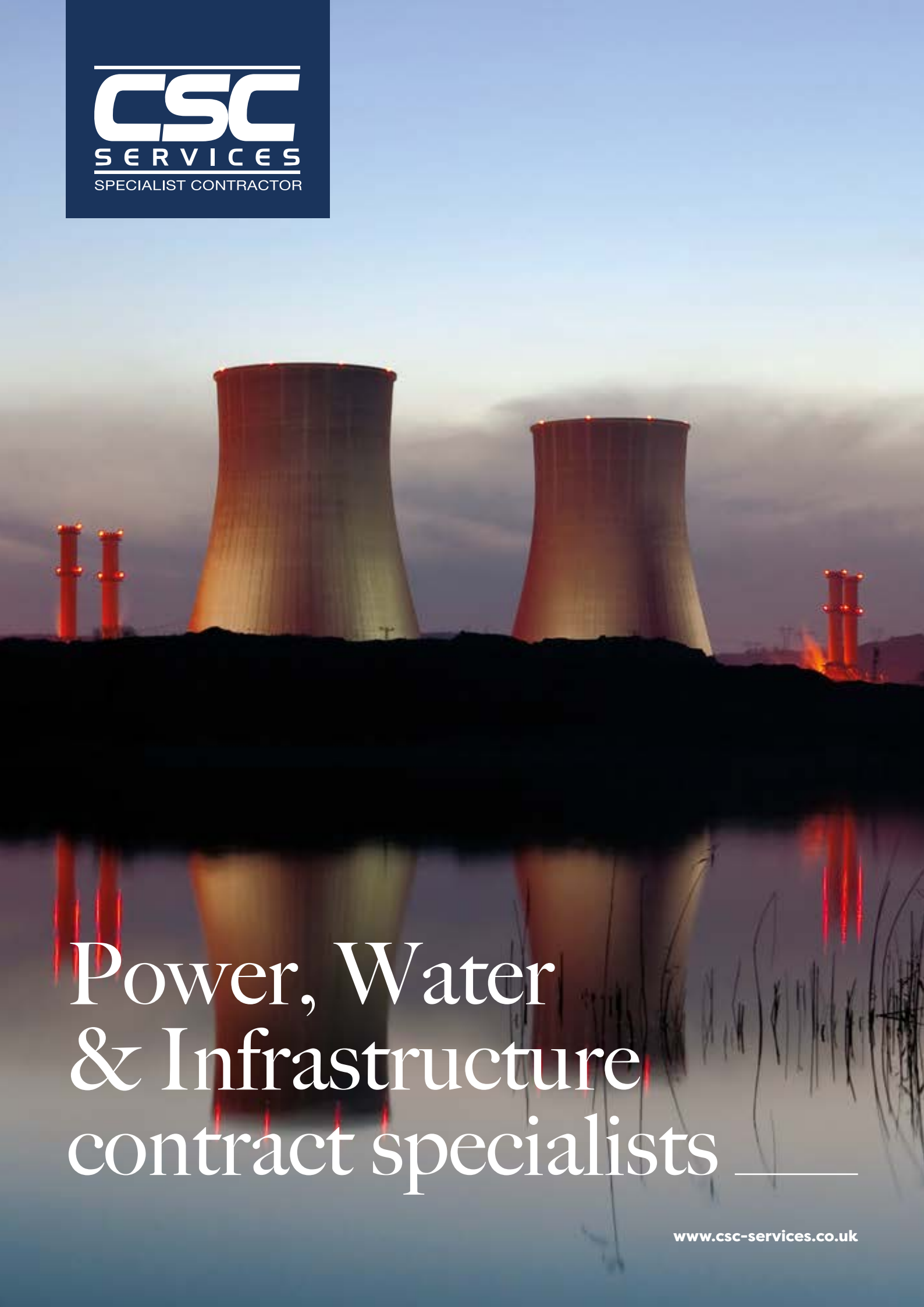
CSC SERVICES
SPECIALIST CONTRACTOR



Power, Water & Infrastructure contract specialists

www.csc-services.co.uk

Welcome

CSC Services offer a range of services. Our experienced teams can advise on the most cost effective and sustainable solution to your problem.

At CSC Services our clients depend on us for safe, reliable and cost-effective contracting services in concrete structural repair, refurbishment and protection. Working with us is more than a service, it's a partnership.

CSC SERVICES
SPECIALIST CONTRACTOR

Our services

Clean & Prepare

- Grit blasting
- Precision dustless blasting
- Ultra High Pressure Water Jetting

Specialist Services

- Confined space working
- Reactive work
- Asset condition surveys
- Ladder/handrail installation

Coatings Services

- Cementitious coatings
- Chemical coatings
- Corrosion control coatings
- Epoxy resin coatings
- Industrial painting
- Pipework painting
- Waterproof coatings
- Waterproof membranes
- Anti-carbonation coatings

Repair Services

- Concrete repairs
- Culvert repairs
- Expansion joint repair
- Resin injection
- Machine grouting
- Carbon Fibre Wrapping
- Cathodic Protection
- Low Cover Concrete Repairs
- Sika Liquid Plastic Roofing Systems
- Water & wastewater tank and reservoir refurbishment

Concrete Repairs and Protective Coatings

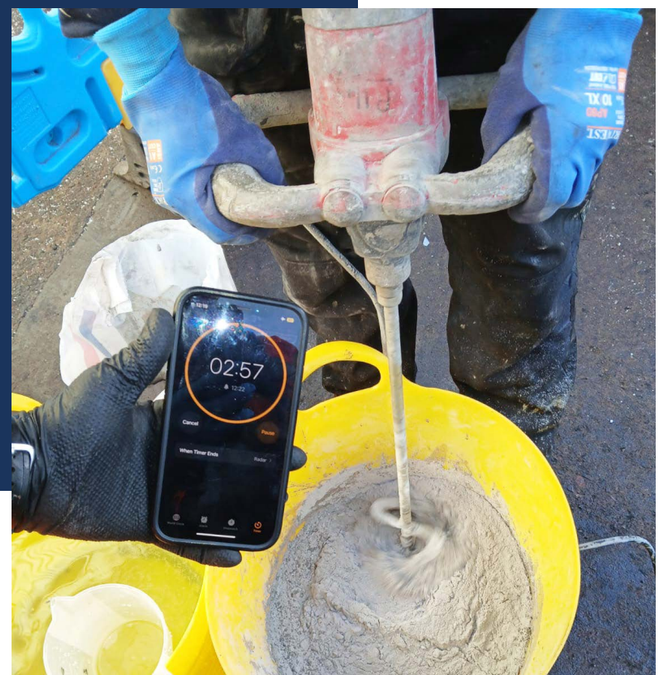
CSC Services (UK) Limited were appointed by MB Developments (Scotland) Limited to carry out Concrete Repairs and Protective Coatings to a Wet Well, on the East Coast Scotland.

Scope of works

Concrete Repairs to various areas of the Wet Well followed by Flexcrete Monolevel 844 SP Waterproof levelling/fairing coat. All internal surfaces to be finished with Flexcrete Cemprotec E942 protective coating.

Wet Well

- Vac ex clean out
- Installation of scaffolding
- Confined space access/egress
- Substrate repairs
- Flexcrete monolevel 844 SP application
- Cemprotec E942 application



Solution

Benefits of FLEXCRETE Monolevel 844 SP:

Durability and Strength: Monolevel 844 is designed to offer robust performance in harsh environments, making it suitable for wet wells subject to constant moisture and potential chemical exposure.

Waterproofing: Monolevel 844 can act as a waterproof barrier, reducing the risk of water intrusion and protecting the structural integrity of the wet well. Adhesion: This product typically provides excellent adhesion to a variety of surfaces, which is crucial in applications where the substrate may be damp or uneven.

> "From the initial consultation to the carrying out of works through to completion CSC services proved to be an excellent choice of contractor for us. Their communication and work ethic was excellent despite facing various challenges and we would be happy to work with them on any future projects."
>
> **Mark Ballantyne**
> **MB Developments (Scotland) Limited**

Progress

Benefits of CEMPROTEC E942 Cementitious Coating:

Chemical Resistance: The E942 cementitious coating is formulated to resist harsh chemicals, including Hydrogen Sulphide gas which is often found within wastewater environments.

Additional Waterproofing: Applying E942 can enhance waterproofing, further preventing moisture infiltration and helping to protect the structure.

Versatility: It can be used on a variety of substrates and is suitable for various environmental conditions owing to its flexibility and abrasion resistance.

