



Balvac

Specialists in repair, strengthening,
refurbishment and protection

Balvac
Balfour Beatty



Balvac, part of the Balfour Beatty Group, is a leading specialist in repair, strengthening, refurbishment and protection of all types of buildings and heritage and civil structures across the UK. The service we offer combines project management expertise, survey and design work and the proven specialist skills to carry out technical structural repairs.

Our focus

Our focus is on our customers requirements. We discuss, solve, agree and deliver innovative solutions that meet exacting needs.

We work across a number of market sectors including road and rail infrastructure, power, water and waste water, commercial buildings and car parks.

Our CARES Accreditation allows us to undertake post tensioning installations to bridges, buildings and tanks.

As principal contractor we provide specialist skills and project management services to deliver technical structural repair solutions, with project values ranging from £100,000 to £5 million.

On smaller projects we also act as a specialist subcontractor for a range of activities including carbon fibre composite strengthening, leak sealing and grouting, vacuum-assisted crack injection, consolidation and impregnation of masonry and brickwork, concrete repairs (hand placed, sprayed and flowable), structural refurbishment and concrete protection.

Flexible and responsive, we are able to assist for any period from a few days to offering multiple teams over longer periods.

Infrastructure

We undertake works to all types of road and rail infrastructure, bridges, tunnels, highways and underpasses. Our work is carried out under framework agreements and individual contracts across the UK.

Our approach

Our team undertake extensive surveys and assessments to understand what level of repair and protection is necessary and provide our customers with accurate costs. Our customers come back to us time and again due to our reputation for providing best value technical solutions.

On a bridge refurbishment project we can handle all aspects of a contract including the complex access systems and traffic management.

Our skills range from conventional concrete repair to specialist techniques including post tensioning, duct grouting, carbon fibre strengthening and cathodic protection.

We are well established in the market and involved in a number of framework agreements providing structural repair services across the UK. We undertake projects directly for customers as a principal contractor and also deliver specialist work packages as a subcontractor.

Technical expertise:

Bridges:

- Reinforced concrete bridges
- Post tensioned bridges
- Steel bridges
- Masonry arch structures
- Rail and highway bridges

Tunnels:

- Leak sealing by resin injection
- Seepage control
- Brick stitching
- Vacuum assisted grouting
- Masonry repair
- Cementitious grouting
- Rail block replacement
- Spray concrete

Highways:

- Structural repairs
- Strengthening using FRP or steel
- Corrosion prevention – impressed current cathodic protection
- Sprayed concrete
- Remedial duct grouting
- Complex access arrangements
- Traffic management
- Project management



CASE STUDY

We have installed over
10,000m
of innovative cassette
anode system to the
reinforced concrete bridge
deck, protecting it from
ongoing corrosion.



Halton Borough Council Bridge Maintenance Partnership

The Silver Jubilee Bridge is of significant importance within the North West of England highway network. It is one of only three major road crossing points on 20 miles of the River Mersey and is exposed to traffic volumes regularly exceeding 80,000 vehicles per day.

As part of the Halton Borough Council (HBC) Bridge Maintenance Contract we have been responsible for completing concrete repairs, cathodic protection, sprayed concrete, steelwork repainting, steelwork strengthening, parapet replacement and bridge deck refurbishment.

The combination of high traffic volumes across the Silver Jubilee Bridge, four narrow running lanes and no central reservation present significant traffic management challenges when maintenance works are undertaken.

By building a strong collaborative relationship with HBC we were able to combine work packages and share management and logistical resources. This approach minimised disruption to the public while delivering savings of £700,000 over a four year period.

Having a partnership contract in place to deliver major bridge maintenance works was instrumental in HBC's successful major scheme bid to the Department for Transport.

This resulted in the award of a maximum value grant, over a five year period, to deliver the final element of HBC's future maintenance strategy.

In February 2013 HBC awarded Balvac a two year contract extension based on the partnerships performance and customer satisfaction levels over four years.

Power: nuclear and renewable

We have worked across the power sector and have capabilities that range from detailed visual and exploratory investigations of structural defects to the installation of complex steel support systems, concrete repair works and protective coatings.

