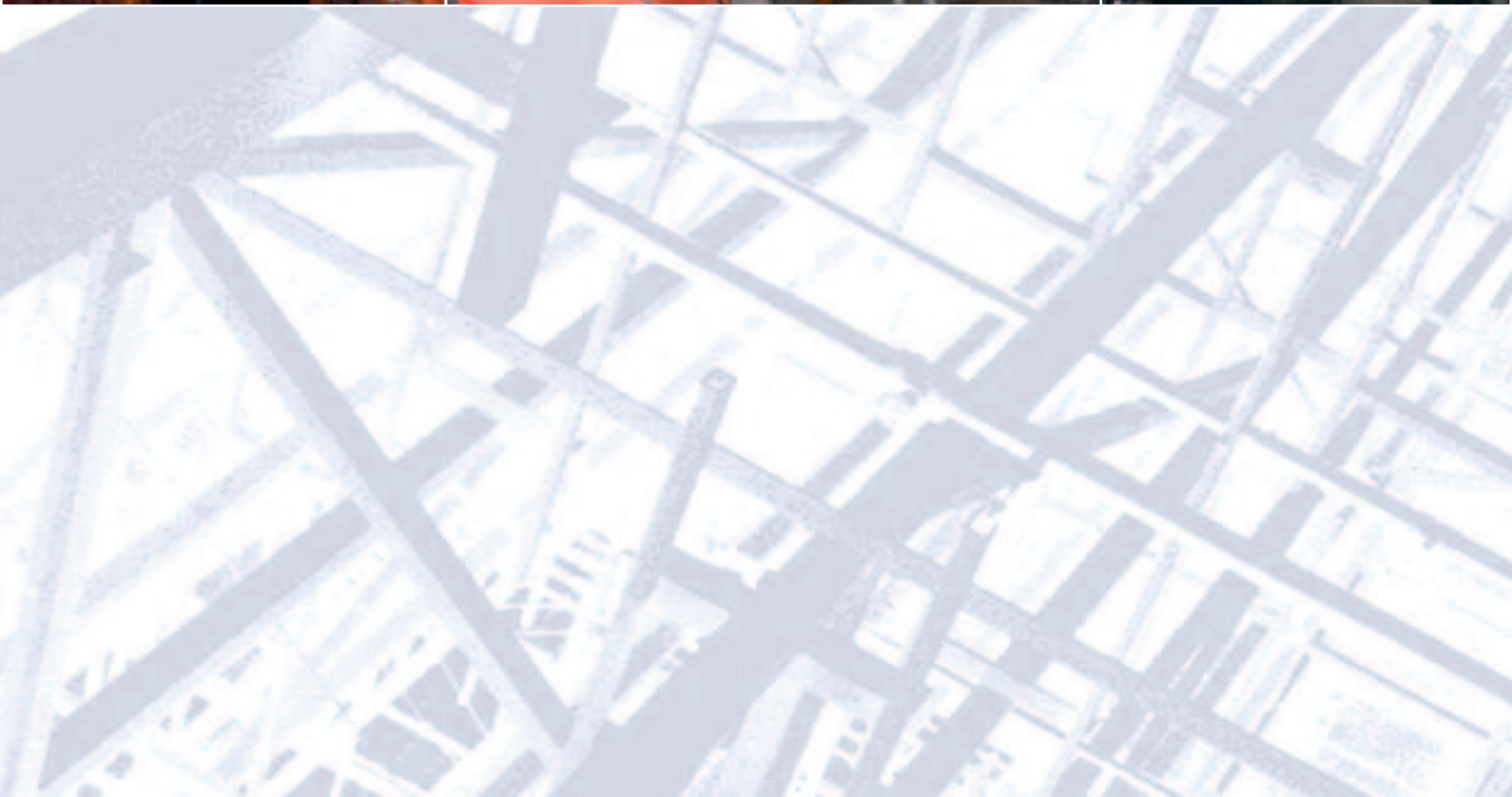
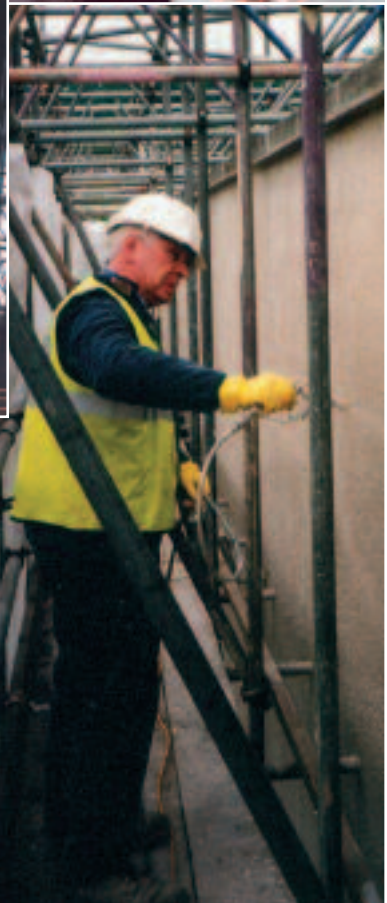




