



# The Arrival of British Standards for Concrete Repair

By: Roel van Es, BSc(Hons), MCS, MICorr., Associate Director of Makers UK Ltd, who has been involved on various committees working on the production of standards on Concrete Repair for more than ten years - more recently as CRA representative on the main BSI committee, actively supporting the UK Chairman, Hywel Davies.

The publication of the BS EN 1504 series of British Standards will, for the first time in the UK, provide a comprehensive set of standards for concrete repair. They therefore represent an opportunity to further improve UK practice. They also present a challenge to the industry, which needs to adapt to these standards as they are issued. In an industry previously devoid of specific British Standards, this will be a significant landmark.

The new British Standards will have a significant impact on repair and protection work throughout the UK, especially in the design and execution of repair works. Introduction of the Standards is also relevant in the context of the current drive to improve supply chain integration and to increase the value of specialist input to projects in the early design stages, when it can be most beneficial.

## NEW BRITISH STANDARDS

The new British Standard BS EN 1504 series cover the whole repair process, from first identification of a potential problem, right through the on site works, to ongoing inspection and maintenance. They specifically advocate a whole life cost approach, based on the anticipated future needs of the client and the functional requirements of the building or structure.

The series can be viewed on the CRA web site at: [www.concretereport.org.uk](http://www.concretereport.org.uk) There is a selection of relevant material there, including detail of the many supporting standards.

Of greatest relevance to many will be Part 9 and Part 10 of the ten-part BS EN 1504 series, dealing with design and site execution

respectively. Given the overarching nature of the key Part 9 of the BS EN 1504 series, which has been available from BSI since 1997, it is worth briefly reviewing the structure and basic philosophy of design of concrete repair set out in Part 9.

Historically Part 9 builds on the work of the international RILEM Technical Committee on repair strategy (Schiessl, 1994) and on the work of the German Society for Reinforced Concrete (1991). From the outset it was stressed that this standard should not be a code of practice, but a framework for the whole process of determining the need, assessing the extent,

and delivering a repair package, using materials and systems which have been tested in accordance with the European standard test methods. Initially the standard set out to address the whole process from inception to completion on site, but this proved impractical. The standard therefore has two parts reflecting the design and site execution processes, respectively:

Part 9: General principles for the use of products and systems.

Part 10: Site application of products and systems and quality control of works.

Part 10 is at formal vote stage within CEN and publication is expected early in 2003.

Early issue of Part 9 as an ENV in 1997 was justified on the basis that the design approach is the key to the success of the whole repair process. Formal adoption as an EN will ensue when the remaining Parts of BS EN 1504 are

... new standards will increase the value of specialist input to projects...



(Pictures by kind permission of CRA member Makers UK Ltd)



published. The new British Standards will require significant changes in practice by many in the industry.

Whilst some manufacturers and contractors have shown interest, recent industry feedback events on draft materials specifications have indicated that there is a significant lack of understanding of and planning for the implications of the new Standards.

## BEST PRACTICE

To ensure that they derive the full benefits, repair contractors, materials suppliers, construction professionals, as well as building owners and operators, need

information, guidance and support for the introduction of the new British Standards.

Continued on page 2

## Free advertising?

Advertisements inviting companies to tender for concrete repair and associated work can be regularly seen in the various journals that serve the construction market.

It is, no doubt, incumbent upon many clients to invite tenders in this manner.

In order to augment such public notices the CRA has been debating an idea to allow clients to include these tenders on the CRA web site also, thus enabling their message to be directly targeted at specialist repair contractors and material manufacturers.

It is proposed that details would be included within a special section of the Association's web site, **completely free of charge.**

Before progressing matters, however, the Association wishes to gauge its readers' reaction to the idea. It would therefore be appreciated if you would indicate whether you approve of such a scheme, or otherwise, by ticking the relevant box and returning the enclosed Fax-Back. Alternatively, should you wish to submit a more detailed response, please write to the Editor, Cracking Matters.

## What's happening to the insurance industry?

Much has been written and talked about in the national media recently about the problems with the insurance industry. Certainly many contractors (and CRA members are no exception) are extremely concerned about rocketing insurance premiums - in some instances up by an incredible 1,000%. Imagine the impact on your business if your average premium is normally £50,000 or so!

So, what's going on? And just as important, what are the likely knock on effects?

According to some informed people that the CRA has talked to recently, the primary reasons for the increases are four-fold.