Our approach

Our teams work closely with project designers to develop co-ordinated approaches and economic solutions through teamwork, planning and cooperation with other stakeholders. We design innovative solutions, plan and programme works to minimise disruption, undertake complex repairs and deliver a quality end product with safety and sustainability at the forefront of all of our activities.

Nuclear

Our work in nuclear power stations has involved undertaking phased repairs and seismic strengthening work. Through working closely with our customers we have developed specific quality systems. Long-term relationships with our customers demonstrate our ability to deliver to stringent safety and quality standards within a demanding power station environment.

Renewable

We undertake a range of specialist repairs within the renewable energy sector. On wind farms these include turbine foundation investigations, resin injection, grouting, stabilisation, concrete repairs and resealing flanges to ensure long-term trouble free operation of these valuable renewable energy sources.



Below: Hartlepool Power Station



CASE STUDY

Keeping foundations firm and turbines producing energy.

Wind farm foundations, Ballybane, Cork, Ireland

The turbine foundation design at Ballybane wind farm uses a steel 'can' that is embedded into the concrete foundation to which the tower segments are then fixed to form the main tower.

The turbine foundation design at Ballybane wind farm uses a steel 'can' that is embedded into the concrete foundation to which the tower segments are then fixed to form the main tower.

Occasionally problems occur with movement of the embedded 'can' inside of the concrete foundation. This can cause the turbines to be stopped for safety reasons.

When excessive movement was detected at Ballybane we undertook specialist repairs to resolve the problems, helping to maintain the operation of the turbines.

The work was carried out over a three week period and has ensured that the smooth operation of the turbines continues.

Our work involved:

- Careful break out of any delaminated concrete around the edge of the 'can'
- Precise drilling to specific angles and depths to access the base flange
- Injection of specialist epoxy resin
- Surface preparation of concrete and reinforcement
- Application of corrosion inhibitors and concrete repair mortars
- Application of specialist sealants around the 'can'

Water and waste water

Sewage treatment works can come under attack from various aggressive influences of waste water. The effects can cause extensive concrete damage especially in enclosed treatment works where the formation of hydrogen sulphide, an acidic gas, attacks the concrete and causes severe damage.

Our approach

We provide a wide range of specialist services to help maintain and extend the life of vital water and waste water structures in the UK. We have UK CARES PT1 and PT2 certifications meaning that we are one of a limited number of UK contractors able to undertake specialist post tensioning works.

Our teams provide detailed surveys, inspections and technical proposals. We undertake extensive concrete repairs, application of concrete protection systems, crack repairs, leak sealing works, joint sealing and waterproofing works to ensure these vital structures continue to treat waste water and provide clean water for our communities.

Technical expertise:

- Condition surveys
- Technical proposals
- Project management
- Concrete repairs
- Concrete protection
- Leak sealing/resin injection
- Joint sealing
- Crack repairs
- Post tensioning of circular tanks
- Tendon monitoring/replacement
- Strengthening using FRP/steel
- Cathodic protection
- Hydrodemolition
- Gritblasting



Right: Concrete repairs at the Chester sewage treatment works
Opposite: 'Top of the Cow' – Post tension installation as part of tank construction



UVDB
 empowered by Achilles
 Supplier Number: 06159

Car park refurbishment

The success of a car park refurbishment lies in the ability to balance the requirements of the car park owner with the needs of the users. Our enviable track record demonstrates our commitment and ability to deliver complete customer satisfaction.

Our approach

Maintaining the operation of a car park is one of our key objectives when completing refurbishment works. To do this, we implement well planned traffic management systems – making sure that the health and safety of workers and the public is protected at all times.

We undertake all aspects of car park refurbishment work from initial condition inspections and surveys to specialist repair and protection techniques, including electro-chemical methods such as the installation of sacrificial anodes and impressed current cathodic protection systems.

Our strong supplier relationships mean that we are approved applicators of the leading concrete repair systems and deck waterproofing systems.

We utilise the latest techniques and materials to deliver solutions that benefit both our customers and the end user.



Right and opposite: Livery Street Car Park, Birmingham



CASE STUDY

Close co-ordination of operations, suppliers and subcontractors was essential on Birmingham's Livery Street car park.



Livery Street, Birmingham

The flagship Livery Street car park serves Snow Hill train station and the city's business district. It has 800 spaces and is open 24 hours a day, every day.