**Ram Services Limited**









# Introduction

**Ram Services Limited** was established in December 1980, and initially enjoyed success with leak sealing and waterproofing works at many of the CEGB's power stations, undertook work internationally, and developed unique systems for insitu application of epoxy resin linings in pipes. Over the ensuing period, the company has grown to become a recognised specialist in many aspects of complex structural repair work.

With turnover now established in excess of £2,000,000, the company takes pride in offering effective and economic solutions on a properly considered and implemented basis. We work for a wide range of clients, whose structural repair requirements can vary greatly from simple leak sealing in a lift pit to major strengthening of a motorway viaduct or total refurbishment of a water storage reservoir.

The company's experience and expertise has been recognised through pre-qualification exercises for numerous client organisations, and by the Constructionline and Achilles UVDB national databases.



## Diamond Division

More recently, the company's expertise has been widened by the acquisition and development of a dedicated diamond drilling and sawing operation. The "diamond division", as it has become known, uses a wide variety of techniques including:



- diamond drilling
- diamond wall and floor sawing
- diamond wire sawing
- hydraulic bursting and crunching of concrete
- related controlled demolition functions.

In addition to routine drilling work, the division caters especially for major structural alterations associated with change of use (eg formation of lift shaft or escalator openings, removal of redundant floors or walls), and where more disruptive conventional percussive techniques may not be suitable.

The two aspects of the company complement each other and frequently operate together to offer a packaged approach to more complex structural alteration or refurbishment schemes for a wide variety of clients or larger contractors.

## Structural Repairs

Structural repair experience includes:

- Investigation, testing and preparation of structure condition reports on a wide variety of commercial and industrial premises, culverts, shafts, tunnels, car parks, water treatment works etc
- Structural leak sealing and waterproofing
- Concrete repair and protection
- Preparation and application of chemical, corrosion or weather resistant coatings to concrete, steel and masonry surfaces
- Pressure grouting
- Pressure pointing and repair to masonry structures
- Insitu strengthening of structures using drilled and grouted tie bars, resin bonded steel plates or carbon fibre composite materials
- Installation of mechanical expansion joints on bridges and car parks



Through a mix of specialist training and experience, the company's work force is able to operate in nuclear power stations, confined spaces, at height and over or in water, and has developed a reputation for getting the job done no matter how awkward or arduous the site conditions.

# Structure Refurbishment

Our wide skills base enables us to apply a packaged approach to structural investigation and repair. Typically this will cover initial survey and assessment, technical and cost “optioneering” to determine the most appropriate strategy for repair or refurbishment, and then implementation of most, if not all of, the specialist and traditional elements of the practical remedial process on an in-house basis.