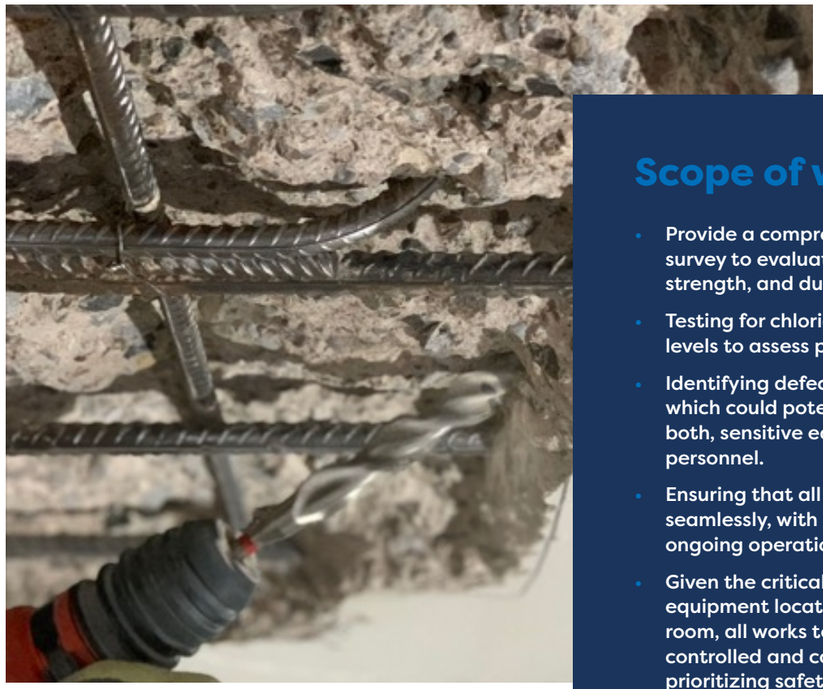
Safety & Sustainability: Cementitious coatings are generally safe and environmentally friendly due to the lack of Solvents and VOC's within the product, which can be a consideration for projects where safety and sustainability is a focus.

CASE STUDY:

Concrete Survey and Repair

CSC Services (UK) Limited were appointed to carry out Concrete Survey and Repair works to a confidential client site in Northumberland

CSC Services undertook a crucial project involving a comprehensive concrete survey and subsequent repairs in a plant room and soffit containing highly sensitive equipment essential for the daily functions of the facility.



Scope of works

- Provide a comprehensive concrete survey to evaluate structural integrity, strength, and durability.
- Testing for chlorides and carbonation levels to assess potential corrosion risks.
- Identifying defective areas of concrete which could potentially pose a risk to both, sensitive equipment and on-site personnel.
- Ensuring that all work was conducted seamlessly, with zero interruptions to ongoing operations.
- Given the critical nature of the equipment located within the plant room, all works to be meticulously controlled and coordinated, prioritizing safety and functionality throughout the project.

Solution

In response to the findings of the concrete survey, CSC Services implemented a multi-faceted repair strategy consisting of the following steps:

- Defective Concrete Removal: Removal of any delaminated and defective concrete identified in the soffit, ensuring that any compromised sections were systematically addressed.
- Rebar Assessment and Replacement: A detailed examination of the embedded rebar was carried out, resulting in the replacement of rebar that exhibited significant corrosion or loss of integrity.
- Installation of Patch Guard 350 Anodes: To mitigate the incipient anode effect, PatchGuard 350 Anodes were installed at 400mm centres around the perimeter of the repairs. This solution was facilitated with support from Sam Wheelhouse and Ryan Williams from CPT.
- Half-cell Monitoring & Verification: After the installation of the anodes, half-cell monitoring equipment was used to assess and certify the anodes, ensuring optimal performance and effectiveness.
- Concrete Repair System Implementation: The repairs were reinstated using Flexcrete concrete repair material – Monomix HD followed by the Monolevel SP levelling/fairing coat.
- All materials were installed in accordance with BS EN 1504 and to the manufacturer's specifications.
- Corrosion Inhibitor Application: Upon complete curing of the repairs, a corrosion inhibitor (Sika Margel VPI 580) was applied across the soffit to address the elevated chloride levels identified during the survey. This application significantly enhances the longevity and durability of the concrete structures.
- Expected Outcomes: The implemented systems are expected to provide full protection to the concrete soffit and plant room floor for over 20 years.
- Completion The project was successfully completed within the set timeframe and budget, ensuring high safety standards throughout the process. Sensitive equipment within the area of operation was able to continue duties without interruption during the entirety of the repairs, demonstrating CSC Services' commitment to meticulous planning and execution.

Progress photos

Conclusion

The successful completion of the concrete survey and repair project illustrates CSC Services' expertise in handling sensitive infrastructure needs in a controlled environment. With a focus on safety, efficiency, and durability, the project not only met but exceeded expectations, positioning the plant for continued operational success.

Cathodic Protection to Drumscreen

Meticulous planning and a scheme of 24-hour working meant power station refurbishment work that historically took over one hundred days was completed within three weeks by CSC Services.

Working for EDF Energy's contract partner Cape, CSC Services installed a cathodic protection system to one of the drumscreen chambers at Hartlepool Power Station during the planed shut-down of one of the reactors. Two twelve-hour shifts were worked each day/night.

Carbonation and chloride ingress of the reinforced concrete structure had been caused by sea salt passing through the Drumscreen as part of the Power Station's cooling process.

A cathodic protection system was specified to address corrosion across the entire area treated. This could not be achieved with conventional repair methods without removing all the concrete where salt or carbon dioxide had penetrated.

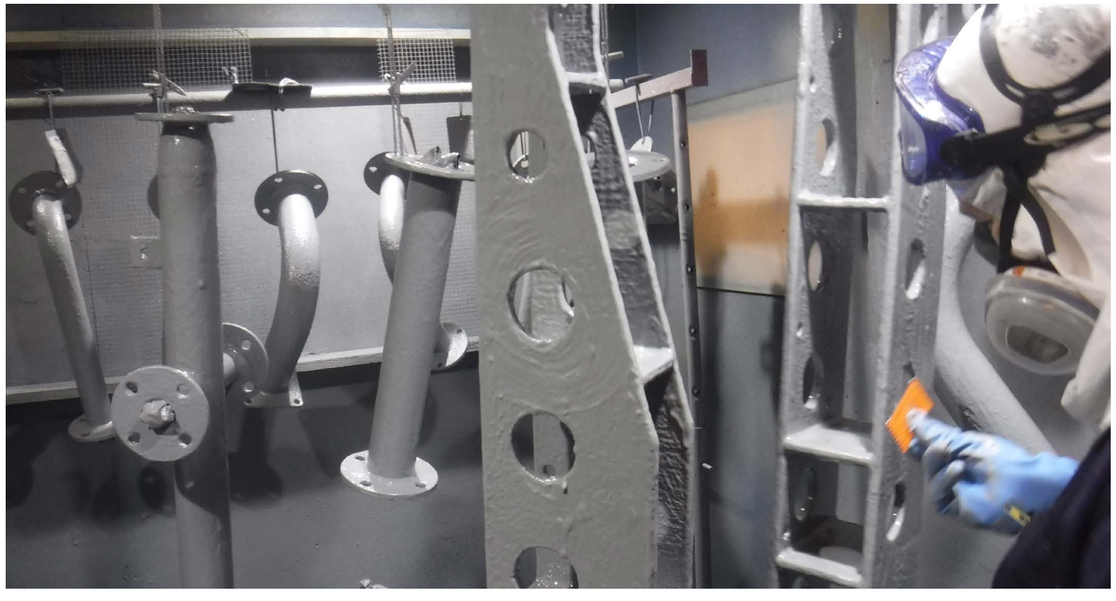
Hammer testing of concrete surfaces was undertaken prior to hydro demolition to give an estimated square meterage of repair site. Following the hydro-demolition of spalled concrete, a site inspection quantified the structural reinforcement replacement bar and anode requirements.

580 sacrificial anodes were installed and several hundred metres of structural reinforcement replacement bar in a range of dimensions fitted. Over 22,000kg of concrete was then spray applied to return the structure's surface to profile. Access ladders, platforms and framework were then replaced.

CASE STUDY: EDF Energy, Dungeness B Power Station

Chemical Resistant Coatings

Work to replace the rubber lining of the Mixed Bed Regenerator Vessel was completed. The vessel forms part of the Power Station's water treatment plant, backwashing, rinsing and injecting resins with sulphuric acid and caustic soda. Inspection revealed the internal rubber lining to be significantly blistered with some patches degraded through to substrate.



Following the removal of lateral supports and internal pipework, chemical resistant lining Ceilcote 242 Flakeline by International Paints was used for the vessel refurbishment. Ceilcote 242 Flakeline is a flake filled vinyl ester coating with excellent resistance to organic and inorganic acid solutions and many aliphatic solvents. It has a designed lifetime of ten years. The coating system comprised of primer and four coats roller applied.