Working for Birmingham City Council, we delivered the £750,000 refurbishment of Livery Street car park.

To maintain day-to-day operation of the car park, we worked closely with our suppliers to co-ordinate works.

We also implemented a traffic management programme and used signage and protective fencing to make sure our work areas were safe – both for our employees and the general public who were in close proximity. This approach meant that the majority of the car park was available for use at all times.

Using Tremco's high specification waterproofing system across 22,000m² of the deck surface we delivered bright coloured parking, driving and non-slip walking zones to improve way finding and safety for the public.

The safety of the car park was further enhanced by the installation of a new CCTV system and energy efficient lighting.

We also undertook a number of concrete repairs as well as applying white protective coatings to soffits and walls and replacing vehicle barriers and signs.

Our work involved:

- Traffic management
- Waterproofing
- Line marking
- Concrete repair and protection
- Protective coating application
- New lighting and CCTV

Building refurbishment

From large complex projects to small refurbishment works, our team is experienced in a wide range of external repair works. These include concrete repairs, applying protective and waterproof coatings, brickwork inspection, stabilisation work and roofing repairs.

Our approach

Partnership and Social Housing

We have completed partnership and social housing refurbishment schemes and have a firm understanding of the requirements of social landlords.

Central to our approach is the appointment of a resident liaison who has specific responsibility for communicating with neighbours – ensuring they are fully aware of works that will be carried out and any impact that they may have. This consultation and communication goes on throughout the project.

Taking Care of our Heritage

We have undertaken repairs to a number of heritage structures including the high profile restorations of the Albert Dock in Liverpool, Rhuddlan Castle in North Wales and listed warehouse buildings within the Liverpool ONE retail development.

Our staff are highly trained and skilled in the latest carbon fibre strengthening and vacuum resin injection techniques. Their expertise ensures that they are well equipped to undertake sensitive repairs on castles, churches and listed structures.

We are experienced in liaising with the appropriate heritage organisations such as English Heritage, Historic Scotland, CADW and the Welsh Government.

Services:

- Access systems
- Concrete surveys
- Concrete repairs
- Protective coatings
- Brick work repairs
- Joint sealant renewal
- UPVC window replacement
- Asphalt and roofing works

Where we work:

- High-rise blocks
- Building refurbishment
- Schools and universities
- Hospitals
- Commercial buildings
- Historic buildings

We used vacuum assisted resin injection techniques to stabilise and strengthen extensive vulnerable areas of brickwork at Albert Dock, Liverpool



Our skilled staff project manage works to occupied buildings devising safe access arrangements to commercial buildings and residential properties ensuring that any disruption is minimised.

CASE STUDY

Preserving a historic fortress
for future generations.



Rhuddlan Castle, North Wales

Rhuddlan Castle is situated on the banks of the River Clywd, two miles inland from the coastal town of Rhyl.

Rhuddlan Castle has a long history dating back to the 13th century and for the past three hundred years has served as a ready source for local building materials.

The inclement weather and strong coastal winds have further contributed to weathering the weakened sandstone walls.

Development of the repair and impregnation programme was carefully developed by the site team and approved by CADW's conservation and archaeological specialists.

A programme of testing, trials and sampling ensured full awareness of the systems prior to the work beginning to ensure the 800 year old castle was preserved safely.

Our technical team undertook a variety of work and deployed a number of techniques across the castle. Cracked lintel stones above window openings were pinned following resin injection to prevent the further ingress of water and to provide lateral support for the stone.

In order to stabilise individual weak and weathered stones the surface was vacuum flushed with a low viscosity sealant material. This technique utilises a sealing shroud spaced off the substrate surface and resin introduced under vacuum to penetrate the substrate. The holes for the anchors were cored using 25 millimeter diameter diamond tipped core barrels varying from 500 up to 2000 millimeters in length.

Installation of fibre reinforced polymer anchors bonded with polymer resin has physically tied loose masonry in place and together with vacuum assisted resin injection, composite repairs have been achieved. The joints in masonry were pointed with a lime mortar and the surrounding stone filled through injection tubes with resin. The stones were then impregnated with a low viscosity resin.

The expertise and passion of our project team means that future generations can enjoy this historic ruin.