Firstly, because of a recent spate of disasters, caused by El Nino, global warming and September 11, the re-insurance market has been overwhelmed by the primary insurers and as a consequence, has paid out heavily. Secondly, a large number of insurance companies, wishing to maximise income from premiums, whilst reducing their exposure to risk, have switched their marketing emphasis into niche sectors. Many will simply no

longer take on employer's liability since the ratio of premium to pay out is less than for, say, household contents cover. Thirdly, those companies offering cover such as buildings insurance, an area formerly dominated by some very active independent insurance companies, have experience a very difficult period. As a result they now insist on a better ratio and therefore premiums have risen disproportionately, in some cases six-fold year on year.

Continued on page 3

## INSIDE

- CRA members news
- New CRA Chairman
- H&S warning
- Report concern
- I don't believe it!

# The Arrival of British Standards for Concrete Repair

Continued from page 1

Dr Hywel Davies of Hywel Davies Consultancy, a freelance consultant who has been active in the development of the Standards for over ten years as the Chairman of the relevant BSI committee and as the UK delegate to CEN TC104 SC8, has been awarded a DTI Partners in Innovation project, Best Practice in Protection and Repair of Concrete Structures.

It will publicise the introduction of the new BS EN 1504 series of standards on Concrete Repair. It aims to reach specifiers and clients, as well as the suppliers and contractors involved in the industry.

Details can be found on the CRA website.

## NEED FOR GUIDANCE

The UK currently spends hundreds of millions of pounds annually on repair, maintenance and replacement of reinforced concrete. Whilst much of this is effective and gives value for money, a small but significant amount of work fails prematurely, causing extra costs and further remedial work.

Further remedial work disrupts the business activity or public service delivered by the facility. Disruption also causes social costs, particularly with infrastructure or social housing facilities, where occupants may have to be decanted, or service users suffer delays to journeys due to works. Environmental costs due to the waste, noise and pollution also arise from additional repair works.

Whilst these costs are always considerable, the additional cost of using appropriate repair products and methods for the original repair would often have been small by comparison. The marginal costs of good materials and site practice are a small fraction of the potential costs of premature failure.

Because good practice costs more in the first instance, in a lowest first cost culture it is placed at a competitive disadvantage, even though it delivers better value and lower

whole life costs. The contribution of good practice to achieving best value over the whole life of an asset is currently not widely considered and understood in the industry as a result of the client driven short-term lowest initial cost culture. There are, however, signs that this is changing, with increasing interest in whole life costing.

The DTI project seeks to provide guidance and information on the contribution that adoption of the new standards can make to the development of best practice in repair and protection of concrete structures, and to a whole life cost based approach to repair works. This will also of course benefit clients as they seek to demonstrate that they are delivering best value, whether to shareholders or to taxpayers.

# NEWS from CRA Members

Use the enclosed Fax-Back to obtain more information

## SOLUTIONS FOR EVERY APPLICATION

Caught in the same shot, the newly converted Baltic Arts Centre and Millennium Eye Bridge, that dominate the riverbank of the Tyne at this point, graphically illustrate the wide range of solutions that **weber sbd's** construction portfolio offers both Building and Civil Engineering projects.

Winner of the prestigious RIBA Stirling Prize, the dramatic footbridge literally 'sits' on weber's high performance grouts. Used in critical areas under the bridge 'hinges' and to support vital gear mechanisms in the machine rooms, these grouts were chosen because of their reliability and performance history.

The highly acclaimed Baltic conversion drew on other products from the portfolio, in the areas of waterproofing and in concrete and pavement repairs. The extensive range holds many other problem solvers for Designers and contractors working in the demanding Civil and Building Conversion arenas.

For further details telephone: 08703 330070.

ENQUIRY NO: 1001



## FOR ACCRETE ... READ MAKERS

Specialist partnering contractor **Makers UK Ltd**, a subsidiary of global construction services provider - the Keller Group plc, has significantly strengthened its position in the UK water and wastewater market through the recent acquisition of the entire share capital of specialist repair and refurbishment contractor **Accrete Ltd**.

The acquisition of Accrete, who is firmly established in the refurbishment of water industry sites, represents a strategic move by the company. A Makers spokesman commented, "The recent acquisition will enhance the position of the Makers Infrastructure Division as a major contracting organisation in the utilities sector and through its already proven and successful 'partnering' initiative will provide an excellent platform for significant business expansion".

