



Concrete Preservation Technologies

Leading Edge Corrosion Solutions

Industry specialists in developing corrosion mitigation treatments for steel reinforced structures.

Car parks | Bridges | Coastal Structures
Buildings & Industrial Structures | Steel Frame

Table of Contents

CPT Company Profile	02
Research & Development	03
Product Supply	04
Application of our Products	05
CPT Services	06
The DuoGuard Hybrid Anode	07
The PatchGuard Galvanic Anode	11
Long Term Monitoring	14
Pre-stressed Structures	15
Project Profiles	16
Current and Previous Clients	18

CPT Company Profile

Concrete Preservation Technologies Ltd

Research and develop new technologies for the treatment, assessment and monitoring of reinforced concrete structures

The CPT Directors have over 40 years of combined experience in concrete repair consultancy and 30 years of experience in the electrochemical treatment of reinforced concrete structures.

We offer an innovative and flexible range of products to effectively treat steel corrosion problems on a wide range of reinforced concrete structures such as bridges, car parks, coastal, industrial and high rise structures. Our products have been installed on over 200 projects in 11 countries.

With research and development at the core of the company, we are constantly developing new products and building on our existing range to remain at the forefront of corrosion repair technologies. We work closely with clients to assess their structure, determine the extent of corrosion and deliver a cost-effective solution.

We invite you to contact us to discuss your corrosion problems and allow us to assist in the design of a bespoke solution that will significantly extend the life of your structure.



Nigel Davison,
Director, Concrete Preservation Technologies Ltd



Cert No. 10159
ISO 9001



CORROSION PREVENTION ASSOCIATION
CATHODIC PROTECTION • REINTEGRATION • CHLORIDE EXTRACTION
SACRIFICIAL ANODES • CORROSION INHIBITORS

Research and Development

Research and Development has always been at the heart of CPT. We use our detailed understanding of corrosion and concrete technologies to continually advance our product range and lead the industry in product innovation.

CPT frequently collaborates with Loughborough and Nottingham Universities on research and development projects. Development work is conducted in our own laboratories and trials of prototype products are conducted on “real world” structures.

- CPT employs highly qualified technical staff, with over 70 years of combined experience in the field of corrosion protection
- All of CPT products are protected by international patents
- The Directors of CPT have produced over 100 technical publications in the field of corrosion and concrete protection