Operational excellence



We use a range of specialist techniques to deliver repairs, strengthening, refurbishment and protection of buildings and civil structures.

Our specialisms

Post tensioning

We provide a full post tensioning design, supply, installation and maintenance service for a wide range of structures. These include bridges, multi-storey buildings and circular tanks. We also undertake the monitoring, testing and replacement of tendons within existing structures such as nuclear power station reactor buildings.

We work on both bonded tendon and unbonded tendon installations and our works are externally audited through our CARES accreditation. Our experienced engineers also provide preliminary design and budget pricing for schemes at early planning stages.



Right: Tendon monitoring at Oldbury Power Station
Opposite: Repairing the Castlefield Viaduct in Manchester





Our specialisms

Concrete repair and protection

Our experience, extensive knowledge and use of specialist techniques allows us to carry out all forms of concrete repairs.

Where concrete is exposed to aggressive environmental or chemical attack we apply a range of specialist concrete protection systems helping to extend the life of the structure/asset.

Our technical department offers a full service from concrete testing and analysis to providing technical proposals, trials, designing temporary works and ultimately undertaking the concrete repairs.

Concrete pavements and slabs

Reinforced concrete pavements, highway slabs, airports and distribution centres can be restored to extend their useful working life using the Balvac developed system of vacuum void grouting.

Developed in the late 1970s for highways and still used extensively throughout the UK on both Highways England and local authority roads, this technique to stabilise slabs has gone on to be successfully used in distribution centres and other commercial properties.

Vacuum void grouting extends the life of the asset and, particularly in distribution centres, has been shown to reduce plant maintenance costs. A variety of testing techniques and surface/joint repair techniques complement the vacuum void grouting stabilisation technique.

The technique has been approved by Highways England and has been highly successful in solving problems associated with rocking slabs. Work can be carried out under short period possessions, often at night with appropriate traffic management in place, where productivity and quality control are both required to focus on efficiency of delivery.

Cathodic protection and corrosion prevention

We are experienced in the application of cathodic protection systems designed to treat areas of deterioration in reinforced concrete. Our teams undertake investigations and evaluations in order to determine the most suitable specification and design.

Corrosion of steel in concrete is probably the single most serious cause of deterioration of reinforced concrete structures. Buildings, bridges, car parks, jetties and other structures suffer from chloride induced corrosion largely due to de-icing salts, sea salts and salts cast into the concrete.

Cathodic protection can also be applied to steel frame buildings where the frame is encased in masonry or brickwork with reasonably consistent contact between the mortar and the steel. Individual evaluation of the circumstances is required to ensure appropriate action is taken.

Techniques include:

- Impressed current systems
- Mesh and overlay systems
- Galvanic anode installation
- Conductive paint systems
- Hybrid anode systems

Opposite top: Vacuum void grouting on the M42

Opposite bottom: Concrete repairs at Newcastle Police Station

Above: Cathodic protection inspection and testing on the Widnes approach viaduct



Right: Installation of carbon fibre wrap at Gatwick Airport

Opposite: Vacuum Resin Injection – A421 Bridge Abutment

Our specialisms

Vacuum assisted crack injection

This technique utilises both vacuum and low pressure to introduce grout into cracks as small as a few microns in width. A variety of methods are employed to introduce the most appropriate material for the particular repair and, in addition to concrete, the process can be utilised on more traditional materials such as brickwork and masonry. Vacuum injection is of particular benefit where high levels of penetration and filling of the crack are deemed important.

Resin injection

Leak sealing and seepage control of water ingress and egress is essential in the performance of structures. Resin injection is used both to stop the ingress of water into structures such as underground tunnels, stations, basements and to stop the egress of water from storage tanks, thus preventing loss of the stored material and pollution. Specialist single and twin piston pumps are used to inject a variety of polyurethane and acrylic resins depending upon the particular site conditions and customers' requirements.

Applications:

- Tunnels, tanks and water retaining structures
- Buildings, bridges and civil structures
- Concrete carriageways
- Airport taxi ways
- Warehouse floors
- Industrial sites
- Rapid strength gain situations

FRP strengthening

Balvac is one of the pioneers of fibre reinforced polymer (FRP) strengthening, bringing it to the UK construction market in the late 1990s.