Lateral supports and pipework were inspected and cleaned for blockages and recoated externally. This process took place offsite at CSC Services premises, to minimise disruption at the Power Station.

Surface Preparation - To ensure the substrate was prepared correctly, Ultra High Pressure Water Jetting was used at 36000psi, followed by grit blasting to Standard Sa3.

On completion of the work dry film testing and spark testing were undertaken and showed 100% coating coverage had been achieved within specification. Alan Smith, Project Engineer from Dungeness B Power Station said:

"This project was a collaborative effort throughout, with CSC providing advice to inform the specification of the coating material, working closely with both Investment Delivery and the Technical Advice Group. The quality of workmanship and application of the coating have been noted by others and positively regarded."

CASE STUDY: EDF Energy, Hinkley Point B Power Station

Concrete Spalling Remediation Programme

Over ten tonne of specialist repair mortars and structural strengthening products were used to rectify the degradation of reinforced concrete at various areas across the station.

A combination of environmental exposure, water ingress and the age of the station building, had caused spalling in areas, including the flask bay and turbine hall.

Maintaining ongoing nuclear safety and plant reliability were the key objectives driving the programme of work, which began in April. The repair work will significantly expand the durability of the structures, enabling their original design life to be achieved.

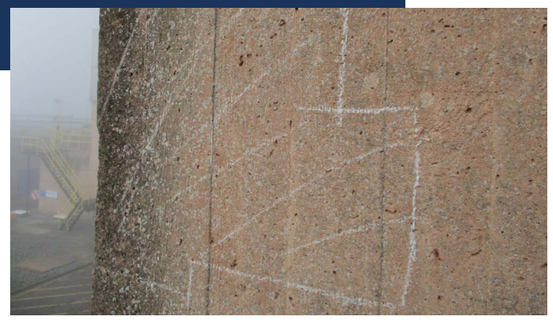
The scope of work included:

- Provision of a suitable repair specification for each specified area
- Provision of suitably trained and experienced operatives to execute the repairs
- Provision of all repair materials in accordance with the identified specifications

Repair areas included: the vent plant room, flask bay opening, and turbine hall.

A range of protective coatings were used to protect the structures from moisture intrusion and further corrosion, reducing the need for ongoing maintenance work for the life of the station.

As part of the programme, Carbon Fibre Wrapping was installed to the DW Plinths in the Turbine Hall. A separate case study is available about this work, which will provide significant strength to the plinths and protect against further corrosion and erosion.



CASE STUDY: EDF Energy, Hartlepool Power Station

Ferrous Sulphate Plant Upgrade

CSC Services installed a Sika Liquid Plastic Roof to a Pumphouse Flat roof at Hartlepool Power Station for EDF Energy. Sika Decothane Ultra was specified for this system, which was inclusive of Reemat and Decotrim Type F. The roof was approximately 205 square metres.

CSC Services installed a Sika Liquid Plastic Roof to a Pumphouse Flat roof at Hartlepool Power Station for EDF Energy. Sika Decothane Ultra was specified for this system, which was inclusive of Reemat and Decotrim Type F. The roof was approximately 205 square metres.

The full contract took 28 days. This also included the application of a new coating system and non-slip floor to the bund area, within the ferrous sulphate plant. (This was also to a Sika specification comprising of Sika Monotop 620 repair mortar, Sikalastic 625 coating including concrete primer, reemat and termination bars, Sika Floor 415 none slip system and Sika 625 steelwork.)

Sika UK Ltd produced the specification for the project, which included a condition report, system schedule, guarantee, details on preparation, pre-treatments and priming, vapour control, pre-waterproofing, detailing and top coats.

The existing roof was prepared and refurbished in full adherence to the specification provided for these works by SIKA UK Ltd. The specification was available at the workface and held by the Supervisor. During the roof refurbishment CSC Services carried out necessary inspections and kept coatings records. SIKA Liquid Plastics performed third party inspections at the required stages to ensure conformity for guarantees. All SIKA products were used in accordance with CSC Services CoSHH Assessments.

All persons employed for this work were over 18 years of age and had current EDF Energy Vetting and Training. Personnel were inducted into Site Procedures and Safety Systems.

Fifteen year Sika Guarantee

With a 15 year guarantee the roof will outlast the life expectancy of the station. The system offered a safe, speedy & cost effective solution.

"I was very impressed with the quality of the installation and the aesthetically pleasing finish by CSC Services. It was nice to see operatives checking data sheets and specifications throughout the project to ensure they were working to Sika guidelines." (Will Russell MIoR, Sika Field Technician)

Liquid Plastics

QA Approved Contractor

Filter Tank Refurbishment

Steel filter tanks are used in water treatment plants across the UK, as part of the process to ensure that safe drinking water is produced for customers. Water is passed through filter media such as sand and anthracite as part of the filtration process.

These multi-media steel filter tanks are extremely expensive to replace and if they need to be, can cause significant disruption to operational services due to decommissioning, removal and construction of new steel tank filters. Tank refurbishment offers a cheaper and quicker alternative and can allow remaining filers and operations at a treatment plant to continue.

CSC Services recently refurbished such a steel tank filter for United Utilities in partnership with Western Carbons, who provide filter refurbishment services.

Corrosion to the tank walls, accelerated by the abrasive action of the filter material had caused rust to develop. CSC Services removed all of the failed coating and rust. This created the required surface profile for the installation of a new protective coating.

Acothane, a solvent free polyurethane protective coating was installed to provide effective corrosion and erosion resistance. Approved by the Drinking Water Inspectorate, this coating provides a completely waterproof membrane, preventing any potential ingress of water, which can cause osmotic blistering, air filled cavities and cracks. Acothane is proven to resist the growth of bacteria, such as micro aquatic organisms and black spore fungi. It has a long life performance and requires minimal maintenance.

The photographs show the tank before, during and after the work was completed.

Leak Sealing to Cable Trench Covers

CSC Services completed work to waterproof cable trench covers at Hartlepool Power Station for EDF Energy. Deterioration of the previous concrete cable covers had resulted in water ingress. This was having ramifications with the Station's fire protection system in the Turbine Hall Cable Tunnels.

To rectify the problem localised joints were filled with a fast setting mortar and the area was cleaned and prepared using a water jetting unit before a concrete was primer was applied. Sikalastic 625 was then applied.

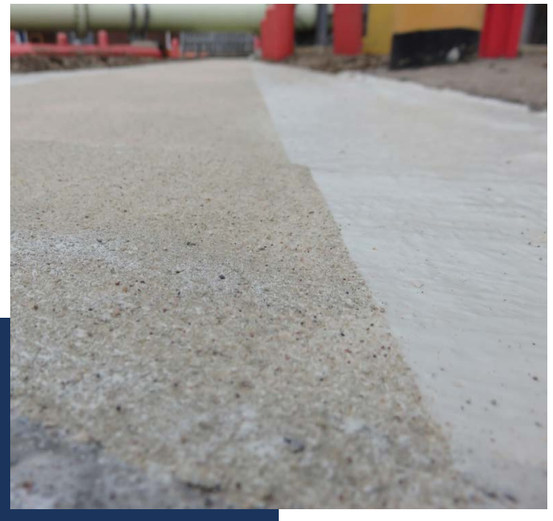
Sikalastic 625 is a single component, cold-applied, moisture-triggered liquid waterproofing membrane that cures to form a seamless, durable and weather resistant waterproofing solution for exposed areas. This coating was selected for the work as it is completely cold applied so there is no requirement for any heat or naked flame. This meant the risk of fire was completely eliminated and work could be safely carried out whilst operations continued.

Speaking about the work, Terry Weldrake from the Work Engineering Group at Hartlepool Power Station said:

"CSC Services did a brilliant job. The job went really well and the positives have been seen instantly as there has been a significant reduction in moisture which I hope will stay that way."

Visual inspections of the work since completion have confirmed that there is no further ingress despite heavy rainfall over recent weeks.

Images from the work undertaken are shown to the left.



CASE STUDY: United Utilities

Repair and Reline of Service Reservoir

CSC Services completed a scheme of work to reline and repair a Service Reservoir for United Utilities.

Specialist coatings are required to protect such structures from various types of corrosion and erosion. Any coating applied to such a structure must be compliant with Regulation 31 set by the Drinking Water Inspectorate (DWI). This ensures that water suppliers, when producing and distributing drinking water, only use products and substances that do not cause any detrimental effects to the safety or quality of the drinking water.

