and against individuals for manslaughter.

The new offence addresses criticisms of the current law where, as it presently stands, a single individual, identifiable as the directing mind of the company, has to be personally guilty of gross negligence/manslaughter before the organisation can be convicted.

In essence, the new law makes it easier to convict organisations whose senior managers have breached their duty of care, causing death. Previously, prosecutions have failed against all but the smallest companies, so the new act could potentially see a dramatic rise in the number of corporate manslaughter cases against businesses of all sizes. Only seven companies have ever been convicted under the old common law offence.

The new law will bring further scrutiny to businesses across all sectors as health and safety performance is seen as indicative of the culture and corporate governance of a business. A business that fails to address these issues may find itself not only on the wrong end of very serious charges, but also with a real impact on recruitment, retention, customers and reputation.

### How it will affect your business?

It is more important than ever that health and safety moves up the priority list of your businesses. Of the major changes, the new Act holds all employers accountable for the actions and decisions of their senior managers, rather than one single individual, which was perceived to be the key failure under the old law.

The Government says (in its guidance) that it only expects the new law to be applied to the most serious and obvious cases and those organisations with good safety policies have nothing to fear. It predicts that there may be only a dozen or so prosecutions

under the new legislation every year.

The reality is that every workplace fatality already results in an investigation commenced by the Police looking at the possibility of manslaughter, before passing on responsibility to the Health and Safety Executive or Local Authority to investigate health and safety breaches. Now that the new law is in force, the Police will have to look at the new corporate manslaughter offence, so will remain involved in any workplace fatality investigation for far longer.

There will surely be considerable pressure in reality to test the water with the new offence. On top of this, the penalties will become far more severe with the Courts potentially encouraged to fine a guilty company based on a percentage of annual turnover - a recommendation outlined in a recent consultation paper from the Sentencing Advisory Panel. The starting point recommended by the Panel (which is not yet in force) was for a fine of 5% of an organisation's turnover, rising to 10% of turnover in the worst cases.

In addition, a convicted company may be forced to publicise their offence and write to customers and suppliers notifying them of their conviction, which could be extremely damaging to the business' reputation.

### How should you prepare for the Act?

Businesses with a strong commitment to health and safety, which is followed through in practice, should have nothing to fear. However, it is vital that all companies are up-to-date with the new law. Some key steps include:

- Identify potential areas for risk and address them immediately
- Check all health and safety policies are up-to-date and are consistently reviewed
- Ensure all senior management are trained in health and safety and are aware of the implications of the new legislation
- Re-visit road risk - does the organisation have a clear driving policy
- Audit your safety management system
- Check that your crisis management plan is current with relevant contact details.

### NOTE FROM ED:

*Eversheds have trained more than 1,000 delegates on the implications of the new Act and have developed a bespoke in-house course.*

ENQUIRY No: 2101

## CURRENT ENVIRONMENT *How are they impacting*

By: Mark Woods, Managing Director of Statius Management Services Ltd

**L**ove it, or loathe it, environmental concerns are moving up the management agenda. Modern 'Greens' have been active internationally since about the mid sixties. More recently and more pertinently, however, there has been a surge in government and business interest.

The first major milestone was probably the 1990 Environmental Protection Act. This was quickly followed by the 1992 Rio Earth Summit, where 150 world leaders agreed to take action on quality of life issues, agreeing on Agenda 21; an agenda for the 21st century. After the Earth Summit came the Kyoto Protocol and more latterly the critical economic tome of the 2006 Stern Report, which spelt out the impact of climate change and environmental mismanagement.

As a result of the Rio Earth Summit, 27 environmental principles were also agreed and later reproduced in the rear of the 1996 publication, the then new environmental Standard ISO 14004, which is the sister Standard providing guidance to the ISO 14001 environmental management system Standard. Also published as an appendix to this Standard were the environmental principles developed by the International Chamber of Commerce (ICC).