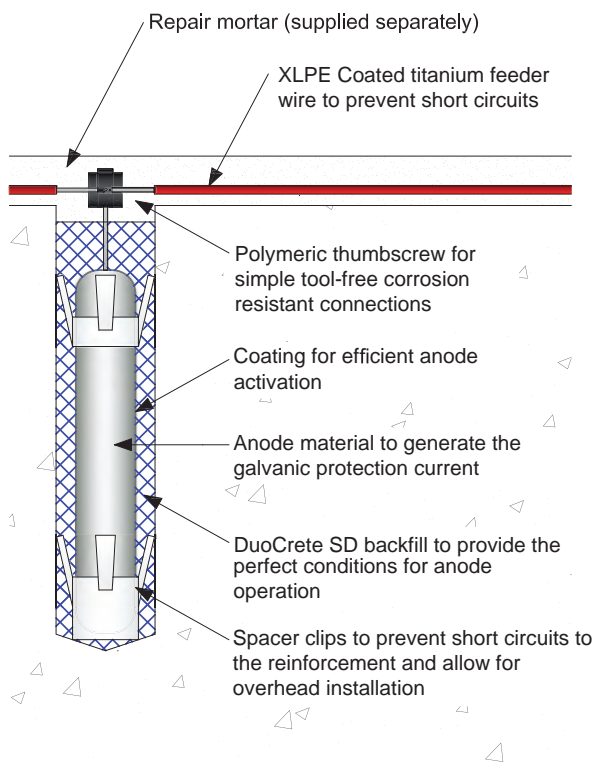


Product Supply

Leading technology products used worldwide

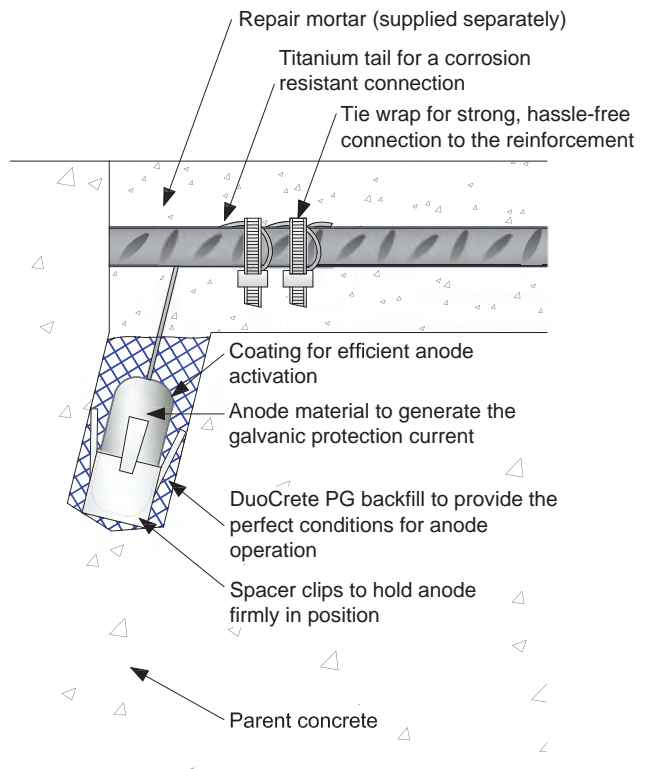
DuoGuard Anode

3rd generation global protection offering a lifetime range of between 20 and 60 years



PatchGuard Anode

2nd generation targeted galvanic protection for patch repairs, installed in the parent concrete



PatchGuard Connect Anode

2nd generation global protection offering a lifetime range of between 10 and 20 years



RebaGuard Anode

1st generation targeted galvanic protection for patch repairs



Application of our Products



Car parks



Bridges



Marine



Buildings

Which product suits my corrosion problem?

		3 rd Generation Global Protection	2 nd Generation Global Protection	2 nd Generation Patch Protection	1 st Generation Patch Protection
		DuoGuard Hybrid Anode	PatchGuard Connect Galvanic Anode	PatchGuard Galvanic Anode	RebaGuard Galvanic Anode
Protection	Global Protection of Sound Concrete	●	●		
	Patch Repair			●	●
	New Build	●			●
Application	Bridges	●	●	●	●
	Car Parks	●	●	●	●
	Coastal Structures	●	●	●	●
	High Rise	●	●	●	●
	Industrial Structures	●	●	●	●
	Pre-stressed Structures	●	●	●	
	Steel Framed Structures	●			
	Used on Highways Structures	●		●	
Longevity	10 - 20 Years*	●	●	●	●
	20 - 60 Years*	●			
Approvals	ISO 12696:2012	●	○	○	
	Conforms to TR73		●	●	●
Other Features	System Performance Monitoring	●	○	○	○
	Bespoke Anodes	●	●	●	●
	Design Service	●	●	●	●
	Thin Section Concrete	●	●	●	
	Future Charging Possible	●	●		
	Specification Available	●	●	●	●

● Yes

○ Possible

*Dependant on local site conditions, including chloride concentration, concrete properties, humidity and temperature