Such an approach has been usefully brought to the following areas of activity:

- **Strengthening or reconstruction of minor bridge structures**

Controlled demolition, blasting and coating of structural steelwork, re-construction of bridge decks, deck waterproofing, repair or re-construction of masonry parapets and re-surfacing

- **Total refurbishment of cable tunnels**

Initial survey and investigation, optioneering, cable protection, replacement of defective structural steelwork, blasting and coating of structural steelwork, leak sealing, concrete repairs, roof waterproofing, removal and replacement of roof slabs

- **External refurbishment of listed building**

Survey and investigation, replacement of corroded steel, concrete repairs, façade repair, specification and application of specialist façade coating system, roof waterproofing

- **Pipe bridge refurbishment**

Temporary works, concrete repair and protection, removal, design and replacement of valve chamber roof slabs, design and construction of new steel access walkway, painting of structural steelwork

- **Major bridge strengthening**

Design and application of carbon fibre plate deck strengthening, steel plate deck strengthening, concrete repairs, diamond drilling, shear bar installation

- **Structural conversion works – offices to hotel**

Concrete repairs, diamond drilling, diamond sawing, soft strip clearance, construction of new brick/block partition, formation of openings in structural slabs for escalators and lift pits/shafts

- **Strengthening of listed culvert structure**

Initial survey and investigation, masonry repairs, grouting, tie bar installation, arch saddle slab construction, waterproofing, earthworks, confined space working

- **Pipeline/aqueduct refurbishment**

Leak sealing, waterproofing, steel fabrication and coating, removal, design and replacement of valve chamber roofs, void grouting, concrete repair and protection, bridge deck waterproofing, temporary works

# Mechanical Expansion Joints

Supply and installation of sectional steel/rubber mechanical expansion joints on bridge structures.

Installation of large modular steel rail type expansion joints providing significantly higher levels of movement accommodation for larger bridge spans.

Solutions for smaller expansion joint requirements where water tightness is critical but movement levels exceed the capabilities of conventional mastic type sealants. Applications include large water retaining structures, footbridges, minor highway bridges, multi-storey car parks, tunnels, inverted roof decks etc.

Renewal of failed joint mortar nosings and elastomeric seal inserts.

## Associated activities

- Structure condition surveys
- Concrete repairs
- Waterproofing
- Surface preparation





# Structure Condition Surveys

Our experienced technical and support staff regularly operate in confined spaces (pipelines and culverts), at height using roped access techniques or mechanical access equipment, in restricted access locations (nuclear power stations, service reservoirs) as well as more conventional environments on a wide variety of commercial and industrial infrastructure.

Visual inspections are an essential requirement in determining the condition of structures including impounding reservoir tunnels and shafts, culverts, internally and externally on large diameter pipelines, water treatment facilities, other confined space structures, multi storey car parks, bridges etc.

Equally, and in addition to visual inspection, sampling and testing of construction materials, including concrete, cast iron etc, are often vital in determining the cause and extent of defects requiring repair.

We provide fully detailed reports with interpretive comment and properly considered recommendations for remedial action including specification, scheduling and costing of work which takes account of need and buildability, economics, whole life issues etc.

Through our trading partners we can also undertake more involved work including materials testing such as metallurgical analysis, load testing, non-destructive surveys using wide ranging techniques including ultrasonics, ground penetrating radar, half cell potential and resistivity measurements, structural assessments and the like.

Where appropriate this can be developed to encompass Assessments in Principle documentation, or design work associated with structural repair procedures, replacement structures etc.



## Plate Bonding

This is an economic and effective technique to improve bending capacity or reduce deflections in beams and slabs in buildings and bridge structures.



Ram Services Limited undertook one of the first steel plate bonding applications in the UK, strengthening the M1 Brinsworth Bridge (Sheffield) for South Yorkshire County Council in 1983.

In 1998, the company undertook the first and largest application of carbon fibre plates for UK Highways Agency (M60/A34 Barnes Bridge – South Manchester).

The company developed, and remain the only exponents of, the use of liquid resin adhesive as part of a plate bonding process. Adhesive resin injected into place caters for situations where substrates are particularly uneven, for example where strengthening plates need to be attached to riveted plate girders.

Many of the plate bonding schemes undertaken by Ram Services Limited (including Barnes Bridge) involved an element of design in addition to the site application work.

Recent developments now include use of carbon fibre wrapping to strengthen and improve impact resistance of concrete columns, and a related procedure provides for shear strengthening of bridge decks and floor slabs using precision drilling and resin grouting of high strength steel bars.