This thinking at the international, or even planetary level, then cascaded down into national and local initiatives, which directly affect a range of companies and those involved in concrete repair are no exception.

In the UK there are 15 government headline indicators influenced by the findings of the Rio Summit. H1 to H3 are economic indicators and H9 to H15 are environmental protection indicators, e.g. climate, air quality and land use. At the local government level, there are a further 29 'local quality of life' indicators developed from the 15 headline indicators. The environmental management section of these 29 indicators has 2 groupings - prudent use of resources and protection of environment.

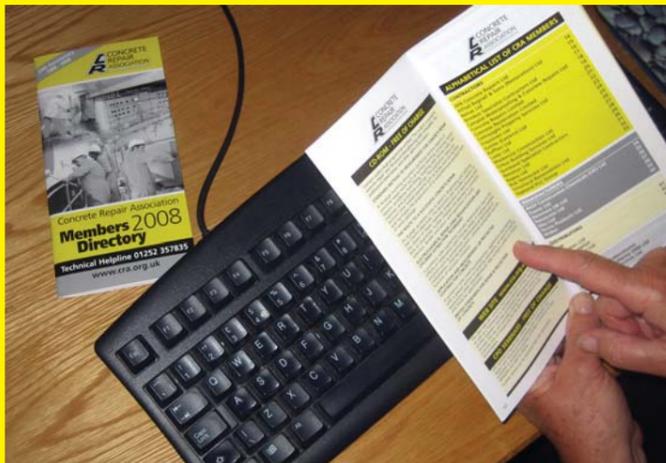
This is all very well and all very technical, but how does it affect us you might ask.

Well, central and local government indicators are being measured and monitored by bodies like the audit commission against (1) how they are performing and (2) how they are influencing their supply chain to improve their performance. As a result, at the top level central and local government departments are using the tender process to apply pressure usually to organisations like the MCG (Major Construction Group) to improve their environmental performance. These companies, consultants and architects, then apply the same thinking to their supplier base thus increasing the pressure on the whole range of construction and sub contractor companies.

# DETAILING THE UK'S CONCRETE REPAIRERS

The handy and popular one-third A4 sized CRA Members Directory for 2008 has been updated and published.

As well as including information on each of the CRA's thirty-five member companies, the document is specifically intended to be of practical, every-day use to Clients, Specifiers, Consultants, Surveyors and Local Authorities involved in the practice of concrete repair and allied activities.



The 58-page, pocket-sized booklet gives information on each specialist contractor, product manufacturer and product distributor member, as well as associated organisations. The pages list head and regional office locations, web sites, email details and the names of primary contacts. They also include a description of the company's specialist concrete repair capabilities (or in the case of manufacturers - its products) and third party accreditations.

To assist selection when compiling tender lists for concrete repair work, each contractor's entry includes details of contract values catered for, the company's largest contract to date, its total turnover, the value of its concrete repair related business and its geographical area of operation.

The Directory also contains details of the Association's technical helpline; its NVQ/CSCS related training scheme, Codes of Practice, a bibliography of allied documents and a list of closely related organisations. It also provides information regarding the Association's free CD-ROM, which contains audio-visual programmes on 'The route to a successful concrete repair' and 'Structural strengthening with composites', as well as other useful Advice Notes.

Copies of the 2008 edition are available free of charge and can be requested via the Cracking Matters Reader Enquiry form.

## ENVIRONMENTAL DEMANDS on your operations?

Company comments such as "2-3 years ago the pre-qualification questionnaire (PQQ) used to have only one or two questions relating to the environment. Now there is a whole section devoted to our environmental credentials", are becoming the norm.

In addition, to the uninitiated these questions are both difficult to understand and time consuming to complete. An amalgam of real examples is as follows:

- What is your approach to environmental matters relating to the product or service you provide?
- In particular detail your views regarding sustainability and how you would be a 'good neighbour' in the execution of your works
- Does your Company audit the impact it may have on the environment? If so, how and what are the results?
- Does your Company set any targets for improving its environmental performance? If so, what are they and how have you improved?
- Please describe how you design out waste from your processes
- How is your environmental policy brought to the attention of your employees?
- Please identify the environmental legislation that is applicable to your business and describe the steps you take to comply.

