

Cracking Matters

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ISSUE NO. 3

SIZE MATTERS!

... at least it does when you need to competitively price a concrete repair project.

In the case of small, accessible contracts, the policy of quantifying repairs under the generic term of 'item' is not a problem. With these contracts the repairs are easily measured by the contractor and there is little room for possible dispute with the client.

With larger, less accessible repairs, however, this policy has to be called into question. Since May 1990, when the Concrete Repair Association first published its 'Standard Method of Measurement for Concrete Repair' the need for complete and accurate measurement as the cornerstone of a competitive bid for a project has been completely accepted by all sides of the industry. In fact, figures show that among specifiers of all disciplines, this publication is one of the most often requested from the Association.

And yet

..... a straw pole of contractors within the CRA showed that for some time now there has been a tendency for the Bills of Quantity covering concrete repair contracts to be presented to potential tenderers under the generic term of 'item'.

This is all very well and is doubtless justified by a feeling among specifiers that the time saved in preparing an itemised Bill of Quantities is time (and of course money) well saved. However, this viewpoint, although understandable, calls into question whether we are in danger of, to use a nautical expression, 'spoiling the ship for an ha'porth of tar'.

Consider the dangers inherent in this practice. With a non-quantified Bill,



Agreed and defined areas of concrete repair are all-important.

prospective contractors must protect themselves by covering the worst case scenario, leading to a higher sum being allowed for concrete repairs than might otherwise be the case. On a large job the full extent of concrete repairs will not be revealed until after the defects have been

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cut out and measured. In this case the client, faced with a single billed item - concrete repairs = £ xxx, can find themselves faced with unnecessary expense.

A quantified Bill, prepared by a surveyor experienced in concrete repair, which also anticipates the worst case scenario, places the client and his agent in a far better position to ensure that they only pay for what is necessary to complete the project. By preparing the Bill of Quantities in line with the CRA 'Standard Method of Measurement', an experienced specifier can obtain a more cost-effective tender price for the client.

By now there will be some readers who are questioning exactly why these sentiments are being voiced in a journal specifically produced by the trade Association for concrete repairers and their suppliers. After all, anything that gives the contractor an edge ought to be welcomed by the CRA. This would, however, be a misconceived line of thought. (Continued on page 2)

CRA APPOINT NEW TECHNICAL OFFICER



In line with the CRA's ongoing commitment to advance the understanding, education, technology and practical development of concrete repair, Brian Poulson MA, CChem, FRSC has been appointed to act as Technical Officer for the Association.

Brian is a Chartered Chemist with an honours degree in Chemistry from the University of Cambridge and has devoted his career to the application of science to building and construction. He first became involved with concrete repair 30 years ago and has since been engaged in senior technical management successively for Cementation, Prismo, Fosroc, Prodorite and Grace Construction Products before setting up an independent consultancy in 1995.

Brian has been involved with the development of European Standards for concrete repair and protection and is a member of the relevant CEN and BSI committees. He also serves on working groups with CIRIA, BRE and CITB. In addition to his work for CRA, he is also Secretary-General and Technical Officer for other construction-related organisations.

Brian will report directly to the Association's Executive Committee and is responsible for the management and co-ordination of the CRA's technical working groups, the initiation and production of technical papers and advice notes on current topical subjects, and for liaison with other trade bodies and external committees.

His duties include the monitoring and progressing the CRA Training Scheme, involvement in the vetting of new members and, on behalf of the CRA membership, the lobbying of Government agencies and public bodies on technical and commercial matters.

Importantly, for specifiers, building owners, main or specialist contractors, manufacturers and end users, Brian is also available to advise and assist regarding concrete repair systems and services. Routine telephone advice will be provided without charge.

He can be contacted through the CRA at Association House, 235 Ash Road, Aldershot, Hants GU12 4DD. Tel: 01252 321302. Fax: 01252 333901, or direct by telephone on: 01485 578796. Fax: 01485 578193. E-mail: poulson@btinternet.com

THE JOURNAL OF THE
CONCRETE REPAIR ASSOCIATION

THE
CONCRETE
REPAIR
ASSOCIATION

(Continued from page 1)

To understand why, is to understand what the CRA stands for and why it came into being. In a word the Association stands for **QUALITY**.