For further information telephone: 01462 477333.

ENQUIRY NO: 1002



## HIGH PROFILE PROJECTS UNDERTAKEN BY MACKENZIE CONSTRUCTION

Mackenzie Construction is undertaking refurbishment and strengthening works on two road structures for the Land Services Department of Glasgow City Council - the historic King George V Bridge over the River Clyde and the Finnieston Flyover on the Clydeside Expressway. Both projects require extensive traffic management.

At KGV, works include hydro-erosion, structural repairs to reinforced concrete, repairs & refurbishment of existing bearings, deck waterproofing, carriageway construction and footpath strengthening. The Finnieston flyover, a more modern structure, also includes the replacement and strengthening of the existing parapet and drainage improvements. Mackenzie is delighted to be involved in these high profile projects.

For further information telephone: 0141 633 5555

ENQUIRY NO: 1003



## FLEXCRETE PROTECTION SYSTEMS FOR MARINE STRUCTURES



Recognised as a foremost supplier of repair and refurbishment systems for marine structures, **Flexcrete Limited** has a complete range of systems designed to overcome the unique and rigorous demands placed on engineers and specifiers responsible for maintaining the integrity of structures such as coastal defences, wharves and pier decks.

Flexcrete's range of purpose designed marine mortars, sprayed mortars and specialist cementitious coatings ensure optimum performance in wet, chloride laden environments and offer excellent resistance to wash-out. Flexcrete marine products can be installed between tides to damp substrates and will cure under water to form a resilient, durable finish that resists abrasion and chloride ion diffusion.

For more information telephone: 01772 255074.

ENQUIRY NO: 1004

## INVESTIGATION & TESTING IN CONFINED SPACES

**Birmingham City Laboratories (BCL)** have recently entered into a partnering arrangement with a major local authority to provide specialist investigation and testing to a number of highway structures, which require working in areas classified as confined spaces. BCL has therefore expanded its training programme in order that additional team members can become certificated and competent in confined space entry.

BCL's Building Investigation Section is able to carry out a wide range of specialist tests, surveys and in-house analysis.

For an information pack or general enquires please contact Trevor Box - telephone 0121 303 9300



ENQUIRY NO: 1005

## BROOKES CONCRETE SURVEYS AND INVESTIGATIONS

**Brookes** offers the following concrete testing and survey services: -

- Visual Inspections
- Delamination Surveys (Hammer Testing)
- Covermeter Surveys
- Carbonation Depth Testing
- Sampling of concrete for analysis by independent UKAS accredited testing laboratories
- Half Cell Potential Mapping
- Electrical Continuity Testing
- Concrete Resistivity Measurement
- Rate of Corrosion Measurement
- Production of Tender Documentation, including Drawings, Specifications, and Bills of Quantities

Plus a **FREE** initial visual assessment

For more information telephone: 0845 601 8319.

ENQUIRY NO: 1008



## YOLDINGS AT SILVERTOWN - JOB AND FINISH



Against some of the toughest opposition in the industry, Hailsham based contractor **Yoldings Ltd** secured the contract to refurbish the Silvertown Flyover in the London Borough of Newham. With credibility in Health & Safety and provable site skills being regarded as being as important as price by the client, Yoldings were able to demonstrate superiority in all three areas.

With a requirement to undertake; cathodic protection, spray concrete repairs, traditional repairs and general upgrades within a short time period, the project required a high degree of site management. By dedicating both a specialist site agent (Alan Oliver) and a highly skilled and experienced supervisor in Andrew "Bill" Bettison along with their support crews, the Yoldings operation was kept under tight control and the job brought in on time and budget. For more details contact Allen Broad on 01323 442288.

ENQUIRY NO: 1009

## CRL SECURE HIGHWAYS AGENCY PARTNERING AGREEMENT

Specialist main contractor **Concrete Repairs Ltd (CRL)** has secured two four-year partnering agreement packages (with the option of an additional three years) for an estimated £8m worth of concrete repair and cathodic protection work on Highways Agency Areas 9 and 10.

Under the agreement, CRL will be responsible for bridge refurbishment works in Area 9, comprising all Midland Links motorways and Spaghetti Junction, in Birmingham, parts of the M42, M6 and the M5 as far south and west as Chepstow and Shrewsbury. Area 10 in the Manchester region involves the M60 orbital motorway, parts of the M6, M53, M56, M61, M62, M67 and major trunk roads.