The answers to these questions are not easy and may depend on a number of variables within any given company and their clients requirements. For instance (and this list is obviously not exhaustive!):

- The predominant type of client, e.g. central/local government, MCG, Blue Chip, domestic, etc
- The type of work undertaken, e.g. bridges, highways, airports, car parks, etc
- The preparation methods, e.g. grit blasting, chemical treatment, power washing
- The type of system and processes employed, e.g. single coat, 2 part, cathodic protection
- The materials employed
- The contract requirements, e.g. who is responsible for preparation, who is responsible for the waste generated.

In conclusion, most of the political and scientific elite believe that environmental management, climate change and sustainability are issues. They are possibly the biggest challenge that man has ever faced and that the sooner they are tackled, the less severe the impact is likely to be. Individuals and companies can view this as an opportunity or a threat. The choice is yours.

ENQUIRY NO: 2102

Notes from Ed:

- (1): The CRA has agreed that all its members should work towards achieving ISO14001 by 2010.
- (2): Statius Management Services Ltd is a consultancy practice specialising in raising standards and optimising organisational performance.

# INDUSTRY Developments

Use the enclosed Reader Enquiry form to obtain more information

## WEBER CONCRETE MORTARS MEET NEW BS EN1504 REPAIR STANDARD

The Weber range of high performance technical mortars for civil engineering, concrete and crack repair meet the new BS EN1504 standard, the tough new regulations which come into force across Europe in January 2009. This unified standard, to which Weber has made significant contribution in both time and financial investment, details the technical performance criteria for the protection and repair of concrete structures. Weber is already providing technically compliant data to assist with these complex new regulations and a new RIBA approved CPD module is now available.

Weber. Tel: 01525 722169. www.netweber.co.uk

ENQUIRY NO: 2103



## NEW 'HERITAGE' BROCHURE FROM CRL

Leading structural refurbishment contractor, Concrete Repairs Limited (CRL), has published a brand new brochure illustrating the company's specialist capabilities in the Heritage sector.

CRL provides a professional service through a network of offices across the UK. The Company operates at the leading edge of refurbishment technology and, if the conditions demand, has access to the latest corrosion control techniques for minimising repairs and enhancing durability.

CRL services include Condition surveys; Feasibility studies and trial repairs; Full external façade renovation and cleaning; Concrete masonry and stonework repairs to match the existing colour and texture; Installation of resin anchors; Replacement of precast units to match existing; Protective coatings; Corrosion inhibitors and Cathodic protection systems.

Tel: 020 8288 4848. Website: www.concrete-repairs.co.uk

ENQUIRY NO: 2104



## FREYSSINET LIMITED PURCHASE MAKERS INFRASTRUCTURE NORTH

Freyssinet Limited, the specialist repair and strengthening company based in Telford, Shropshire, acquired a number of assets from Makers UK Limited in October 2007.

The new company has become a division of Freyssinet and will be known as 'MAKERS Freyssinet'. It will continue to operate from its existing bases in Glasgow, Belfast and Dublin, servicing contracts in Scotland, the North of England and Ireland.



Operations for the remainder of the UK are also being carried out from Freyssinet's Head Office in Telford.

MAKERS Freyssinet will continue to operate in all existing markets but will provide a far wider range of services and products, backed by the technical support and overall strength offered by the Freyssinet Group.

For more information telephone 01952 201901, or e-mail: info@freyssinet.co.uk

ENQUIRY NO: 2105

## STEEL FRAME CORROSION CONTROL

Many steel framed buildings constructed in the early part of the 20th century were clad in brick, stone and terracotta, which is often in intimate contact with the steelwork. Any corrosion on the steel frame, however, will cause façade cracking and spalling, which is why specialist contractor Concrete Repairs Ltd (CRL) has just produced a new brochure highlighting the problems, as well as the answers.