'Quality' is a much-abused concept. But for the CRA it has always symbolised the kind of excellence that can only be achieved when the entire project team; client, specifier, specialist contractor and product manufacturer work together. It was in order to introduce, maintain and improve this ethos that led to the original foundation of the Association. It is also the ethos that motivates the current membership.

Needless to say, CRA member companies believe that a commercial benefit stems from being part of this drive for ever higher standards. Other members of the project team can and should benefit from the improvements, but sadly this is not necessarily the case, which brings us back to the original point.

For clients and specifiers to benefit fully from the quality measures being adopted by the CRA, everyone has to play a part. For the specifier that means providing quantified Bills that enable the contractor to compete on a level playing field, thus providing the client with the best value for money.

Assistance is available. In addition to the Standard Method of Measurement previously referred to, the CRA also publishes other informative literature, is prepared to present its audio-visual programme entitled 'The route to a successful concrete repair' and to provide routine technical advice via its Technical Officer.

In the final analysis, the choice lies with the client. After all, he pays the bills. The choice between a short term saving and the long-term benefit is often a more difficult one than most of us like to imagine. But, in pursuing the tougher second option, the CRA feels that it is giving the best of its abilities to the client. Hopefully, other members of the project team will come to feel the same way.

NOTE FROM ED:

Other publications from the CRA include 'The route to a successful concrete repair' (cost £5.00) and 'The application and measurement of protective coatings for concrete' (cost £5.00). The recently updated CRA Members Directory is available free of charge.

TREND TOWARD SMALLER CONTRACTS BEING LET

The latest set of state of trade findings, produced by the CRA and relating to the U.K. concrete repair market for the six months - January to June 1998, show overall business volume down in comparison with the first six months of 1997.

The figures, produced on a six-monthly basis, are compiled from returns supplied by the Association's contracting members, who, between them account for the majority of concrete repair work carried out in the U.K.

In comparison to the first six months of 1997, the figures reveal that despite completing more concrete repair projects, CRA contractor members experienced an overall decrease of almost 8% in the total value of concrete repair work completed.

Other comparisons showed a decrease of approximately 17% in contract values for building related work, but an increase of 1% in civil engineering related work.

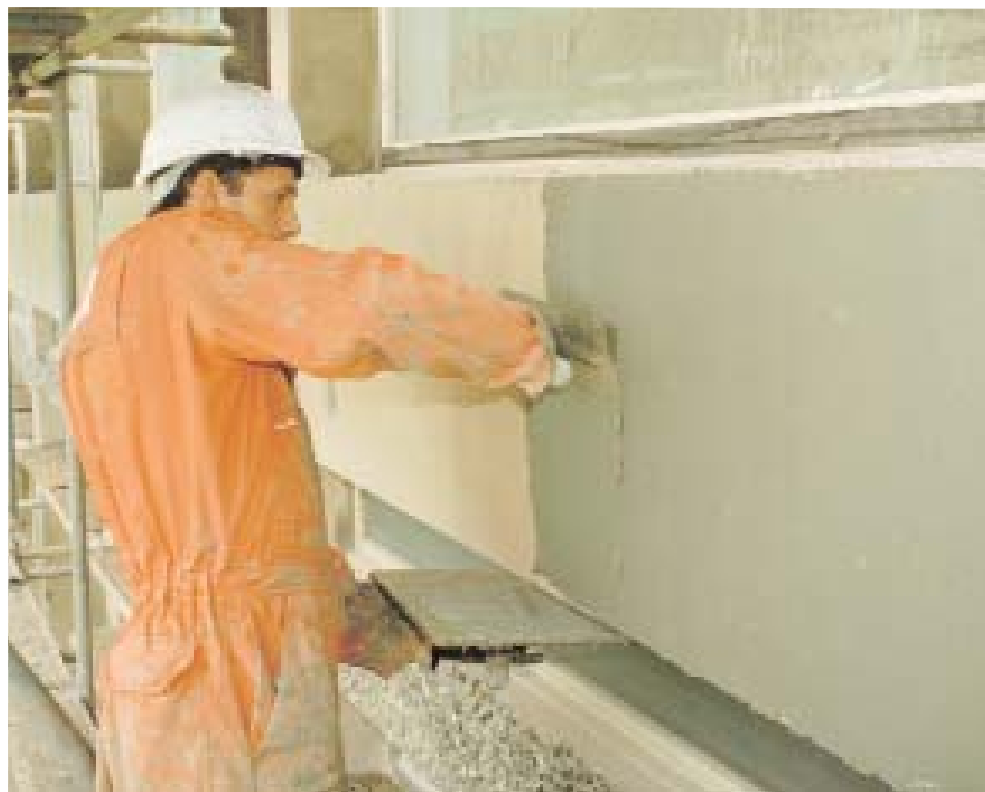
During the period, however, the number of contracts won by CRA members (currently being carried out) were up by 2.4%, but lower in value. These findings are similar to the trends shown in the final six months of 1997, indicating a continuation of smaller value contracts being let. Concrete repair related work enquiries received were slightly down in the Building sector but up on the Civils side. During the period, no appreciable change in the intervals between concrete repair enquiries being received and work being let had been experienced.