CRL anticipate the bulk of the work to be repairs on the elevated section of the Midland Links motorways. For further details telephone John Drewett on 020 8288 4848.

ENQUIRY NO: 1006



## SIKA AT WORK: BUILDING & CAR PARK REFURBISHMENT

**Sika** is a world leader in proven, high performance construction chemicals. Our latest newsletter showcases project information in relation to a range of activities and products, including the following:

- ▲ CORROSION INHIBITORS - with proof of effectiveness
- ▲ CAR PARKS- deck waterproofing & full product portfolio
- ▲ CONCRETE REPAIR / PROTECTION - unrivalled durability
- ▲ BALCONY DECK WATERPROOFING
- ▲ STRUCTURAL STRENGTHENING - using carbon fibre plates
- ▲ INJECTION TECHNOLOGY FOR FILLER JOIST CONCRETE

We offer a free and comprehensive technical support service. Please contact Mike Moore on 01707 394444 for assistance

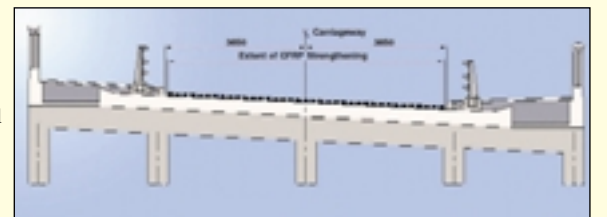
ENQUIRY NO: 1007



## MBT PRODUCTS STRENGTHEN THEYDON BOIS VIADUCT

**MBT Feb** recently worked in partnership with Mouchel and Makers UK Ltd, to repair and strengthen railway arches at Theydon Bois viaduct for Essex County Council. The project increased the multi-span road-over-rail structure's weight restriction from 17 to 40 tonnes.

The underside of the viaduct was in poor condition where the original concrete had spalled, leaving the steel rebars exposed. The rebars were beginning to corrode and this was treated by taking back the concrete and reinstating it by shotcreting with MBT's Shotpatch 12. On the surface of the bridge, pre-bonded MBT-MBRACE® carbon fibre plates were installed to the road surface for extra reinforcement.



ENQUIRY NO: 1010

# Health & Safety - you have been warned!

By: David Bowen Bravery, Partner, Mitchell, McFarlane & Partners

As any experienced Engineer or Contractor will tell you, there is no such thing as a safe building site and there probably never will be, despite the modern politically correct drive for seemingly complete risk free operations. For as long as humans are involved in any activity, risks will remain. This is a fact of life. However, nobody in their right mind would wish the past (or current) accident rate on building sites to continue. Much can be done through both design and site practices to significantly reduce risks and thus accidents during and after construction. Of course, an article of this brevity cannot possibly seek to address all the issues in this vast subject, but it can cover some of the aspects that are particularly close to my heart; following many years of involvement in health and safety issues both within our Practice and advising clients.

Traditionally, Consulting Engineers considered health and safety to be solely a Contractors responsibility and ridiculously dangerous practices on site were ignored with the attitude 'it's not my problem'. However, litigation and the issue of the CDM Regulations in recent years, has changed this thinking and Engineers have been forced to take a more proactive role in health and safety matters, not only at design stage but also at construction stage. Responsible

Engineers have quickly appreciated the benefits to site safety that can be achieved by their active participation albeit, I'm afraid, that some still consider their involvement in such matters to be purely part of the growing 'fashion' of new regulations and red tape. Accordingly their input on safety issues is tailored to do as little as possible to comply with the Regulations. This negative attitude is both risky and disappointing particularly when people's lives are at stake. The issue of health and safety and designers responsibilities is here to stay and rightly so. It is very clear that in future the HSE will be looking very carefully at the role of all CDM duty holders, not just the Contractor.

The new CDM Regulations created a new role in the design/construction process by way of the Planning Supervisor.