Impressed current cathodic protection (ICCP) controls the steel frame corrosion, is remotely monitored when installed and provides long term durability for this increasing problem on buildings. The installation of ICCP systems often reduces the extent of intrusive façade repairs and thus the overall refurbishment costs to the client.

CRL services include Façade surveys and NDT inspections; ICCP Feasibility studies; Conceptual and full ICCP system design; ICCP installation commissioning and on-going monitoring.

Tel: 020 8288 4848. Website: www.concrete-repairs.co.uk

ENQUIRY NO: 2106



## FREYSSINET LIMITED (incorporating Makers Freyssinet Ltd)

Structural Repair and Strengthening Specialist



- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| ■ Specialist Concrete Repairs         | ■ Structural Investigation & Survey |
| ■ Cathodic Protection                 | ■ Full Car Park Refurbishment       |
| ■ Chloride Extraction/Re-alkalisation | ■ Specialist Coatings               |
| ■ Crack Injection                     | ■ Bridge Bearing Replacement        |
| ■ Plate Bonding/Composite Wrapping    |                                     |

ENQUIRY NO: 2107

Tel: 01952 201 901 Email: info@freyssinet.co.uk www.freyssinet.co.uk

## ARE YOU COMMITTED TO SUSTAINABILITY?

The world is changing very quickly and so is people's awareness of the planet's limitations.

This means that methods of distributing information, to those who need to be in the know, are being examined in greater and greater detail. One of the reasons, for example, the CRA produces 'Cracking Matters' in hard copy format is because 80% of the Association's database (created over many years and consisting entirely from individuals that have previously requested information from the

Association) is held in name and address format only. That's around 4,800 individuals.

Whether people wish to receive 'Cracking Matters', technical or advisory industry information by email or in hard copy format remains debatable but, like everyone else, the CRA is moving towards playing its part in managing resources. If you, therefore, wish to receive future information by email, complete the 'Reader Enquiry Form' and fax-back to the number shown.

## METALLISATION PROTECTING ANGLESEY'S ALUMINIUM JETTY

CRA member, Brookes Specialist Contractors Limited, has recently completed a major anti-corrosion protection project, using Thermal Arc spray technology, to protect reinforced concrete beams on the Anglesey Aluminium Jetty in Wales.



The offloading jetty is an essential asset for Anglesey Aluminium as it enables them to take delivery of raw materials directly into its UK aluminium processing facility. Being exposed to the harsh environment of the sea, the natural presence of salt had contaminated the concrete and caused corrosion of the steel reinforcing bars.

Simple concrete repair would not have provided sufficient long-term protection so Brookes applied 'Asset Guard', a unique aluminium/zinc/indium anode, developed to provide electro-chemical protection for steel reinforced concrete structures. Application of the sacrificial surface treatment means that the coating itself will bear the attack, rather than the steel reinforcing bar.

BROOKES - Tel: 0161 789 0901

## THE FUTURE IS BRIGHT - ON!

CRA member, Structural Renovations Ltd, has successfully carried out stabilising work on decorative Victorian lamp posts at Brighton Seaford, using a Sika Ltd (another CRA member) resin.



Over the years some of the top spigot sections had worked loose within the bottom socket section of each post and required 'tightening up'. This was achieved by drilling through the cast iron base into the gap and injecting with Sika Rail KC330, a 2-part flexible resin normally associated with stabilising track in the rail industry.

STRUCTURAL RENOVATIONS LTD - Tel: 01753 825511

## TOP COATS ELIMINATED WITH NEW RENOCON WATERPROOFING SYSTEMS



In line with the company's ongoing policy of introducing new technologies, CRA contractor member Renocon Ltd has launched two new systems developed by

DWS (Deutsche Waterproofing Systems), one of Europe's largest waterproofing and liquid roofing system manufacturers.