CPT Services

CPT offers a complete package for Corrosion Mitigation

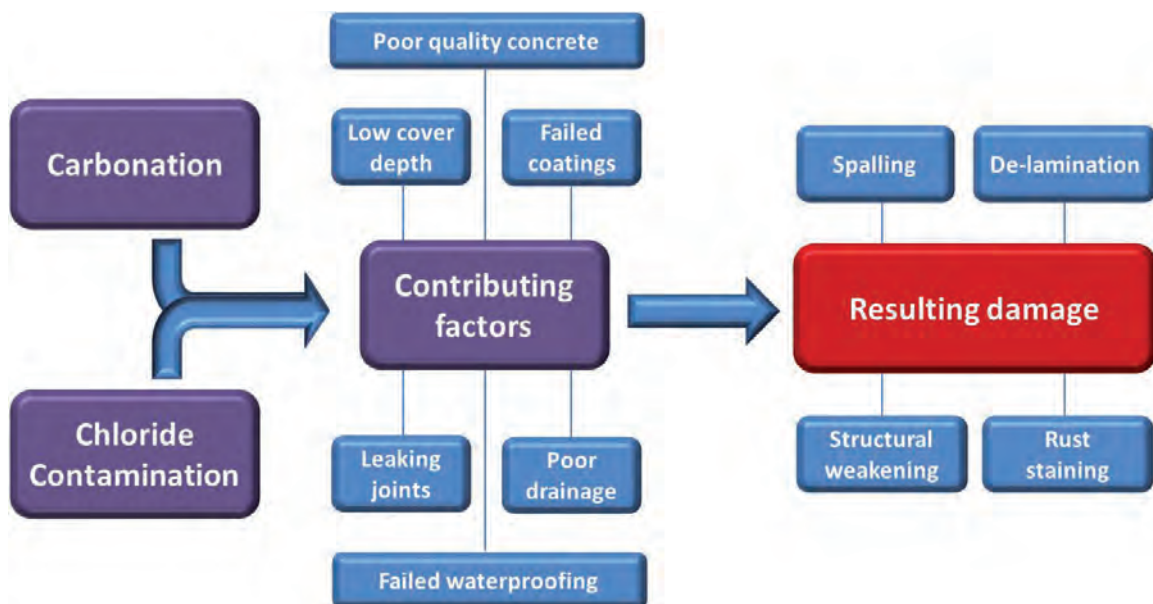
1. Corrosion Testing & Evaluation

CPT can undertake an iterative analysis of your structure to identify the mechanism and extent of corrosion.

Concrete corrosion testing services include:

Visual inspection & assessment, Delamination survey, Cover depth meter survey, Carbonation depth, Chloride content profiling and Half-cell steel potential survey.

Causes and Implications of Concrete Deterioration



2. Installation Design

Following the initial assessment, CPT can design a detailed corrosion mitigation solution for your structure, making the project as efficient and cost-effective as possible.

3. Site Support

CPT are on hand to provide quality training and continued technical support throughout installation and commissioning.

4. Corrosion Monitoring

We can provide monitoring and data logging equipment for the long term assessment of your structure. *(For more details see page 14)*

The DuoGuard™ Hybrid Anode™ Range

An innovative and powerful anode system applied to treat corrosion on a complete structure or targeted areas

DuoGuard is a hybrid treatment, which uses the same embedded anode in both an Impressed Current and Galvanic Current role to stop ongoing corrosion within a structure.

For a short period (typically one week), a high current density is applied using a fixed voltage power supply. This has the effect of halting corrosion by rendering the environment at the steel surface less aggressive through the generation of hydroxide locally.

Following the impressed current phase, the anode is connected to the steel galvanically in order to maintain the steel in a passive condition for the remaining life of the structure. In this phase no power supply or control equipment is required, offering our clients substantial cost savings both on initial installation and ongoing whole life running costs.

DuoGuard anodes are available in five sizes in order to accommodate various concrete depths and densities of steel reinforcement:

Product Name	Product Dimensions
DuoGuard 175	42 mm long x 18 mm diameter
DuoGuard 350	77 mm long x 18 mm diameter
DuoGuard 500	110 mm long x 18 mm diameter
DuoGuard 750	165 mm long x 18 mm diameter
DuoGuard 1000	220 mm long x 18 mm diameter



The DuoGuard Hybrid anode range



Peggy Bells Bridge,
United Kingdom



Cape Don
Lighthouse,
Australia



Arousa Bridge,
Spain



Blois Hospital,
France

The DuoGuard™ Hybrid Anode™ Range

Typical DuoGuard installation sequence



7. Monitoring boxes and data logging equipment can be installed for ongoing assessment.



1. Identify steel location using a covermeter.



2. Drill the anode holes, and make saw-cuts between anode holes to house the connector wire.



6. Fill in holes and saw-cuts with repair mortar.



3. Break-out a small area of concrete to make a steel connection.



5. A high current density treatment is applied for typically 7 days before the anodes are connected to the steel galvanically.