My original understanding, from discussions with the HSE, was that it was envisaged a member of the design team should have undertaken this role. In practice, however, it has spawned a whole new breed of professionals whose sole role is that of undertaking Planning Supervisory duties. Whether this state of affairs is a good thing or a bad thing is open to debate, but the most common result is that the Pre-construction Health and Safety Plan, envisaged by the HSE as being a simple document (immediately available) that would highlight risks that would not be apparent to a reasonably competent Contractor, has become a major document that attempts to pick up every conceivable risk and serves mainly to protect the Planning Supervisor rather than assist the Contractor in his appraisal of the most critical health and safety issues. The Contractor is generally already overwhelmed with a mountain of contract documents and the addition of a voluminous Pre-construction Health and Safety Plan simply does not help in any way. A Contractor is far more likely to read a short simple document that highlights the major risks. Two major ring binders containing everything but the kitchen sink will just be put on the shelf and forgotten. This may not be palatable to some but I believe it to be a true reflection of what often happens. In the case of the CDM Safety Plan I believe that the old adage of 'less is more' should be generally adopted.

Contractors, of course, have a mandatory duty to provide a safe place of work. This is now much more clearly defined by the HSE who are themselves currently taking a far more proactive role and conducting site 'blitzes' in many areas. They are also recruiting more staff so this activity can only increase in future. If this saves lives and serious injury on site, I am all for it. It is my understanding that the HSE will be strongly challenging Contractors on a range of topics but

most importantly on three main issues. The use of ladders to carry out work, site welfare facilities and working from height. In addition, they will be carefully looking at hand arm vibration, asbestos, manual handling, noise and transport. Be warned. They really mean business and are increasingly resorting to court action, which often results in the imposition of hefty fines, which are not always restricted to the contractor but also to employers and other members of the design team.

Consulting Engineers visiting site have a duty of care to bring dangerous site practices to the attention of the Main Contractor. This is sometimes difficult to achieve. Main Contractor presence on site is often cursory, the site operations seemingly being run by any number of uncoordinated sub-contractors. Some clients are even writing such duties into

Engineers/Surveyors Conditions of Appointment, sometimes in an attempt to avoid their own responsibilities. As professionals, Engineers are expected to know at least the rudimentaries of good site health and safety practice. The old 'head in the sand' attitude of the past is no longer a tenable position. Be that as it may, less responsible Contractor's do not appreciate adverse comments on health and safety issues from Consulting Engineers and even some clients are sometimes unsupportive of such comments as they consider that it 'sours relationships'! I'm afraid that Engineers must just grin and bear it and not be afraid to raise such issues. It may well save lives or serious injury. In most cases, they would be well advised to do so formally as this is now virtually a legal requirement. In the event of an incident/accident, all parties must be able to demonstrate that they acted reasonably. In today's litigious climate Engineers cannot afford to be faint-hearted even if this makes them unpopular.

In terms of concrete repair there are particular problems of health and safety, notwithstanding that associated with often being a Specialist Sub-Contractor and being asked to carry out work from access arrangements out with their control. It is a brave Sub-Contractor who refuses to let his operatives use a scaffold/cradles that he is not happy with, or because of scandalously poor welfare facilities, yet if any of his workforce are injured because of such matters, it is he who will carry the can because it is the employer who must ensure a safe place of work. The Main Contractor does not employ the Sub-Contractors

men! All Sub-Contractors should insist upon a specific site induction presentation before they set foot on a site and an inspection of the site prior to beginning work is essential. But if we are honest, how often in this done? Many subbies appear to arrive on site and begin work in complete oblivion to any dangers associated with site, the works involved, or even basic emergency procedures. If this is doubted just talk to site operatives and ask a few basic questions! Be this as it may, there are three matters specific to concrete repair which I would like to raise.

**BREAKING OUT DEFECTIVE CONCRETE**  
In our experience, these operations are invariably undertaken by the least trained operatives; sometimes by labourers without any basic training whatsoever; sometimes by persons whose knowledge of English is very sparse. Yet

this operation is potentially one of the most dangerous in terms of injury. We have noted many occasions where no protective footwear is worn (trainers are often the order of the day!) even when breaking out with mechanical breakers at low level where one slip of the Kango would result in a very serious foot injury. Other protective clothing, although provided by the Contractor appears to be optional (e.g. gloves, ear muffs, goggles, etc) - particularly in warm summer months.

Of course of great concern to all is now the risk of hand arm vibration syndrome (commonly known as "vibration white finger") caused by the use of concrete breakers and the like. The HSE has issued

guidance on the use of such equipment which requires frequent rest periods. Strict compliance with these recommendations would be very costly and it is difficult to envisage how a Contractor can competitively tender and comply. However, this is a very real risk to health and court judgements in the mining industry concerning HAV have been very severe. I am reliably informed that legal proceedings have been instigated against concrete repair contractors, so this is a very real problem already recognised by many in the industry. The answer probably lies with the use of newly developed low vibration breakers currently being introduced, or by the use of high pressure water jetting to break out concrete, albeit this causes its own specific problems which I do not have space to go into at this time.