The new waterproofing systems are based upon a range of polyurethane liquid membrane and polyurea coatings, which have the added advantage of not requiring top coats. They are fully compatible with all types of traditional roofing methods, as well as existing waterproofing membranes.

The systems are fully compliant for the roofing and waterproofing of car parks and marine environments and strengthen the external façade package supplied by Renocon.

RENOCON LTD - Tel: 020 7538 5492

## DEXTERITY AND LATERAL THINKING

CRA member, Laser Special Projects Limited has employed Houdini-like dexterity combined with lateral thinking to carry out concrete repair work on the M4 elevated section in West London.

Inspections on the viaduct, built in 1967, revealed that de-icing salts had seeped past the road deck's asphalt plugs at the joints and penetrated the concrete crossheads, promoting corrosion of the internal steel reinforcement.

Since closing the elevated section for conventional replacement or repair of the crossheads was unthinkable, the designer Chris Atkins of Mott MacDonald (assisted by Laser), came up with the innovative idea of drilling a single hole through the 18m length of the crosshead to enable the installation of a cathodic protection system. Upon completion, a string of anodes were introduced into the void and connected up, before grouting with a cementitious compound.

The unique repair approach reduced the drilling element of the works by 170 metres per crosshead significantly reducing both noise and traffic management requirements.

LASER - Tel: 01905 742750

## WEBER TO BUILD NEW PRODUCTION UNIT IN TELFORD

Construction materials manufacturer Weber has commissioned the building of a state-of-the-art production and warehouse facility in Telford, Shropshire - with completion scheduled for summer 2008.

The eight-acre site will initially accommodate a 5,500m<sup>2</sup> factory designed to output 80,000 tonnes of facade renders and tiling adhesives annually. This is in addition to Weber's existing manufacturing sites which will remain fully operational. The design follows an architectural and technical template already employed by Weber in other European countries and will include the iconic 33m high round production tower.

"The new facility will free up capacity in the Bedfordshire factory where our technical mortars will continue to be produced," says Kevin Medhurst, Plant Manager. "This is only the first stage of our UK expansion plans in what will undoubtedly be Weber's flagship plant." The BREEAM certified factory is designed to meet the most stringent emissions criteria.

WEBER - Tel: 01525 718877



## CEMPLAS 'BRIGHTON' UP CAR PARK

CRA member, Cemplas Waterproofing & Concrete Repairs Ltd, has completed the refurbishment of a leaking asphalt podium deck forecourt, above an underground car park in Brighton, for the Adenstar Group.

The worn, cracked and leaking deck was the cause of water penetration into the car park beneath. The project required the removal of the asphalt, the reinstatement of a screed to falls and the application of a new waterproof decking system.

Working in conjunction with the Hemsley Orrel Partnership, Cemplas were supplied with a specification to apply the Sikafloor 350 elastomeric car park waterproofing system to the podium deck. In addition, Cemplas also reinstated the perimeter construction joints and undertook the line marking of the car park bays.

CEMPLAS - Tel: 020 8654 3149



## 'BENTS' STRAIGHTENED OUT

CRA member, Concrete Repairs Ltd (CRL), has completed a complex concrete repair and cathodic protection scheme on the M6 Ray Hall Viaduct; the elevated section of the M6 that crosses the M5 slip road near Walsall, in the West Midlands.

The project included the repair of seven unsupported reinforced concrete crossbeam, panel walls and columns, known as 'bents', which form part of the substructure supporting the longitudinal steel beams and deck slab of the viaduct. Repairs involved the employment of hydro-demolition preparation techniques, reinstatement using flowable repair concrete, strengthening of one bent and the installation of a Cathodic Protection (CP) system.

The restoration of each bent was carried out in a strict sequence of small repairs. On traditional contracts the repairs would be considerably larger with the temporary supports protecting the structure.

CRL - Tel: 020 8288 4848



## Not strictly concrete repair...



Stairway to heaven? What, we wonder, would Health & Safety Officers in the UK construction industry make of such a practice?