On this occasion CSC Services installed an Acothane DW system. This is a polyurethane coating approved by the Drinking Water Inspectorate. It is a complete solvent free technology that has a tough impact resistant finish, that will resist the growth of micro-aquatic organisms and protect against periodic cleaning regimes.

The first image shows a tank heating system was used to dry the tanks after cleaning and repair, prior to coating application. This ensures the correct environmental conditions are achieved.

The second image shows the build up of system. Primer, first coat and top coat.

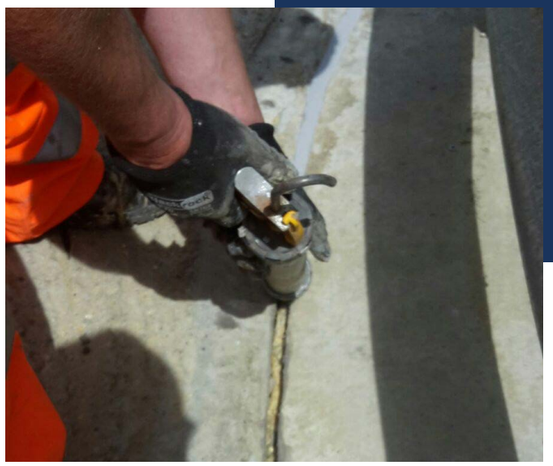
The third image shows first coat applied.

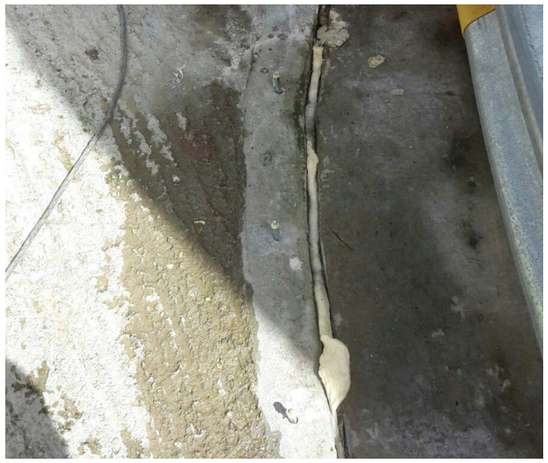
The fourth image shows the second coat applied.

CASE STUDY: EDF Energy, Dungeness B Power Station

Resin Injection – Leak Sealing

CSC Services repaired a structural leakage problem at a quarry water treatment plant for Cemex – a leading supplier of cement, mortars, screeds and aggregates.





The process of Resin Injection was used to repair cracks in the bunded area of the treatment plant, where water was percolating through construction joints as shown in this image.

On this occasion a hydrophobic polyurethane foam was used, which is very fast acting on contact with water and can halt the flow of water quickly and prevent future leaks.

With any refurbishment programme, surface preparation was key. The concrete must be cleaned to remove contaminants. The crack itself was blown off with clean dry air so that resin could flow freely into and along the cracks. Resin is then injected under pressure either into inlet ports that have been stuck to the concrete surface over the crack or through holes drilled to intersect the crack.

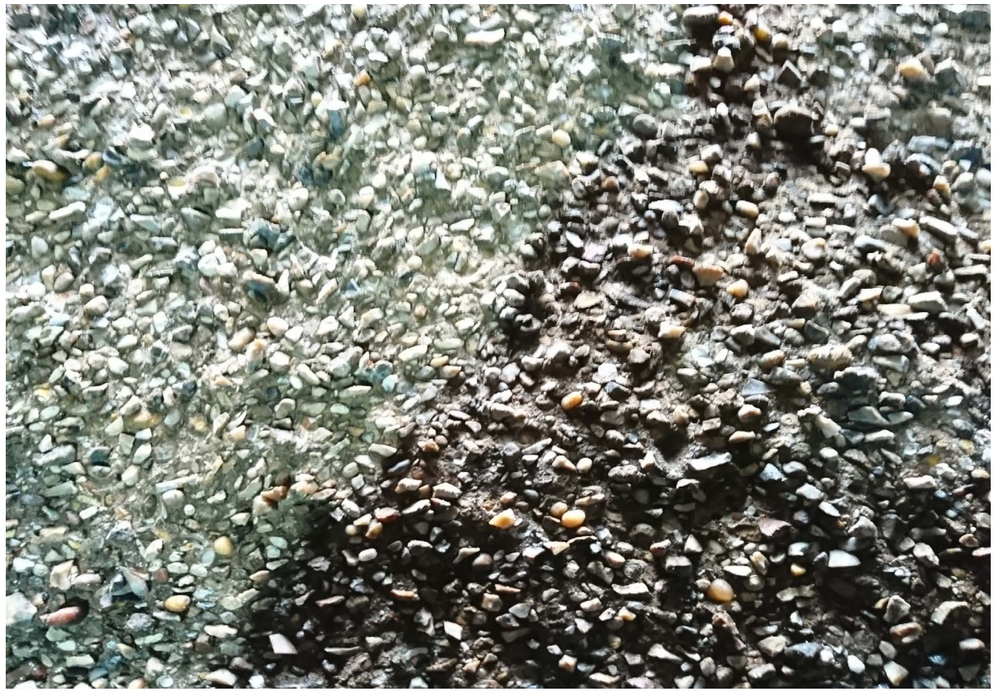
Injection is undertaken using a pump to apply pressure. On larger projects the pump may incorporate measuring and mixing equipment to deliver the resin thoroughly mixed together. For smaller projects injection is undertaken using a hand pressure gun.

If the crack needs to be structurally repaired and the area needs to be as strong or stronger than the concrete around it, an epoxy would be used. Epoxies for crack injection are available in a range of viscosities and have a compressive strength that usually exceeds that of concrete. Epoxies cure very slowly, generally taking hours to harden which can allow time for the epoxy to flow into the smallest of crevices.

If the crack needs to be repaired to prevent water leakage or the crack is actively leaking, a polyurethane would be used. If there is concern about material leaking out the back of a crack, polyurethane foams should be used. They begin to harden and foam on contact with water. This reduces the chances of the material flowing out of an injected crack while still in liquid form, and even if some does leak out, the foam will fill the void.

Pumping Station Wet Well Refurbishment

CSC Services refurbished a sewer pumping station wet well for Anglian Water. The structure had suffered from significant hydrogen sulphide corrosion to the internal concrete surfaces, and had been taken out of service.



> "I was very impressed with the work ethic and service provided by CSC Services. They worked effectively with the product manufacturer to provide the best refurbishment solution for Anglian Water."
>
> **Nick Hudson**
> **Anglian Water Project Engineer**

Following high pressure water jetting off internal surfaces and removal of debris, a high strength structural repair mortar was applied to the concrete surfaces. A water based cementitious coating system was installed over the repair mortar to provide a hard, durable coating with excellent resistance to water and hydrogen sulphide. With greatly enhanced chemical resistance this system was specified for the protection of concrete offered in sulphate contaminated conditions. This will significantly extend the life-span of the structure.

The first image shows the profile of the corroded concrete surface prior to refurbishment work.

The second image shows the profile of the refurbished concrete surface following application of the cementitious coating system.

The third image shows a CSC Services Operative installing repair mortar to the wet well. The bottom section of the wet well is complete.

The final image shows the wet well following full refurbishment, prior to final inspection and full return to service.

Surface Water Chamber Refurbishment

CSC Services refurbished a surface water drain chamber at Dungeness B Power Station for EDF Energy using a cementitious coating system.

> "CSC Services worked with EDF Investment Delivery in recommending and agreeing suitable products for the chamber refurbishment. The work required confined space access and was subject to plant isolation, which was delayed by one day. Despite the delay, CSC Services completed the work to a very high standard and within programme."
>
> **Alan Smith**
> **Project Engineer, Dungeness Power Station**

The chamber forms part of the surface water drainage system and is also the authorised minor discharge route for waste condensate water being discharged from the power station. Although the chamber was intact, there were voids in the mortar and cracking around pipe penetrations. The defects needed to be repaired to ensure environmental compliance is maintained. A protective lining was required that would tolerate the heat from the water being discharged.

CSC Services repaired the chamber and lined it with Cemprotec E942 from Flexcrete. This water based cementitious system gives a hard, durable coating with excellent resistance to water, chloride ions, oxygen and aggressive chemicals. Images of the chamber before and after the cementitious system was installed are shown.

The drain was blocked and allowed to dry before work could commence. CSC Services also installed an over-pumping system to isolate the chamber. It was imperative that the specified coating had a rapid curing time, to allow the speeded return to service of the surface water drainage system.