### Associated activities

- Surface preparation
- Diamond drilling
- Tie bar installation and grouting

# Diamond Drilling, Sawing and Controlled Demolition

Since its establishment, the diamond drilling and sawing division of Ram Services Limited has set itself high standards in seeking to offer and maintain the highest level of service to its clients at extremely competitive prices. Operating nationwide, we offer a comprehensive range of services to the construction industry. Through experienced management, well-trained and competent operatives and modern, fully maintained plant and equipment we can ensure a rapid, cost effective solution to client's requirements through applying the following techniques:

## Diamond Drilling

Diamond drilling has become an almost indispensable service in construction, providing accurate, damage free holes without dust, noise or vibration. Hole diameters achievable range from 10mm to 1000mm and can be drilled at any angle into floors, walls and ceilings through a wide range of substrates including reinforced concrete, asphalt, masonry and brickwork. The equipment used by Ram Services Limited's skilled operatives is lightweight, portable and can be powered electrically, pneumatically or hydraulically, to suit the working environment on each site.



## Diamond Chain Sawing

Particularly useful for cutting efficiently where access is limited, with the advantage of square cut corners requiring no overcuts. Hand held chain saws can achieve a depth of cut of 375mm and through portability and ease of use can provide a viable solution for the most awkward cutting problems. Rig mounting enables deeper and more accurate cutting where necessary, ideal for formation of finished openings during structural alterations.

## Diamond Wire Sawing

Wire sawing has been traditionally used in stone quarries and the development of new methods for use in the construction industry has been fairly recent. Using diamond impregnated wire running around a series of pulleys, the technique can be used in a variety of ways not feasible with other forms of diamond drilling or sawing equipment – eg for operating in confined or restricted spaces, or for cutting through steel structures, cast or ductile iron pipes, or reinforced concrete up to three metres thick.

## Diamond Floor Sawing

Using diamond tipped circular blades, clean accurate cuts can be made to a depth of 600mm in a wide assortment of materials. Floor saws are diesel or petrol powered, and electrically driven units are available for use when generation of exhaust fumes may be unacceptable, whilst the use of laminated blades can reduce noise levels. The range of plant operated by Ram Services Limited can meet the demands of all projects from large, time sensitive contracts to small one-day jobs.

## Diamond Wall Sawing

Track mounted equipment can cut openings for doors and windows in the most heavily reinforced concrete of depths of up to 750mm. The wall saw is compact, and its handy modules and simple setting up ensure safe and economic usage in a wide array of working situations.

## Hydraulic Bursting

The hydraulic burster comprises a combination of steel rams encased in a steel cylinder. The equipment is introduced into pre-cored holes, typically 200mm in diameter, and expanded hydraulically to crack and burst the surrounding concrete into manageable sized sections. The technique is free of vibration, silent, and offers a cost effective way to remove thicker concrete construction in noise, dust and vibration sensitive areas. Hydraulic packs can be powered by petrol, diesel or electric motors, allowing their use in a wide variety of environments including confined spaces.



# Pressure Pointing and Grouting

## Controlled Demolition

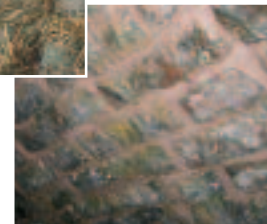
Controlled demolition utilising a combination of the techniques detailed above enables Ram Services Limited to undertake a wide variety of structural alteration works with minimal overbreak, disturbance and disruption. It is ideally suited to formation of openings for escalators, lift shafts, accessways and plant installation in industrial and retail premises, power stations and water treatment infrastructure etc.

## Specialist Mechanical Fixings

Where unusually high pull out values are required in mechanical fastenings, drilled holes can be under reamed or grooved circumferentially to increase the mechanical interlock between the fixing and the surrounding substrate. Applications include fixings for high mast lighting columns, bridge parapet and safety fence posts and machine holding down bolts.

## Associated activities

- High pressure water jetting
- Hydro-demolition
- Diamond floor grinding
- Enclosed shot blasting



Use of basic site batched or more specialist proprietary materials and plant to infill deep joint gaps and infill voids in brickwork and masonry retaining walls, masonry arched bridges, culverts, dams etc to make goods the effects of weathering and water penetration and maintain stability. Often combined with pressure grouting to further enhance integrity.