**CONCRETE/REINFORCEMENT PREPARATION - GRIT BLASTING**  
To avoid the risk of silicosis, only silicon free grit should be used and operatives should be

*Continued on page 4*

*... the HSE really mean business and are increasingly resorting to court action ...*



**REPEX LTD**  
EXTERNAL BUILDING REFINISHMENT



## REPEX CELEBRATING ITS MOST SUCCESSFUL PERIOD

External refurbishment contractor, concrete repair specialist and CRA member, Repex Ltd, is currently celebrating the most successful period in its eight-year history. An increased turnover can be put down to an improving profile as a Main Contractor for external refurbishment and the company's accreditation to the BBA as an applicator of Sika, Weber-SBD and Fosroc materials.

Recently completed works include entire external envelope refurbishment and a huge concrete repair contract at Chalcott Towers and the building's underground car parks (see picture).

For further details contact William Drinkwater: telephone 01435 866666, or visit web site: [www.repex.co.uk](http://www.repex.co.uk)

ENQUIRY NO: 1011

## Tom McCulloch becomes new Chairman of CRA

Tom McCulloch, of Glasgow based specialist contractor Mackenzie Construction Ltd, has been elected Chairman of the Concrete Repair Association.

Previously Deputy Chairman of the Association, he assumed the position from Bob Berry of specialist contractor Concrete Repairs Ltd at the Association's recent AGM. Tom McCulloch becomes the tenth individual to Chair the Association since its inception in 1989. The post is usually held for a two-year period.

Allen Broad, of Sussex based specialist contractor Yoldings Ltd has accepted the post of Deputy Chairman.

Bob Berry will continue to serve as a member seven-man Executive Committee, which in addition to Tom McCulloch and Allen Broad, comprises Mike Hackett of Makers UK Ltd, Neil Perring of Alfred Bagnall & Sons (Restoration) Ltd, Mike Moore of Sika Ltd and Tony Hansard of Weber SBD.

The CRA was formed thirteen years ago to set high standards of workmanship and technical competence in a hitherto fragmented and unregulated concrete repair industry. As well as being able to demonstrate a proven track record and overall proven ability in this specialist construction sector, each full member is currently obliged to be Q.A. accredited to BS EN ISO 9000, to comply with the Association's stringent Codes of Practice and its training requirements.



## What's happening to the insurance industry?

*(Continued from page 1)*

Fourthly and possibly most significantly, the seemingly ever-increasing compensation culture has boosted both the number and the value of claims being made. Because more people are after a slice of the cake, the demand for cover has become disproportionate to the financial cake available. In other words, there is simply not enough cake to go round. Demand is greater than the financial availability ... and we all know what happens to prices when such conditions exist.

The impact on some specialist contractors has been that no one wants to insure their activity, sometimes at any price. Many insurers rely heavily on the Loss Prevention Council and

BRE to offer them indications of the level of risk. In some cases the information supplied is insufficient, so they err on the side of caution and that can cause havoc to certain industrial sectors.

What is virtually certain is that in future insurance companies will be looking more intensely at company's track records before providing the necessary cover. Those who are members of creditable trade associations, such as the CRA, will be in pole position. In the meantime, if conditions remain as at present, or worse deteriorate, it is quite obvious that the additional costs will permeate through and force an upward movement in tender prices. There is simply no alternative.

# Cause for concern over highway bridge repair document

A new document aiming to give guidance to specifiers of concrete repair on bridges was launched at the Institution of Civil Engineers on 31 October 2002. The document, entitled 'Repair of concrete in highway bridges - a practical guide' was jointly sponsored by the County Surveyors Society (CSS), the Highways Agency (HA) and the Transport Research Laboratory Ltd (TRL). The document was funded by the CSS and HA, produced by the TRL and co-authored by Steve Pearson of Derbyshire County Council and Ramesh Patel of TRL.

The seminar, organised to launch the document, featured speakers from the sponsoring organisations and others from councils and consultants. The launch was not, however, without controversy. Some CRA members in the audience, representing concrete repair contractors and materials suppliers, were critical of the lack of representation of contractors and suppliers on the working group and a seeming lack of consultation with these sectors prior to the report's publication.