Fewer CRA contractor members reported that their company was operating at less

capacity than they would normally regard as a satisfactory workload and nearly half remained optimistic about work volume and value for the forthcoming twelve months. Other findings showed that concrete repair work accounted for slightly less than 50% of CRA members' total workload.

A second survey carried out among the CRA's product manufacturer members, covering the same period, shows an increase (in comparison with the first six months of 1997) in sales of all categories of materials, except sprayed mortars and fairing coats. Manufacturers returns also indicate that most companies foresee no significant change in sales volume, value and margins over the forthcoming twelve months.

CRA adopts new training scheme



Accepting that the industry's greatest assets are the highly skilled operatives that carry out specialist concrete repair work, the CRA has decided to fully support operative training through National Vocational Qualifications (NVQ's) at Levels 2 and 3.

The Association believes that such structured training is a fundamental requirement in ensuring continually improving standards of workmanship.

The NVQ (2), which currently is at the pilot stage, will be awarded on the successful completion of eight Level 2 visits. Five of these will be common to the construction industry with the remaining three units being specific to the concrete repair industry. All CRA members are being encouraged to promote this preferred route within their respective companies.

In addition, the Association has wholeheartedly endorsed the Construction Skills Certification Scheme (CSCS). The principal aims of the scheme are to

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POPULAR CRA DIRECTORY UPDATED

The CRA has just produced the latest edition of its comprehensive annual Members Directory, which is designed to be of direct practical use to engineers, specifiers and clients.

The handy, 48 page, one-third A/4 pocket sized booklet, lists all the U.K.'s established specialist concrete repair contractors and product manufacturers in new colour coded sections.

Each member's page entry carries detailed information on the company. It provides main office address and regional office details, a description of the company's specialist activities or products, third party accreditation's and areas of operation.

To be of assistance when compiling tender lists for concrete repair work, each contractor's entry also includes information on contract values catered for, the company's largest contract to date and its approximate annual turnover.

The Directory also includes details of the technical services provided by the Association's Technical Officer, the recently adopted NVQ related training scheme for members operatives, the CRA Code of Practice, CRA publications, a bibliography of related literature and names and addresses of associated organisations.

High performance concrete repair work calls for specialist application capabilities and specialist materials. General contractors and untrained personnel are simply not up to the task. This Directory will therefore prove invaluable to those involved with concrete repair projects.

Copies are available free of charge from: The Secretary, Concrete Repair Association, Association House, 235 Ash Road, Aldershot, Hants GU12 4DD. Tel: (01252) 321302. Fax: (01252) 333901. Email: john.fairley@associationhouse.org.uk