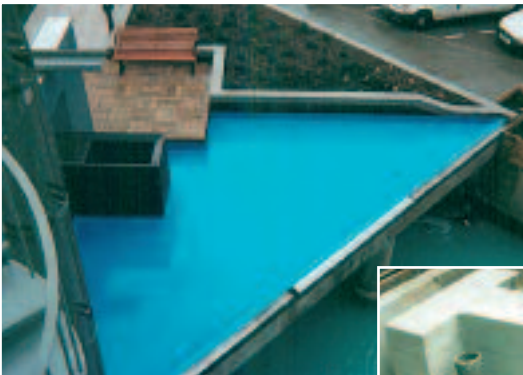
## Applications include

- Small volume placement of grout type materials in specialist or difficult situations
- Infilling of spaces under machine bases, annular gaps around pipe inserts
- Injection of predominantly cement based grouts into or around masonry structures to strengthen cavity or rubble wall construction, stabilise loose fill, prevent movement and improve structural integrity
- Use of small to moderate volumes of foamed concrete or grout to fill redundant drainage pipes and manholes or infill voids beneath redundant bridges and subways
- Prevention of ground water ingress into masonry or segmental concrete manholes, culverts and shafts
- Interstitial grouting of brickwork and masonry using aquareactive resin grouts
- Prevention of water ingress into tunnels, shafts, basement walls and manholes and remediation of the effects of washout.

# Structural Waterproofing

Use of proprietary sheet, liquid and spray or trowel applied material systems is routine in new construction and refurbishment work to tank, line or otherwise waterproof basements, water retaining structures, car park slabs, inverted roof decks, bridge structures, reservoir roofs, chemical storage protection bunds etc.

Specific products and application techniques are available to suit substrate conditions and service requirements. These can include use in contact with potable water (products for use in service reservoirs or contact tanks need DWI certification), on substrates subject to movement (large span reservoir roofs, bridge decks etc), on surfaces subject to abrasion (spillways, hoppers, channels, settlement tanks with scraper mechanisms), or in situations where chemical resistance is required (chemical tank storage bunds, upland water storage/treatment structures where water is acidic).



Other applications include waterproofing to resist negative pressure (for example in basements), or waterproofing expansion joints subject to high levels of movement (in sectional water storage tanks, on podium roofs, or on car park and bridge structures).

# Structural Leak Sealing



In remedial situations, structural leak sealing can be achieved by means of injected cementitious and resin based grouts. Using specially developed equipment, appropriate materials are injected into open cracks, joints or other defects in structures such as lift pits, basements, culverts, tunnels, water containment or treatment structures, tank storage bunds, manholes, shafts, lock chambers and the like.

Polyurethane resins react expansively with water in open cracks or joints to form a gel or foam type of seal, quickly reducing and then stopping water penetration. Variations in formulation allow injected resin to react rapidly to deal with situations where water flow is high, or remain flexible where ongoing movement is anticipated. Other formulations are designed for injection into loose or granular fill, reducing porosity/permeability and increasing stability of fill material around tunnels, culverts, manholes etc.

Acrylic resins have very low viscosity, enabling water penetration through the finest cracks in concrete structures to be sealed using high pressure twin component pumps.

Cement based grouts, modified with polymers or bentonite admixtures to assist dealing with flowing ground water are injected using mechanical worm pumps or pressure pots where large voids or leak paths are known to occur, for example behind lock walls or around manhole shafts.

Other areas of expertise are available to deal with other forms of leakage, such as through joints in large diameter (man entry) pipes, where mechanical seals may be more appropriate.

## Associated activities

- Mechanical expansion joints
- Joint sealing
- Chemical resistant bund linings
- Abrasion resistant and slip resistant coatings
- Pressure pointing and grouting
- Pipe joint repair and testing



# Concrete Repair

We carry out thorough investigation and testing of concrete structures to ascertain cause and extent of defects and validate repair specifications prior to implementation of remedial works. Typically this could highlight some of the following problems and remedial actions.