CASE STUDY: Colchester Supply Area, Anglian Water

Wet Well Refurbishment

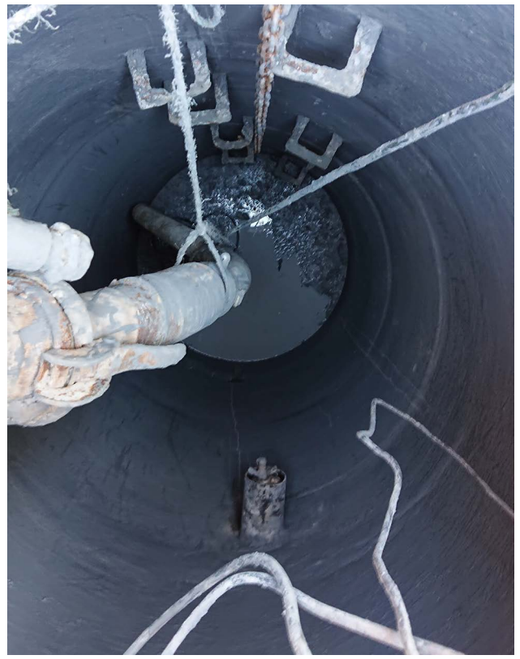
With visible signs of cracking to a wet well, CSC Services were contacted to remove all vegetation and reline the wet well to prevent future problems and to ensure its structural integrity remained. Upon initial inspection of the wet well, tree roots were found to be entering the well through joints and pipe entry. Ring joints and grout holes were leaking. There were holes to the base, and cracks to the wall. 5-10mm of concrete had been lost from the walls and soffit.

CSC Services began the project by inserting pipe access bungs and setting up over-pumping to an intermediate bulk container. Confined space entry was then established. Once the atmosphere was tested and forced ventilation was set up the tree roots were cut out and removed. High pressure water jetting was undertaken to all surfaces.

All joints, grout holes, cracks and voids were sealed using Flexcrete repair mortars. A first coat of Monolevel 844 SP was applied to all surfaces which is a chemical resistant fairing coat to bring concrete back to profile. Protective coating Cemprotec E942 was applied in two 1mm coats to all surfaces to provide protection from future Hydrogen Sulphide Attack. A physical check was made to ensure coating was fully cured. Bungs were then removed and the wet well returned to normal service.

The Project Engineer for Anglian Water said: “I was highly impressed with the level of detail that CSC Services provided on this job. The works were carried out in the duration that was agreed, and updates on the progress of the job were communicated clearly. The finished product looks like a brand-new install. Any works required to this effect in the future CSC Services will certainly be the first call I make. Thanks for a great job.”

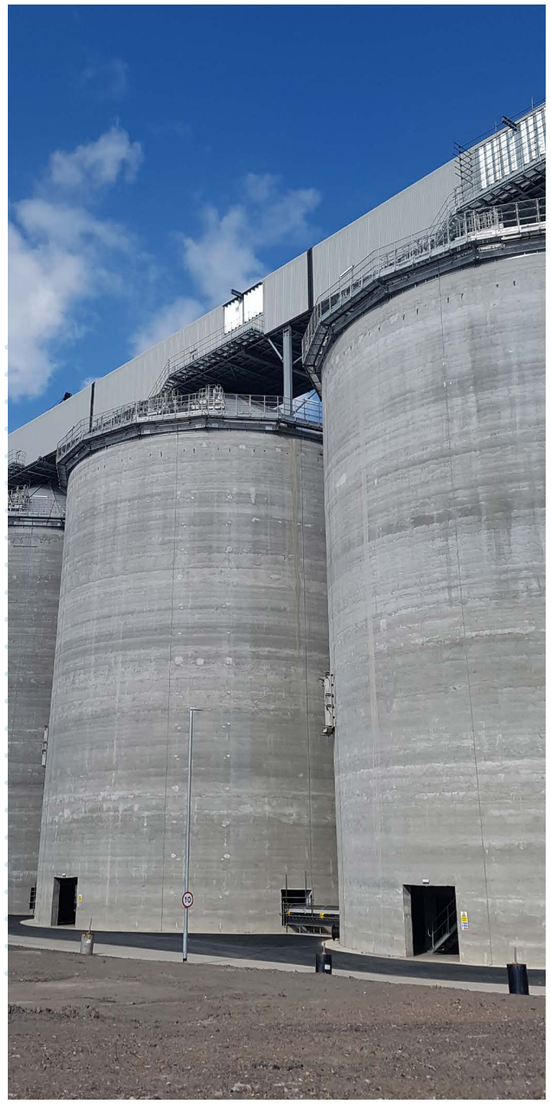
For more information and recent case studies visit www.csc-services.co.uk

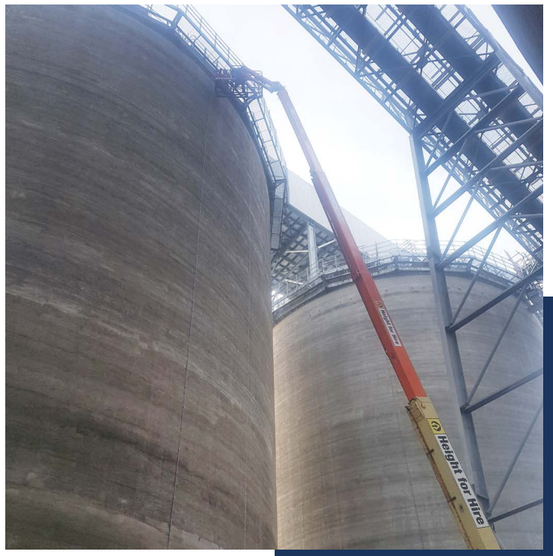


CASE STUDY: **Sir Robert McAlpine, Lynemouth Power Station**

Resin Injection and Leak Sealing

Following the successful installation of a coating system to the materials handling facility and new rail intake area at Lynemouth Power Station, CSC Services returned to waterproof various areas of the station for client Sir Robert McAlpine.





Located in the Northumberland coastal community of Lynemouth, the Station is currently under conversion to be a biomass-fuelled power plant. The Power Station is being converted from coal burn generation to biomass in order to supply the National Grid with up to 390 megawatts of low carbon electricity.

Resin Injection

CSC Services eliminated ingress of water around the floor joints in the rail offloader area caused by the coastal location and high-water table. The TamPur 100 Resin Injection system by Normet was used to halt water flow. This hydrophobic polyurethane reacts when it comes into contact with water, producing a rigid polyurethane foam. The system is solvent free, environmentally safe and chemically resistant.

Leak Sealing

Sikaflex PRO 3 was used to leak seal areas around the metal rings and roof panels of six of the Power Station's silos used to contain the wooden pellets that fuel the station. This moisture-curing elastic joint sealant has both high mechanical and chemical resistance and is solvent free.

Images of the Silos and some of the leak sealing work are shown.

For more information visit www.csc-services.co.uk or call 0191 410 3444.

CASE STUDY: Sir Robert McAlpine, Lynemouth Power Station

Concrete Spalling Remediation

CSC Services completed a scheme of refurbishment work at University Hospital North Tees. This was completed within budget and to strict timescales. Work was planned to ensure public safety and minimise disruption to patient services.

The age of the buildings combined with environmental factors has resulted in spalling of concrete at various areas across the hospital. Defective concrete was removed and concrete repairs undertaken using cementitious repair materials.

To prolong future use of the building, a cementitious coating was used to protect steel rebar from further corrosion. The highly alkaline coating passivates the steel surface chemically to prevent further rust formation. It protects the steel from moisture, gasses and chlorides.

With patient and public safety core drivers of the project, repair materials were hand applied. On sensitive sites such as hospitals, CSC Services can use a range of concrete protection products and application methods to minimise disruption.

All work undertaken was in accordance with the BSEN1504 standard, in which all CSC Services' operatives are fully trained.

For more information and recent case studies visit www.csc-services.co.uk or e-mail: enquiries@csc-services.co.uk

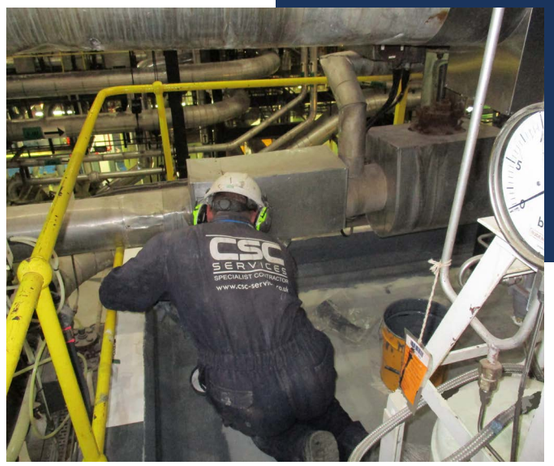
"CSC services site team played a vital role in fulfilling this programme, providing an excellent quality of workmanship and have given the Trust the confidence that the building is safe until more funds can be raised to cover further work."