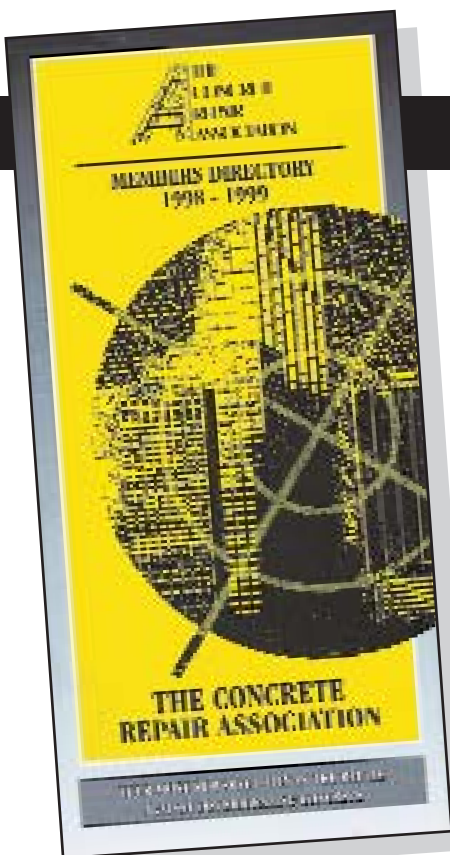
maintain a record of operatives who achieve a recognised level of competence, raise standards of health and safety awareness and promote the use of skilled operatives.

Competencies have been recently agreed by CRA members and a new classification, which mirrors the requirements for NVQ Level 2, was approved for 'concrete repair operatives'. Grandfather rights for entry onto this scheme will be available for the next two years, but after this period the only route will be through formal NVQ training. A regular one-day safety update course for all operatives is a pre-requisite for membership of this initiative.

Qualified operatives will carry an accreditation card that will include a photograph of the individual and show the level to which he has been trained.

Further details concerning CSCS can be obtained free of charge from:

The Help Desk, P.O. Box 114, Bircham Newton, Kings Lynn, Norfolk PE31 6XD. Telephone: 01485 578777.





CHARGE REDUCES COSTS !

Until recently, spalling pre-cast concrete panels at Dunfermline's Lauder College were giving cause for concern. The panels, part of the original structure, had been showing signs of reinforcement corrosion - the result of carbonation and chloride contamination. Refurbishment options were clear and distinct. Either the panels could be removed and replaced, or a cathodic protection (CP) system could be installed to neutralise the reinforcement corrosion. It was agreed that by far the most feasible option was CP and the THORO® CP60 system, part of HSC UK LTD.'S extensive concrete repair and waterproofing product range, was selected for the project. THORO® CP60 is a highly durable anode for impressed current cathodic protection of steel reinforced structures. It consists of highly conductive-coated fibres, dispersed throughout a polymer modified cementitious mortar. For further information contact: on 01527 505100. ENQUIRY NO: 301

YET ANOTHER MULTI STOREY CAR PARK REFURBISHED BY LLEWELLYN STONECARE LTD.

As well as redecorating and therefore improving the final overall appearance, most car park refurbishment projects completed by LLEWELLYN STONECARE LTD. include structural strengthening, concrete repair, the application of new decking and the replacement of barriers and screens. Where concrete repair is involved, with noise and dust impacting on the 'footfall' in shopping centres, clients have overcome the difficulty by opting for Llewellyn's Precision-Cut LF20 system for breaking out defective concrete. Car park users, nearby shoppers and office workers are therefore not inconvenienced by the noise, dust and vibration normally associated with such work. If your car park is ready for an overhaul, give Llewellyn's a call. Contact Brian Gardiner on 01908 679222. ENQUIRY NO: 302



News from CRA Members

CIVIC RENEWAL

YOLDINGS LTD. has recently completed a £220,000 multi-disciplined external refurbishment contract on a nine-storey reinforced concrete building housing Fareham Borough Council Civic Offices in Hampshire. The structure consists of reinforced concrete beams, columns, large pre-cast panels and windows. The contract involved surface preparation by high pressure water jetting, the removal of defective concrete, the preparation and treatment of embedded steel reinforcement, concrete repair and the application of 3,000m² of elastomeric and cosmetic, protective coating, using the Sika Monotop Concrete Repair and Protection system. Additional work included re-sealing of movement joints, asphalt roofing and bearing pad replacement for the roof parapet panels. The contract was completed on time, to budget and to the satisfaction of Fareham Borough Council and Contract Administrators/Consultants, MFD International. For further information contact: Bob Berry 01323 442288. ENQUIRY NO: 303