4. Install the DuoGuard anode and connecting wire using DuoCrete SD mortar, XLPE coated Titanium wire and polymeric screw connectors.

The DuoGuard™ Hybrid Anode™ Range

The DuoGuard Hybrid Anode offers the benefit of both, impressed current and galvanic cathodic protection

Features and Benefits

Cost

- No expensive control equipment required
- No additional costs associated with permanent power supply and maintenance
- Eliminates future concrete repair mobilisations

Product

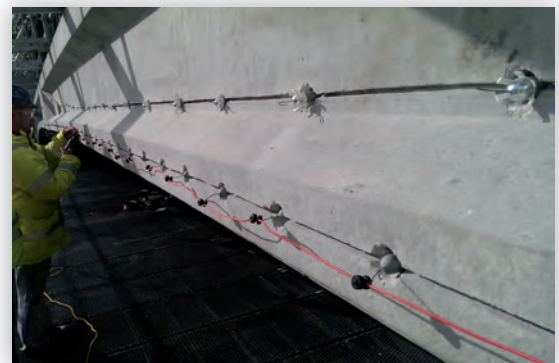
- A large charge capacity for a lifetime of up to 40 - 60 years
- Range of sizes tailored to desired lifetime and steel density
- Spacer prevents short circuits and allows installation overhead
- Polymeric screw connector ensures reliable & rapid anode connections

Installation

- Targeted treatment or installed over an entire structure
- No need to break-out large areas of good quality concrete
- Short on-site treatment minimises down-time and disruption
- Anodes running at safe low voltages during both treatment phases

Long term

- Ongoing performance can be monitored and quantified according to the client's requirements
- Hybrid System can be re-accessed at any future time

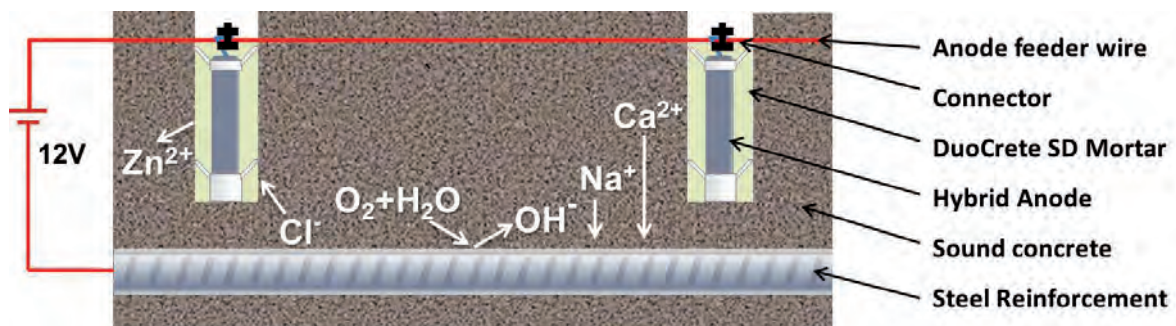


The DuoGuard™ Hybrid Anode™ Range

How does DuoGuard work?