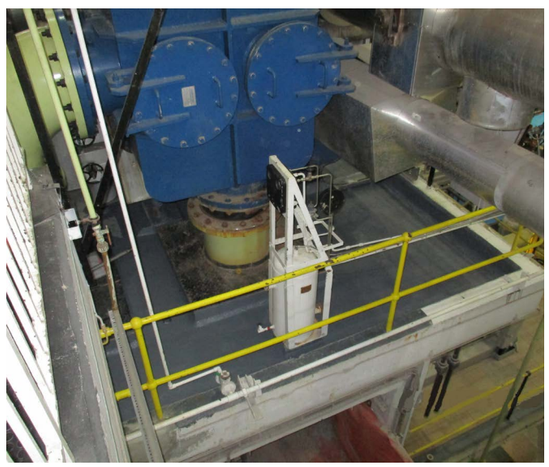
Glen Newby
Design and Development Manager at North Tees and Hartlepool Solutions LLP

CASE STUDY: Edf Energy, Hinkley Point B Power Station

Waterproofing to a complex containment bund

CSC Services installed a protective waterproof system to a high-level bund at Hinkley Point B Power Station, for client EDF Energy.





> "CSC worked well to deliver a challenging programme of work which required a number of specialisms from their teams. The works were completed safely and were of a very high quality."
>
> **EDF Energy Project Manager**

A Sika Liquid Plastics glass reinforced Decothane Ultra System was installed to strengthen and protect a structure. It replaced the previous coating which had cracked and failed, providing a waterproof membrane.

As part of the system, a glass fibre mat reinforcement was installed to increase strength and durability. The randomly orientated fibres within the mat gives maximum multidirectional tensile strength to the membrane whilst allowing it to remain highly elastomeric.

The waterproofing system was installed during working operations at the power station. Decothane Ultra is cold applied, eliminating the risk of fire, which is key where safety is paramount.

The waterproofing was part of a larger scheme of work at the Power Station that also included concrete repair, protective coatings and structural strengthening.

CSC Services are a Quality Approved contractor for Sika Liquid Plastics.

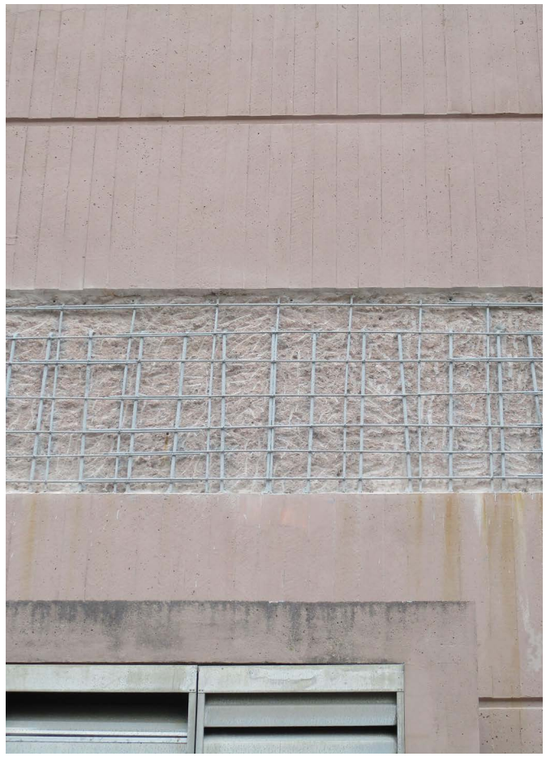
Decothane Ultra is also a low odour polyurethane coating. It is therefore ideal for use on sensitive sites such as schools, hospitals and food manufacturing plants.

Images from the work undertaken are shown.

CASE STUDY: DF Energy, Hinkley Point B Power Station

Concrete Spalling Remediation Programme

Over 300 significant concrete repairs were completed at Hinkley Point B Power Station during a seven-month period.



With widespread areas of spalled reinforced concrete across the station, the work was planned to mitigate the potential health and safety issues, mitigate any impact on plant reliability and to ensure that there is no impact on on-going nuclear safety.

Causes of the concrete spalling were varied, but principally a combined effect of the age of the buildings involved, their environmental exposure and occasional areas where water ingress had accelerated degradation.

Repair Specification

Defective concrete was broken out to allow for exposed reinforcement to be prepared and treated. Flexcrete's Steel Reinforcement Protector 841 was used to protect the steel reinforcement prior to the application of concrete repair mortars. This flexible coating forms a highly alkaline coating with a degree of elasticity which not only protects the steel from aggressive acid gases, moisture and chlorides, but passivates the steel surface chemically to prevent further rust formation.

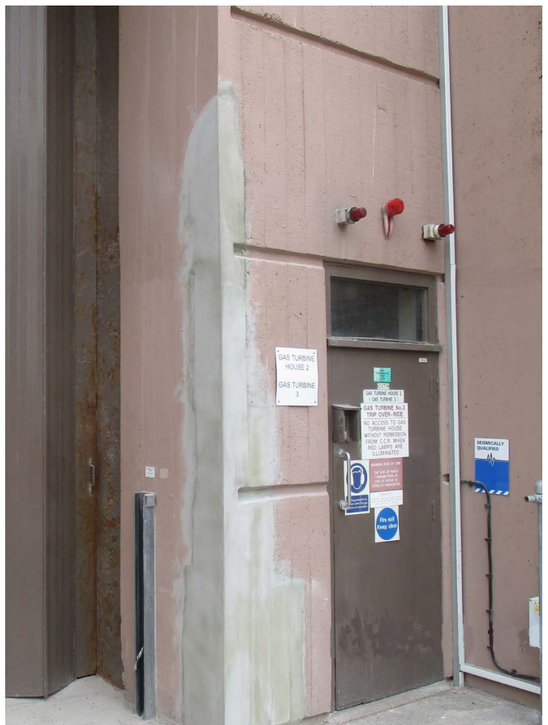
A high strength structural repair mortar was used for the repairs. Monomix HD by Flexcrete is a high strength, waterproof, shrinkage compensated, standard density mortar with good abrasion resistance.

For the structural waterproofing, a cementitious coating was used. Cementitious Coating 851 by Flexcrete is a modified polymer coating. It provides chloride protection and enhances the durability of reinforced concrete by reinstating effective cover to achieve the specified design life.

A larger repair, as shown in the first three images, was completed using Sika spray applied concrete. SikaCem 133GP Gunite was specified to repair the fifteen metres of hollow concrete, following the installation of steel and a Sika steel protection system.

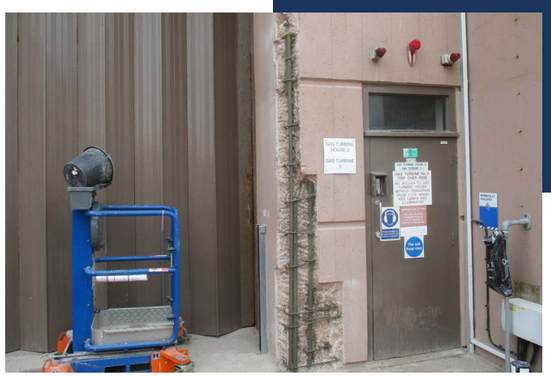
Outcome

All concrete repair works were completed and have a fifteen-year service life guarantee, to satisfy the operational requirements of the Station. The repairs are passive in nature and will not require any maintenance.



"CSC worked well to deliver a challenging programme of work which required a number of specialisms from their teams. The works were completed safely and were of a very high quality."

Alan Smith
Project Engineer,
Dungeness Power Station



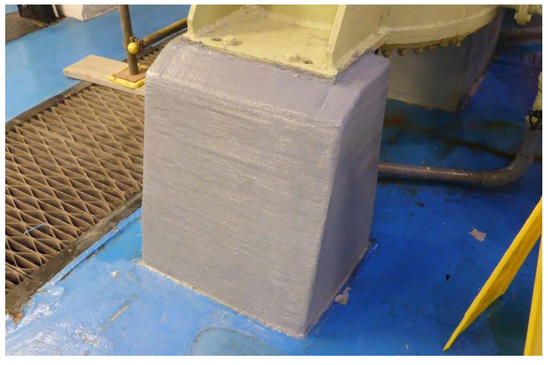
Carbon Fibre Wrapping

As part of the Spalling Concrete Remediation Programme, Carbon Fibre Wrapping was used to add structural strength to the DW Plinths in the Turbine Hall at Hinkley B Power Station.