HIGH ALTITUDE REPAIRS

STRUCTURAL RENOVATIONS LTD. are near to completing repair works to the BT Tower, one of the tallest and most famous landmarks in the capital. The repair works entailed scaffolding the perimeter of the concrete frame from level 24 to level 37, a height of approximately 145 metres. The scaffolding had to be transported up the building using the existing lifts at times to suit the operations staff and the revolving restaurant, which remained in use. A designed cantilevered scaffold was then erected from each exposed concrete deck, protected with a waterproof, weather resistant cladding system from Europe. In order to arrive at a system approach for the repair and coating works, Sika Limited was chosen to supply the Icoment Concrete Repair System primarily because of its long track record of success. For more details contact Kevin Coulman on 01895 623985. ENQUIRY NO: 304

MACKENZIE AT FOREFRONT OF NEW HYDRO-EROSION RESEARCH

The need for concrete repair and refurbishment work in Europe has become a problem of multi-BECU dimensions. Recognising this, a 24-month EU supported study into the development of ultra-high pressure water jetting for concrete removal was launched in the Autumn of 1998. The study has its own acronym; HEROIC - Hydro Erosion for Repair Of In-situ Concrete. A project Consortium comprising five industrial companies, three research providers and the EC has been set up to carry out the study. MACKENZIE CONSTRUCTION LTD., and City University, London, are the UK's partners. Mackenzie's main contribution to the project arises from its extensive experience in concrete repair, which includes operating water cutting techniques. The project intends to develop a high productivity, automatically controlled 'Ultra High Pressure Water Jetting System' capable of surgically removing defective concrete. The shape and depth of removed material will be able to be accurately pre-set. In addition to environmental benefits, blind operation of the system should also be possible, allowing remote/automatic operation with future equipment. More details are available from Tom McCulloch on 0141 633 5555. ENQUIRY NO: 305

SUPER FLUID MICRO CONCRETE FOR CAR PARK REPAIR

Localised repairs to deck slabs at Castleside Multi-story Car Park, Bold Street, Banbury, have been carried out using Cemflow MC, manufactured by the Tamworth based INSTARMAC GROUP LTD. The structure had been suffering from serious chloride contamination and in addition to concrete repairs an impressed-current cathodic protection system was installed. Cemflow MC meets the required resistivity needed for such electrochemical protection. It is a pre-bagged, one part material, requiring a measured amount of water to produce super fluid micro concrete that will not segregate or bleed. It is applied at depths of 50mm to 150mm and is capable of flowing in and around highly congested steel reinforcement, without the need to vibrate. Compressive strengths of 20N/mm² are possible within just 24 hours. ENQUIRY NO: 306



BCL RESTRUCTURE

BIRMINGHAM CITY LABORATORIES (BCL), an entirely independent Local Authority Consultancy and Test House, has recently brought together its Laboratory, Engineering and Scientific services at its Garretts Green Laboratory. The Building Investigation Section is now able to provide the following services: Concrete condition, HACC surveys; Assessment of fire damage; Structural testing; Investigation of material defects; Investigation of components & defects; Wall tie density & condition surveys; Metallurgical consultancy & testing; Monitoring of movement & stress; Investigation of dampness in buildings, asbestos surveys and Assessment of PVCu Fenesta. In operation for more than 80 years, BCL makes its extensive expertise available to both the public and private sectors. For specific tests BCL is accredited by the National Measurement Accreditation Services (NAMAS). For further information contact Trevor Box, Birmingham City Laboratories, Valepits Road, Garretts Green, Birmingham B33 0TD. Tel: 0121 303 9300. ENQUIRY NO: 307

MBRACE STRENGTHENS B.S.I. CAR PARK

Construction chemicals company FEB MBT joined forces with Contractors Makers Industrial and Curtins Consulting Engineers to repair the concrete and strengthen the circular interdeck support columns for British Standards Institute Car Park at their head offices in Chiswick, London. After investigation, the project team chose MBrace Carbon Fibre Strengthening System to replace the original steel rings for the following reasons: (1) World-wide track record of product. (2) Ease of application and (3) Speed of application. All defective concrete was first removed and reinstated using Emaco S88C structural repair mortar and Emaco R101 lightweight repair mortar. Margel corrosion inhibitor was installed and MBrace system installed to the engineers' design. Finally, Masterseal 333 was applied to protect the overall concrete structure for the future. ENQUIRY NO: 308