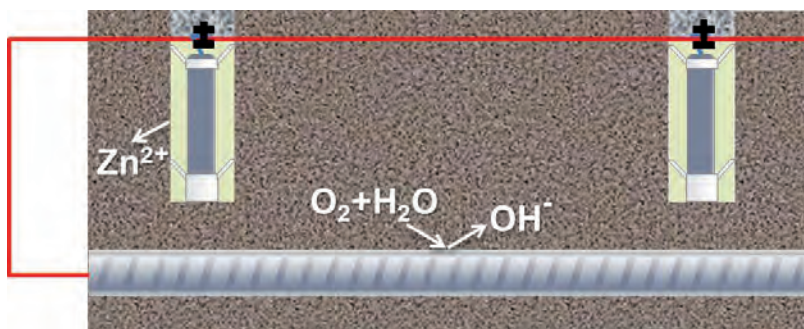
Phase 1 – Short-term Impressed Current

The application of the ~7 day high current density treatment has the effect of halting corrosion activity on the reinforcing steel surface. It achieves this by moving corrosion to the installed anodes whilst reinstating the alkaline environment at the steel.



Phase 2 – Long-term Galvanic Current

Following the high current density treatment, the anodes are connected directly to the steel using the already installed XLPE coated titanium wire to pass a galvanic current without the need for a power supply. This has the effect of maintaining the environment created during Phase 1, preventing corrosion for years to come.



How long will it last?

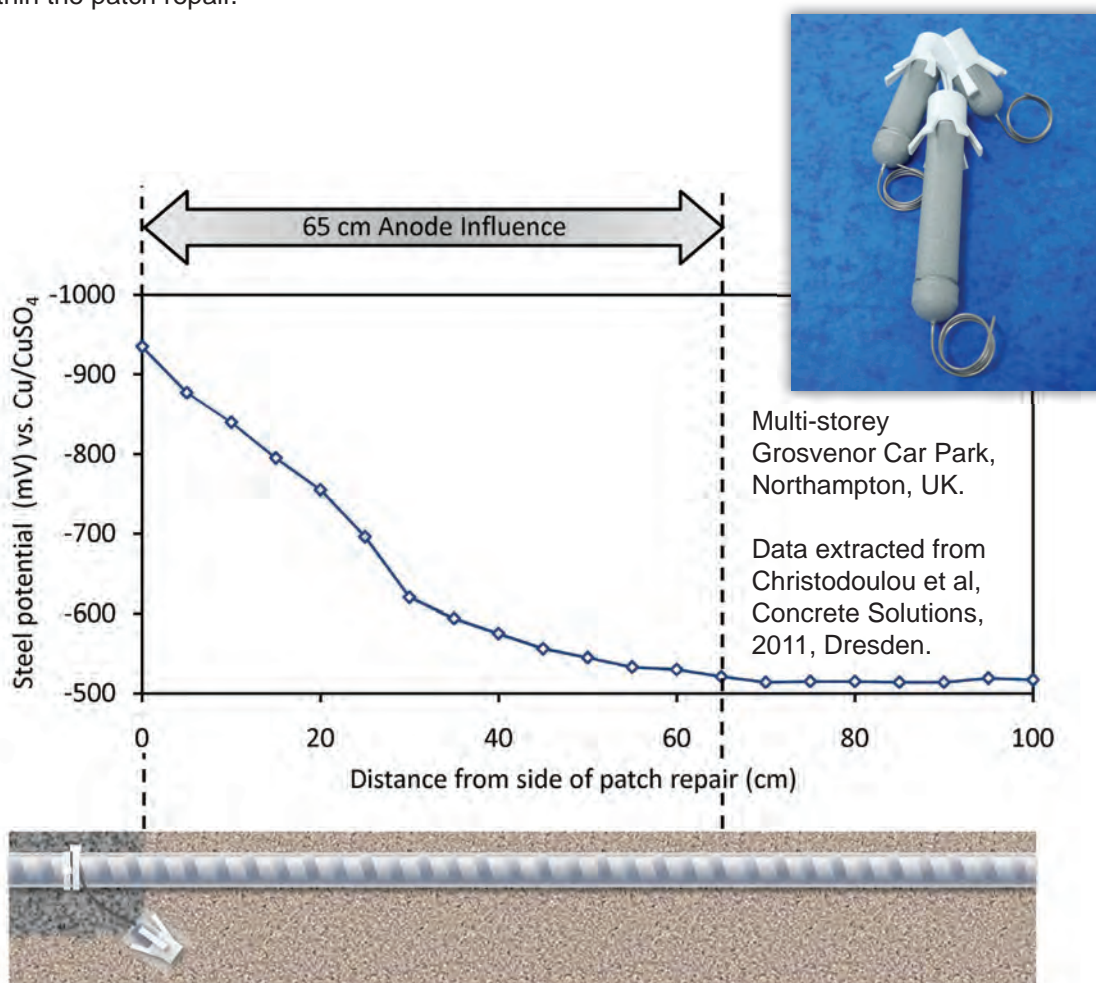
The anodes are made from a sacrificial metal and will corrode (be consumed) in preference to the reinforcing steel. From knowledge of the steel density and the total charge passed by the anodes, the consumption rate can be extrapolated and system lifetime predicted. The lifetime of the anode system will depend on air temperature, moisture and chloride content of the concrete. System lifetime predictions are made by structure basis. Typical installations will have a lifetime range of between 20 and 60 years.