# CURRENT CRA MEMBERS

Contractors:	Telephone:
APA CONCRETE REPAIRS LIMITED	01422 379640
ALFRED BAGNALL & SONS (RESTORATION) LTD	020 8311 3910
BALVAC LTD	0151 650 0184
BROOKES SPECIALIST CONTRACTORS LTD	0161 789 0901
CEMPLAS WATERPROOFING & CONCRETE REPAIRS LTD	020 8654 3149
CONCRETE REPAIRS LIMITED	020 8288 4848
CONCRETE RESTORATION LTD	020 8994 8860
CONNAUGHT PARTNERSHIPS LTD	01293 572200
FREYSSINET LTD	01952 201901
GUNITE (EASTERN) LTD	01480 466880
KAFFTEN LTD	01787 237980
LASER SPECIAL PROJECTS LTD	01905 742750
MACKENZIE CONSTRUCTION LTD	0141 633 5555
QUICKSEAL SPECIALIST CONTRACTORS	01234 354198
RENOCON LTD	020 7538 5492
REPEX LTD	01435 866666
ROK STONECARE LTD	01924 348350
STRUCTURAL RENOVATIONS LTD	01753 825511
TOPBOND PLC GROUP	01795 414050

Manufacturers:	Telephone:
BASF CONSTRUCTION CHEMICALS	0161 794 7411
FOSROC LTD	01827 262222
REMMERS (UK) LTD	0845 373 0103
RONACRETE LTD	01279 638700
SIKA LIMITED	01707 394444
TECROC PRODUCTS LTD	01827 711755
WEBER	01525 718877

Distributors:	Telephone:
BBM	01234 268452
BUILDSPAN LTD	0845 025 4321
EPMS SUPPLIES	01132 760037
W.T BURDEN LTD	0117 941 5495
RESAPOL LTD	01942 609001

Associates:	Telephone:
BIRMINGHAM CITY LABORATORY	0121 303 9300
THE CONCRETE CONSULTANCY 2000 LTD	01707 647266
MARTECH TECHNICAL SERVICES LTD	01487 832288
ORBUS BUILDING SERVICES LTD	0141 647 7677

NOTE FROM ED ... Unfortunately, we're unable to bring you the regular light-hearted 'industry comment' article in this edition, but hope to have it back for the next issue. This, however, does not mean that our usual 'funny' should not be included, so here's this issue's contribution.

A lawyer is consulting his client ...

Lawyer: "We have now received the blood results and I have some good news and some bad news"

Client: "What's the bad news?"

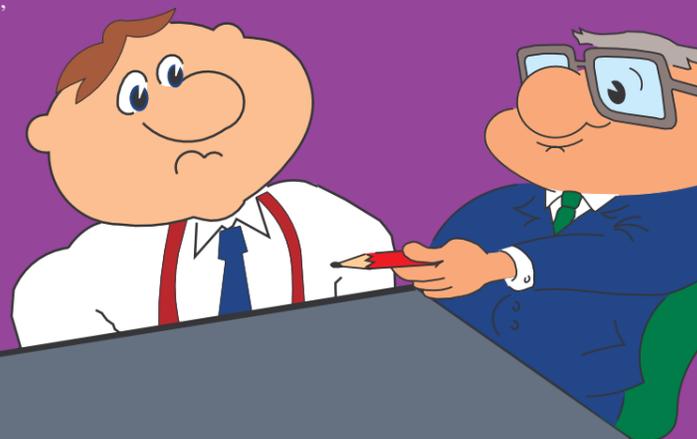
Lawyer: "I'm afraid that your blood has been found on the murder weapon, on the victim's shirt and on the carpet where he died"

Client: "That's dreadful. I'll go down for thirty years!!"

Lawyer: "Yes, I'm afraid it's looking that way"

Client: "This is terrible. At my age I'm unlikely ever to get out. What's the good news?"

Lawyer: "Your cholesterol is down to 5.2"



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