Carbon fibre has very high tensile strength and is also very lightweight. When bonded to the exterior of a concrete column, beam, or slab, it can add significant strength without adding weight that would increase the load on foundations and other structural members. A mix of usually carbon or glass fibre fabrics, and an epoxy resin, wrapping systems are custom designed for each project.

Installation - Following surface preparation and removal of dust, any defects in the concrete are repaired. Sharp edges and corners are smoothed to prevent stress concentrations. The concrete is then coated with a primer to allow for a mechanical bond before the Carbon Fibre Wrapping is fitted. A topcoat will then be installed to provide temperature, chemical and abrasion resistance.

Carbon Fibre Wrapping will not only provide significant strength to the plinths, it will protect against further corrosion and erosion. The impervious material will protect the structure from moisture intrusion and further corrosion, reducing the need for ongoing maintenance work.



CASE STUDY: XXXX

Expansion joint sealing to a range of water assets

CSC Services completed a programme of works including internal and external joint repairs for a regional Water company. This was to a range of assets including, several Service Reservoirs, Aqueducts and storage facilities.

CSC Services offer a variety of mechanical (construction) and expansion joint repair solutions for perished or damaged joints and cracks. These include Hypalon bandage systems which are secured and sealed to each side of the expansion joint or crack using epoxy resin adhesives. DWI approved products are available. These systems are chemical resistant and will alleviate water egress and ingress whilst allowing the expansion joint to accommodate movement.

Aquaduct refurbishment

This image shows Masterseal 930 being used for crack repairs to an Aqueduct. The Aqueduct was taking water from an external reservoir, but ingress was causing flooding to nearby farm fields. Masterseal is a joint waterproofing bandage and epoxy resin adhesive. It is a highly elastic pre-formed membrane, specified for its fast-setting time and range of uses.

Service Reservoir Internal Refurbishment

These images show the BASF Masterseal Thoro Flex 200 system being used for the waterproofing and sealing of expansion joints to the internals of a Service Reservoir. DWI approved, this waterproofing system is suitable where a high degree of movement or high-water pressure is expected. It is resistant to UV light, has good abrasion resistance, resists ozone and a wide range of chemicals.

This image shows a Sikadur system being used to seal expansion joints on walls and floors. This system offers long-term water resistance. It also blocks the path of water penetration and is fully bonded to the concrete preventing underflow.

CASE STUDY: XXXX

Concrete Repairs to High Voltage Substation

Concrete repair work to columns carrying switchgear within a high voltage substation. The works were carried out under outage conditions over several days, due to the dangers associated with operating in this high risk environment.

Working in a high risk environment

High voltage (HV) substations operate as interconnection points on the National Grid network. Power is “stepped down” as it passes through a variety of substations, before it arrives at a distribution substation. At this stage the power is reduced to a level that businesses and homeowners can use to power electrical devices (400/230 volts).

This substation contained a variety of separately mounted and interconnected switching equipment and components which distribute power to various sections of a facility and the electrical loads within those sections.

Working in this kind of environment is potentially very dangerous, so our team was faced with the challenge of working under outage over several days to minimise the risk of electrocution.

Concrete repair work to columns carrying switchgear

Our work was focussed on the concrete columns which carry the substation’s heavy switchgear, a critical component responsible for controlling the flow of electricity within the network.

Our expert team of on-site engineers installed steelwork and shuttering, before applying a Micro Concrete repair system. Next, a three-coat anti-carbonation system was installed to seal the concrete before it was wrapped up to cure.

Public Sector Concrete Remediation Works

As concrete repair specialists UK we've completed additional planned works at the University Hospital of North Tees, following previous repairs to the main ward block, North Wing and buildings housing plant rooms, specialist operating theatres and recovery rooms.

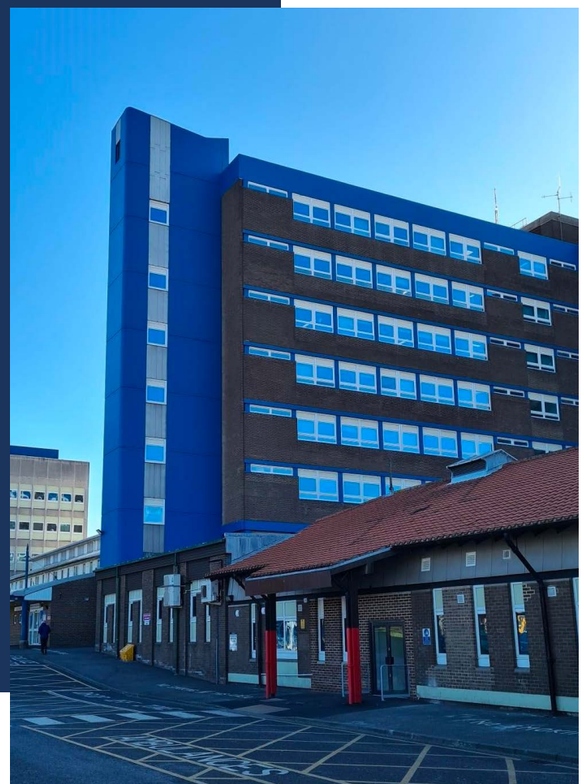
The project

As concrete repair specialists UK we were asked to carry out repair works to the University Hospital of North Tees.

These works form part of an extensive remediation scheme to the main hospital building, originally opened in 1974, providing a modern backdrop to the surrounding area.

Having previously been threatened with closure in 2011, the hospital required an aesthetically pleasing solution while repairing and protecting the original concrete façade, extending the life of the building.

This phase posed an additional challenge to our team as work was being carried out at the height of the COVID-19 pandemic. Robust safety procedures allowed us to continue to operate and ensue programme deadlines were met at a time when the NHS was under significant pressure.



Innovative access solutions

We used a series of innovative hybrid access solutions, combining traditional scaffolding and access cradles supplied by our locally based sub-contract partners, JMac Scaffolding Limited and Apollo Cradles Limited.

This approach allowed us our team to reduce site preparation and mobilisation time, shortening programme duration and ultimately reducing overall project cost.

Specialist concrete repair system

A total area of 950m² of concrete façade has been repaired and coated in the first phase of works, using a specialist Sika concrete repair and protection system.

Products used included:

- Sikaguard 552W Aquaprimer
- Sikaguard 550W Elastic
- Sika MonoTop 610
- Sika MonoTop 615
- Sika MonoTop 620
- Sika FerroGuard 903+

These products combined result in long-lasting protection against carbonation caused by weather conditions and provide a 10-year guarantee to first maintenance.

Collaborative working approach

We worked collaboratively with the client to closely manage impact to site operations while the works were carried out, ensuring minimal disruption to hospital staff, patients and visitors.

Solutions included the provision of computer-generated mock-ups of the finished works, giving the client additional reassurance of what the finished project would look like.

Our highly trained operatives ensured work was carried out safely and efficiently to BSEN1504 standard.

The concluding phase 2 of the works is scheduled to commence in spring time, with a total area of 3000m² scheduled for repair over both phases.

"To date we have complete Phase 1 of the works which proved to be the most difficult piece of the programme, having lots of spalling to repair in a very busy and difficult location. Phase 1 of the programme took approximately four months to complete and we are now two months into Phase 2 of the works which is due to be completed in late June.

Throughout this programme of work, both myself and CSC Services have had to carefully plan each section of work to minimise disruption so that clinical services could continue with their daily activities, this proving very difficult alongside ITU and NNU."

Glen Newby
Design & Development Manager,
North Tees and Hartlepool Solutions LLP

CASE STUDY: EDF Energy, Hartlepool Power Station

Power Station Sea Wall Beam Repair

We were asked by the Investment Delivery Team of an existing power station client to carry out concrete repair work to a 40-metre-long section of sea wall which included crane support and cantilever beams. The steel rebar had rusted, and concrete spalling was found to most of the beams and wall.

The challenge was access to the area to be repaired, which was in direct contact with the sea and no access possible from the station itself. 6-metre-high rising tides were another challenge to overcome.