FRP plates are typically twice as strong and a quarter of the weight of equivalent steel sections. The 8:1 strength to weight ratio gives FRP significant advantages over steel with FRP composites largely replacing steel plate bonding as the technique of choice for strengthening bridge beams, columns, decks and suspended floors.

Techniques include the use of pultruded plates, wet lay systems, pre-stressed plates, ultra high modulus plates and near surface mounted.

We have close and well established relationships with recognised FRP designers. As an approved contractor for all the leading material suppliers, we are able to select the most appropriate procedure and material to value engineer an effective composite system.

Applications:

- Cast iron bridge strengthening
- Under strength structures
- Change of building use
- Increased floor loadings
- Bridge column wrapping



Balvac and Balfour Beatty

Balfour Beatty is a global integrated infrastructure services group, with operations in over 80 countries.

Balvac's history

Balvac Ltd was first incorporated as Whitley Moran & Co. Ltd in October 1933. In the early years of trading the business concentrated on gunite/shotcreting works.

Whitley Moran & Co. Ltd was acquired by Balfour Beatty in 1967 and continued with gunite/shotcreting works, but also started to carry out cementitious grouting, pointing and concrete repair works.

In the 1970s, Balfour Beatty started to develop techniques for impregnating concrete and masonry using vacuum assisted injection of low viscosity resin. The technique was further developed to treat voids beneath concrete pavements, and the 'Balvac Process' was subsequently patented. Numerous concrete carriageways in the UK were treated to stabilise rocking slabs, fill voids beneath and slabs were lifted back level prior to the injection process to fill the voids beneath.

The Balvac unit of Balfour Beatty continued to undertake concrete remediation works and soon they found themselves competing for work with Whitley Moran & Co. Ltd.

The two Balfour Beatty businesses were finally merged in 1986 to form one company, Balvac Whitley Moran Ltd.

Balvac Whitley Moran Ltd (known as BWM) developed skills in all areas of concrete repair, strengthening and protection of buildings and civil structures.

In 2003, the company name was changed to Balvac Ltd.

Balfour Beatty

Every day we work with customers and partners to fund, design, deliver, operate and maintain infrastructure efficiently and safely.

We create the infrastructure assets that help communities, society and nations to live, thrive and grow.

Focusing on geographical regions and key market sectors lets us prosper today and grow sustainably tomorrow. We have expertise and resource through the entire infrastructure lifecycle from financing to planning and design to construction, maintenance and support.



Below: Sprayed concrete roof, Barclays, Warrington

Opposite: Sprayed Concrete Gun, March 1955



Our commitments

Eliminating risks

Zero Harm is our commitment to eliminating any injuries or deaths as a result of our activities and aiming for an Accident Frequency Rate of zero.

- **Eliminating hazards**
We identify and plan out potential hazards.
- **Maintaining Zero Harm day-to-day**
We manage, monitor, review, audit and provide Zero Harm assurance systems.
- **Keeping the public safe**
Zero Harm levels of separation, security, monitoring and stewardship are maintained to keep the public safe.
- **Keeping our people healthy**
Our employees have health checks and are risk assessed to ensure that working for us doesn't harm their health.
- **Working with our customers and supply chain**
We ask our customers to help us achieve Zero Harm, and ensure that our supply chain adopt Zero Harm practices.
- **Making Safety Personal**
Our people understand that safety is a personal responsibility. None of us will ever walk past something unsafe.

Becoming more sustainable

Our approach to sustainability is based around three pillars:

- **Profitable Markets**
Close collaboration with our customers, supply chain and industry partners to achieve more suitable outcomes.
- **Healthy Communities**
Our activities must improve the quality of people's lives while supporting the needs of future generations.
- **Environmental Limits**
Sustainable development means using less natural resources as well as managing our environmental risk and biodiversity.

Building long-term customer relationships

We work with our customers to build long-term relationships.

Our customer experience programme is designed to develop deeper relationships with our customers based on project delivery, co-operation and trust.

Our MAP tool, a key part of our customer experience programme, allows our customers to set the criteria by which they assess our performance and to feedback to us on a regular basis. We then take this feedback and develop an action plan to ensure we are satisfying all of our customers' critical success factors and in doing so build long-term relationships.



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