The report is divided into eight sections entitled introduction; causes of deterioration in concrete bridges; inspection; investigation; review and assessment; decide the course of action; non-concrete repair options and concrete repair. It was hoped that the document would provide the basis for replacements for BD27/86 'Materials for the Repair of Concrete Highway Structures' and BA 35/90 'Inspection and Repair of Concrete Highway Structures', each of which are now seriously dated. This, in turn, would lead to Series 1700 of the Specification for Highways Works being extended to include specifications for concrete repair. Speaker Neil Loudon of the Highways Agency indicated that these aspirations were still some way from delivery.

The document's introduction focuses on the history of concrete bridges, durability and service problems, the extent of the UK repair problem, current trends and future developments. The chapter on deterioration details the main mechanisms of attack; concrete corrosion from chloride attack and carbonation; alkali silica reaction; freeze-thaw attack; sulfate attack and plastic settlement and early thermal cracks. Inspection guidance is brief but contains a table of crack classification linking appearance and location with likely causes. A more detailed section on investigation outlines the range of non and semi destructive tests available to engineers.

The two sections covering review and assessment and deciding the course of action considers strategies open to owners of sub-standard bridges, i.e. preventative maintenance, repairs, replacement, or do nothing. The variety of repair methods available and their suitability for particular circumstances is then considered, with a flow chart provided to guide the user to an appropriate repair strategy.

Non concrete repair options are then pondered in detail. The merits of surfaces treatments e.g. coatings, surface impregnants and corrosion inhibitors are detailed. Electrochemical methods, such as cathodic protection, chloride extraction and realkalisation receive considerable attention. Cathodic protection, in particular, seems about to gain much wider acceptance by the HA and Local Authorities as a mainstream repair method than has perhaps been the case to date.

The final chapter details at length conventional concrete repair options. Materials selection, concrete removal, reinforcement repair and application methods are reviewed and control systems suggested, to ensure a satisfactory outcome is obtained. Crack sealing is also featured. The industry trend

towards hydrodemolition was confirmed by the guidance that "wherever possible hydro demolition should be the preferred method of concrete removal".

Unfortunately it was this final chapter that gave CRA members most cause for concern. It was felt that the lack of representation and consultation with suppliers and contractors had led to a document being produced that was perhaps some years out of date compared with contemporary industry practice. It was technically flawed with regard to material properties and selection and perhaps most seriously, the opportunity to provide robust guidance about the selection of repair contractors had been completely missed.

By enlarge, the guarantee of a successful concrete repair will only come from using suitably qualified operatives employed by reputable and experienced contractors. Employers must take steps to ensure that detailed guidance on appropriate contractor selection is available to their engineering staff in order to maximise the quality and durability of their repair expenditure. That this document did not provide such guidance is a source of regret. It is a missed opportunity to ensure that demonstrable standards of competence are used to select repair contractors.



# Recent work volume up but outlook a little gloomy

Findings from the most recent 'State of trade' survey, carried out by the Concrete Repair Association on a regular six-monthly basis, show that during the period January to June 2002 the contract sales value for the entire UK specialist concrete repair market is estimated to have been worth in the region of £103m.

When compared with findings for the first six months of 2001, the figures indicate a 7% reduction in completed work. They also indicate that the value of individual concrete repair contracts appears to be becoming smaller. The figures reveal that whilst CRA

contractor members were successful in winning just under 600 new orders for concrete repair work (worth approximately £38m) during the latest period, the equivalent period in 2001 generated business worth £39m, from a little more than 500 contracts.

The January - June 2002 findings were not all doom and gloom however, since business won during the period was up by 22% in comparison with the final six months of 2001. In addition, most CRA contractor members also reported that the trend in enquiries received for concrete repair work was up on both the first and second periods of 2001.

# I don't believe it!

A recent survey identified that a new social class had been created, namely 'The Meldrews'.

Named after the television character, the main characteristic of a Meldrew is a willingness to complain and to speak out against the things that vex them. No doubt most people can think of someone who meets that description. Not you of course gentle reader, or me for that matter. We are all models of tolerant reason ... it's the others!

The new social grouping was much on my mind recently when I attended a tenant's meeting as part of a partnering agreement. Now I can wax long and boring over partnering and the abuse of that particular buzzword, but this is not the place. Suffice to say that within the slightly robust definition of partnering, other than that envisaged by Egan, the client, contractor and residents were sat around a table hammering out the details.