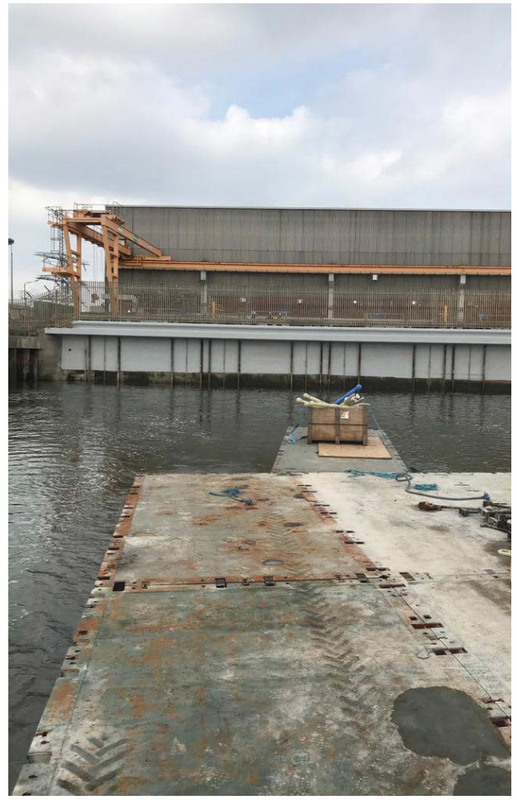
The Approach

The first stage was to think innovatively about how to access the repair area. We worked with North East Safety Boats, who built a bespoke barge for the project using NATO pontoons. The barge was delivered to the site location via the Tees estuary in 3 sections, which were then rigged together and supervised by qualified personnel throughout the entire project, raising and lowering the barge as required in response to sea levels through means of a winch. The barge was fully calculated for stability and mooring analysis carried out to ensure safety and confidence of those working on the project.

These steps allowed the CSC team to work safely on the concrete repair, in the following stages:

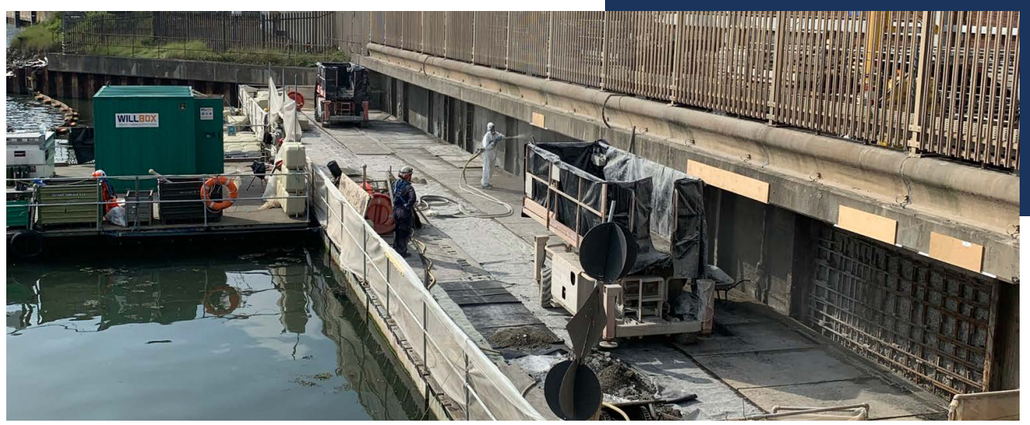
- Hammer test and cut to identify repair areas
- Hydro-demolition to take out the defective concrete
- Handover to engineering team to carry out full inspection of the rebar to be replaced
- Cathodic protection using sacrificial anodes installed by our corrosion technician before being signed off by the engineering team
- Area then repaired back to profile through concrete dry spraying process.
- The Full repaired area including sections not repaired were overcoated to protect from future chloride ingress issues.

The work entailed a 12-man team, consisting of 6 concrete repair and corrosion specialists from the CSC team, with support from North East Safety Boats and Buxton Water over a project completion period of 14 weeks.



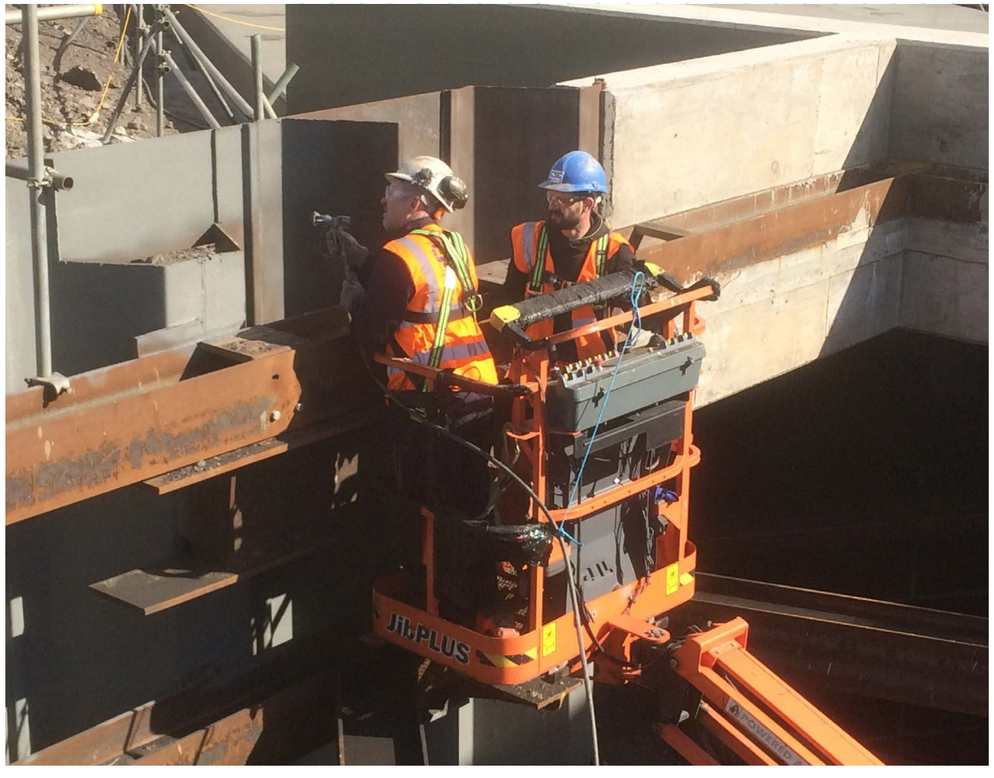
The Result

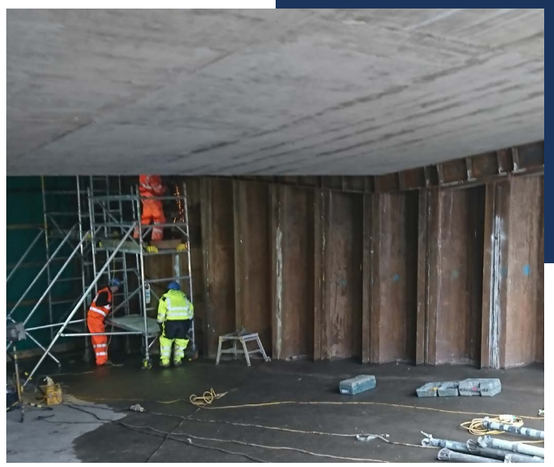
The project was completed on time, on budget and to quality control standards for the client.

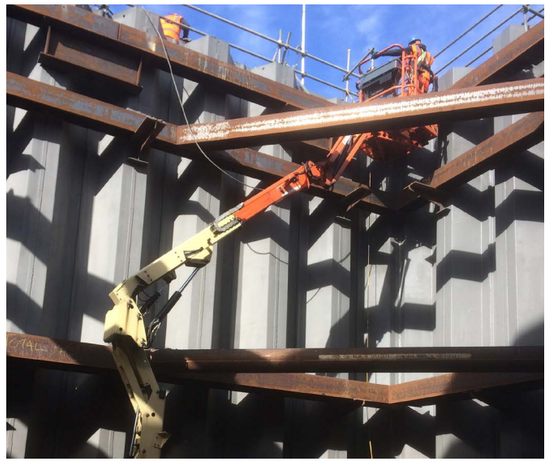


Cementitious Coating System

CSC Services installed protective coatings at Lynemouth Biomass Power Station in Northumberland for client Sir Robert McAlpine







Sir Robert McAlpine were constructing the Materials Handling Facility at the plant in Northumberland. CSC Services installed the protective coating system to the new rail offload areas, which will receive over one million tonnes of wooden pellets imported from US and Canada each year, which will power the new plant.

A cementitious coating system was sprayed on to 1,500m2 of new steel piling in the Materials Handling Facility. With enhanced chemical and abrasion resistance the coating will guarantee the life-span of the steelwork at the plant for twenty years. CSC Services worked closely with product manufacturer Flexcrete to provide the optimum coating specification for the project.

CSC Services later added a cementitious coating system to the new rail intake area at the Station. Due to the coastal location of the Power Station and the industrial operating environment Cemprotec E942 by Flexcrete was specified for the work.

Cemprotec E942 incorporates the benefits of copolymer and epoxy resin technologies into a water based cementitious system to give a hard, durable coating with excellent resistance to water, chloride ions, oxygen and aggressive chemicals.

Images from the work are shown.

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