CONFIDENCE IN BAGNALLS

Specialist contractors ALFRED BAGNALL & SONS (RENOVATION) LTD. have been paid the ultimate compliment of being asked to negotiate the second phase of a prestigious contract by the London based property company, Rich Investments. Faced with a major refurbishment programme to the Rich Industrial Estate, adjacent to Tower Bridge, the client initially went through the standard form of tender for contractor selection. Bagnalls secured the first phase, which involved major concrete repair and brickwork repairs together with window renewal and structural refurbishment. With the units occupied by 'blue chip' clients, conducting business as normal, the highest standards of contract management were called for. Bagnalls completed the project with minimal disruption. Client's representative John Geddes Associates commented "It is unusual to be allowed to negotiate work in this day and age. It illustrates the confidence that my client has in Bagnalls". For more details, telephone: 0181 311 3910 ENQUIRY NO: 309



MARINE REPAIRS IN JERSEY

CONCRETE REPAIRS LTD. has just commissioned the largest marine Cathodic Protection system in the UK. The six-month contract at the London Berth, Jersey, for the Public Services Department, involved major structural repairs and the design and installation of an Impressed Current Cathodic Protection system. Six anode systems were trialed for the installation and after monitoring the system for a year, two were selected as the most appropriate for this project. For the support columns titanium mesh, with Sikacem 133 overlay, was used and for the soffits and beams Thoro CP Anode 60 manufactured by HSC UK Ltd. This project underlines the company's role as a leading contractor in the field of Cathodic Protection. For more details contact: 0181 288 4848. ENQUIRY NO: 310

SIKA GUARDS YOUR STRUCTURES

SIKAGARD coatings offer much more protection than meets the eye. Carbon dioxide diffusion resistance testing after accelerated weathering has shown that SIKAGARD coatings significantly outperform competitors. Moreover, the BBA confirms that Sika coatings will provide decorative protection "for at least 15 years", a unique testimony. Also available is "Quality and Durability in Concrete Repair and Protection", containing a series of independently written, technical case studies. These prove that the coatings are still providing good anti-carbonation protection up to 20 years after application. This places Sika in the unique position of having the best theoretical performances and the only proven results measured in genuine exposure. For further information contact Jimi Fadayomi on 01707 394444. ENQUIRY NO: 311



MULSIFIX AT MOTHERWELL

SBD's Agrément approved Mulsifix Concrete Repair system is a range of polymer modified cement-based materials which are pre-blended and require only the addition of water to provide a bonding bridge and mortar or concrete mixes, giving high strength and adhesion, water resistance and improved chemical resistance. The Mulsifix Concrete Repair System has been used widely on job sites in the UK, including Motherwell Civic Centre (pictured) and around the world ranging from high rise buildings to car parks and shopping centres. Other Mulsifix products have been used to repair major civil engineering structures such as bridges, tunnels and subways. Further details from: 01525 718877. ENQUIRY NO: 312

CRA Member at forefront of new hydro-erosion research

The annual need for concrete repair and refurbishment work in Europe has become a problem of multi-billion ECU dimensions. It impacts on highways, bridges, residential buildings, factories, power stations, airports, coastal defences and all manner of structures.

The scale of the problem is reflected in the estimated 3 million kilometres of paved highway, the 4.4 million system built

dwellings and the 900,000 bridges that currently exist in the European Community. The removal of defective concrete, prior to reinstatement with protective materials, represents a significant element of the maintenance of these structures. Recognising this, a 24-month EU supported study (BES2-2783) into the development of ultra-high pressure water jetting for concrete removal was launched in the Autumn of 1998. The study has its own

acronym; HEROIC "Hydro Erosion for Repair Of In-situ Concrete. A project Consortium comprising five industrial companies, three research providers and the EC has been set up to carry out the study. Concrete Repair Association member Mackenzie Construction Ltd. and City University, London, are the UK's partners. Mackenzie's main contribution (together with Thornbury Hill Engineering

Consultants) to the project, arises from its extensive experience in concrete repair, which includes operating water cutting techniques. Other partners are based in Germany, Spain, Greece and Portugal.