Concrete damaged by abrasion, frost, poor compaction, over stressing, reinforcement corrosion or that is otherwise defective can be removed utilising conventional percussive methods, or using hydro-demolition, diamond sawing, crunching and bursting techniques where circumstances so require.

Reinstatement of degraded concrete utilises site batched and proprietary hand applied mortar, flowable repair concrete and spray applied materials, and cementitious fairing mortar for finishing.

Where rapid strength gain, or chemical resistance or low temperature performance is critical, resin based repair materials may be used.

A wide range of cementitious, mineral, co-polymer or resin based coatings can be used to protect repaired surfaces from further deterioration, and provide a unified finished appearance.

Use of coatings and finishes can also be beneficial to proactively protect concrete and masonry, significantly extending life to first maintenance and reducing whole life costs, particularly in the case of water treatment infrastructure and other environments where exposure to freeze-thaw action or the use of aggressive chemicals are widespread.



## Associated techniques

**Crack injection** – Injection of cracks with polyester or epoxy resin or alternatively cementitious grouts to fill crack spaces, prevent ingress of air and water or contaminants, and potentially restore structural integrity. Specialist formulations of epoxy resin can be produced to suit more onerous site conditions.

**Structural waterproofing** – Use of sheet, liquid spray and trowel applied materials to line and prevent water penetration into or out of a wide variety of structures.

**Specialist surface preparation** – Enclosed shot blasting, open grit blasting, high pressure water jetting, rotary planing, diamond grinding, hot compressed air.

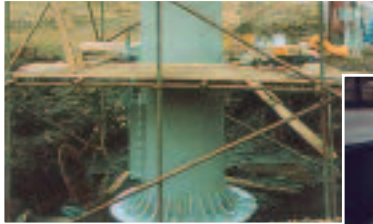
**Protective coating systems** – Weather, chemical, abrasion resistant and hygienic finishes.

**Joint sealing** – A range of techniques and materials includes solid or cellular neoprene compression seals for situations where movement is limited, preformed resin bonded membrane strips or closed cell foam type inserts where movement levels are higher or water tight construction is required.

**Mechanical joint systems** – For car parks and bridge decks where resistance to trafficking and movement are needed, and more conventional poured or gun applied mastic sealants for lesser joints.



## Protective Coatings



Surface preparation – high pressure and ultra-high pressure water jetting, abrasive grit blasting, enclosed shot blasting, grinding and planing

Anti-carbonation and chemical resistant coatings for concrete substrates

Clear impregnations and decorative coatings for façade renovation

Twin or single pack corrosion resistant coatings for structural steelwork

Sprayed chemical resistant or elastomeric waterproof membranes

Flooring – chemical and abrasion resistant, de-contaminable, non slip and protective finishes

## Pipe Joint Testing and Repair

Supply and operation of pipe joint testing apparatus for use in larger diameter, man entry pipe installations

Supply of large diameter pipe stoppers, plugs, wash balls and associated equipment

Internal and external remedial sealing of leaks in large diameter pipe joints

Associated techniques

Leak sealing and waterproofing

Confined space working



## Safety & Training

The company is dedicated to safe working and customer satisfaction, and all employees are committed to being CSCS and/or Safety Passport holders. They receive on and off the job training in practical and health and safety matters relevant to their function, capabilities and experience.

To further this, a structured training programme has been set up in conjunction with the CITB to take employees to NVQ level 2 status or beyond, with additional health and safety and task specific training being provided in-house or sourced from external providers, including product suppliers, specialist training organisations and the CITB. All operatives and supervisors are either directly employed, or retained under long term sub-contract arrangements, ensuring continuity of experience and capability for all the services we offer.





## Why contact us?

Our technical staff all have long term experience in the industry, and are happy to respond to routine or one-off enquiries for structural investigation and repair, or for work using the “diamond division’s” expertise.

Whilst we can and do undertake work against specifications and schedules prepared by others, our wide skills base and long term experience enables us to offer a much broader service. In addition to dealing with the routine, we are particularly known in connection with the more awkward or unusual projects, whereby we make available our knowledge and experience to the processes of investigation, specification, scheduling, and costing of a scheme prior to actual implementation of work on site.



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