In fairness, two of the three tenants representatives were competent and committed to getting their co-residents the best deal going and all power to their elbows, I say. The third was an archetypal Meldrew. His questions ranged from "Why do you have to make a noise breaking out concrete?" to "can you take the scaffolding down at weekends to let us see the view?" My particular favourite was, "If you're still here at Christmas will you be buying us all a present to make up for the inconvenience?"

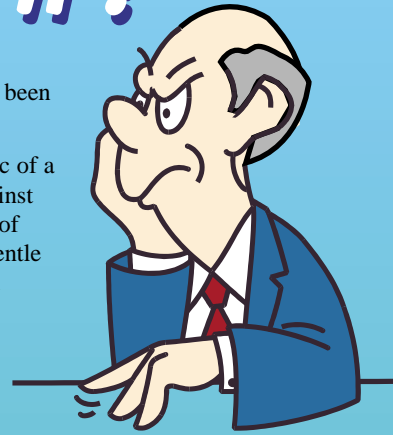
Judging by the body language from his two colleagues, including that well-known rhythmical hand gesture much used by lorry drivers when overtaking, they both had a fairly low opinion of the third guy. Having settled his queries (two no's and a not-unless-we-take-three-times-as-long response) the meeting concluded.

It occurred to me on the way back to the office that whether or not this particular person was being purposely obstructive, he was symptomatic of one of the problems of the contractor/client/resident relationship. The problems being that we, as construction professionals, often assume a level of basic knowledge on the part of the residents that of course they simply do not have.

They do not understand why concrete has to broken out and repaired, or why it has to be done that way. Health and safety procedures are a complete mystery to them and as for COSHH, RIDDOR and all the rest - forget it!

By the same token, whilst we might have been to endless seminars on the principles of partnering, residents regard builders as 'folk who don't turn up when they say they will', or 'those people that are never in evidence when sitting in a queue on the coned-off section of motorway'.

So what we need to do is talk a bit more, in basic terms that explain what we are doing and why we are doing it. If we get this bit right then in theory we should get rid of the Meldrew tendency from our sites. Personally, however, *I DON'T BELIEVE IT!*



# H&S - you have been warned!

(Continued from page 3)

masked at all times. However, many local authority clients specifically prohibit the use of dry grit blasting because it is so easily airborne and can thus be a great problem to residents in occupied buildings both on site and in the immediate vicinity. Wet grit blasting should be used generally to minimise this risk and should be specified by the client, even if it is more expensive. However, the seemingly impractical new Eurocode requirement for reinforcement cleaning to reach the Swedish 2 1/2 SA standard will surely perpetuate the need to use grit blasting to prepare exposed reinforcement prior to repair, unless high pressure water jetting is used.

## REPAIR AND COATING MATERIALS

The continued need for Contractors and Engineers to carry out COSHH assessments and work, in strict accordance with manufacturers health and safety data sheets and other

recommendations, remain absolutely essential. Several protective coatings and reinforcement primers, still widely used today because of their proven performance and track record over many years, contain solvents and the like which require specific handling to ensure safety of site personnel.

There are, of course, many other hazards affecting refurbishment contracts but these are applicable to contracts as a whole such as falling from height, site traffic, site debris, trip hazards and scaffolding to name but a few. These are of a general nature and well known to competent Contractors who are, in most instances, looking to train their staff and implement measures to minimise such risks. I am certainly aware that the CRA are very much au fait with most of the matters raised in this article and are actively advising both Contractors and clients alike. However, there is much merit in taking advice from a health and safety consultant who specialises in concrete repairs and refurbishment contracts. I am also aware that several Contractors in the CRA (and some Consulting Engineers) are already taking advantage of such specialist advice. These moves are very much welcomed and should significantly help in improving health and safety. It should also add to a Contractor's or Engineer's standing in tender appraisals where safety records, 'best value' and 'added value' form part of the evaluation.

ENQUIRY NO: 1012

'CRACKING MATTERS' is published by the Concrete Repair Association (CRA), Association House, 99 West Street, Farnham, Surrey GU9 7EN. Tel: (01252) 739145 Fax: (01252) 739140 Email: info@associationhouse.org.uk Website: www.concretere.com

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. Tenth edition: 01.12.02