The primary obligation of the project is to develop a high productivity, automatically controlled 'Ultra High Pressure Water Jetting System' that is capable of surgically removing defective concrete, stone and other common building materials. The anticipated advantage is that the shape and depth of removed material will be able to be accurately pre-set, even where significant local variations in concrete strength unexpectedly occur. To achieve this, it is expected that major innovation to the water jet nose will be needed.

A successful conclusion to the research will represent an important improvement since, in the wrong hands, existing methods can result in accidental damage or weakening of the structure through the removal of too much material. Additional benefits include the fact that the method is dust free and environmental pollutants are washed out during the process.

Blind operation of the system should also be possible, allowing remote/automatic operation with future equipment. This will mean that operators will find the method safer and less fatiguing than current processes.

If all goes to plan, the Consortium intends to introduce an experimental robotic version of the system in early/mid 1999. Following a period of intense site trials, a production version is expected to follow next year.

DETAILED CONCRETE REPAIR SURVEYS ESSENTIAL

As the lead article in this issue of 'Cracking Matters' points out, insufficient consideration and financial commitment to early survey work on concrete repair projects is continuing to give cause for concern.

Inadequate surveys, prior to work being let, all too often results in substantial additional costs being incurred almost immediately after the commencement of the work. The problem then gives rise to a difficult situation between the specialist contractor and other interested parties, when the client is subsequently asked to fund additional work in order to complete the project. The problem extends to concrete structures as diverse as residential blocks, schools and bridges. Naturally, neither party is happy with this situation and the CRA believes that an increased awareness and a better understanding of the importance of the initial survey and other measurement techniques, is essential for the successful

completion of any project to the ultimate satisfaction of all parties.

Inadequate surveys, prior to work being let, all too often results in substantial additional costs being incurred almost immediately after the commencement of the work.

A detailed survey, undertaken by a specialist company, will provide the necessary assessment of the overall condition of the concrete. Such survey work, usually including chemical analysis of the concrete, determines the general condition of the structure and highlights its specific requirements. It is only following such analysis that a full picture of the actual work to be carried out is made clear and it

is at this stage that a true quantification of repair work becomes possible. To help produce this accurate quantification, the CRA recommends the use of its Method of Measurement for Concrete Repair as a uniform basis for measuring concrete repairs and fully itemising all aspects of the work involved. In order to facilitate the recording of the various areas to be treated and numbers of repairs to be carried out, the document also includes a specimen Bill of Quantities.

Since its launch, the use of the 'method of measurement' has brought a degree of order to such work and it is playing a major role in easing the path of a notoriously difficult area of construction measurement. The CRA believes that the more organisations that use the method, the smoother the running of concrete repair projects.

NEW ELECTROCHEMICAL PUBLICATION DUE SOON

The CRA is currently in the throes of publishing a Guidance Note outlining the processes of carbonation and chloride attack and the various electrochemical methods of repair.

The publication will provide an overview of remedial techniques such as realkalisation, chloride extraction, cathodic protection and corrosion inhibiting. It will also give an insight into the processes and effects of both realkalisation and chloride extraction and will list a host of publications recommended for further reading.

The Association is also close to producing an updated version of its well-received publication "The Route to a Successful Concrete Repair". The Guidance Note does not focus on specific types of repair product or system, neither is it intended to be exhaustive in covering the causes of concrete deterioration, or methods of carrying out concrete repairs. It does, however, fully explain the essential 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. Both publications, together with another Guidance Note - 'The Application & Measurement of Protective Coatings for Concrete' are all available at £5.00 each. The CRA Standard Method of Measurement for Concrete Repair document remains priced at £15.00 each.

All can be obtained from: The CRA, Association House, 235 Ash Road, Aldershot, Hants GU12 4DD. Tel: (01252) 321302. Fax: (01252) 333901. Email: john.fairley@associationhouse.org.uk

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Early survey work essential says the CRA.