The PatchGuard™ Galvanic Anode Range

PatchGuard - second generation technology galvanic protection for use in patch repairs

Galvanic anodes redress the electrochemical imbalance induced through removal of the contaminated concrete in patch repairs. PatchGuard anodes corrode preferentially to the surrounding steel protecting it from further corrosion damage.

Rather than the traditional approach of attaching galvanic anodes to exposed steel in the patch repair, PatchGuard anodes are located within the parent concrete. Protective current is delivered directly to the steel outside the patch which is at greatest corrosion risk as opposed to clean steel within the patch repair.



As PatchGuard is installed in the parent concrete, there is no compromise in the quality of the concrete repair material or primers used in reinstatement, providing a very efficient and unique solution for combating the “incipient anode effect” in the host concrete.

The PatchGuard™ Galvanic Anode Range

A unique solution for combating the “incipient anode effect” in the host concrete

Features and Benefits

Cost

- Targeted application for cost-effective solution
- No long term maintenance
- No power source required
- No specialist repair mortar required
- Eliminates additional repair cycles

Product

- Simple, single small volume unit (only 25mm diameter hole)
- Corrosion resistant attachment system
- PatchGuard Plus and PatchGuard Ultra versions available for greater anode capacity

Installation

- Rapid installation – no additional break-out required
- Bonding primers can be used
- Pre-packaged application mortar
- Simple installation
- Quality of patch repair material not compromised
- Suitable for all rebar sizes and heavily reinforced areas

Long Term

- Current delivered to where it is needed
- Long life (10-20 years)*
- Large charge capacity 150 – 500 kC
- Performance can be monitored

* dependent on local site conditions, including chloride concentration, concrete properties, humidity and temperature



The PatchGuard™ Galvanic Anode Range

Typical PatchGuard installation sequence



1. Drill the hole into the parent concrete.



5. Completed PatchGuard installation prior to repair mortar application.



2. Apply the embedding mortar (DuoCrete PG).



4. Connect the protruding titanium wire from the anode to the clean reinforcing steel rebar with a cable tie.



3. Simply insert the anode into the embedding mortar.

Long Term Monitoring

Peace of mind for years to come

Asset Management

CPT's Monitoring equipment allows long term assessment of corrosion susceptible areas of a client's structure. Not only will the client be informed about the extent of corrosion damage and potential solutions, but will be offered the security and confidence that comes with understanding the real-time condition of their structures.

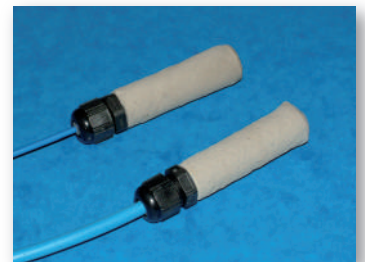
Monitoring An Anode Installation

Installed anode systems can be monitored using our remote or manual data-logging systems which allow the client to observe any changes in the condition of the steel reinforcement (using CPT MN15 reference electrodes).

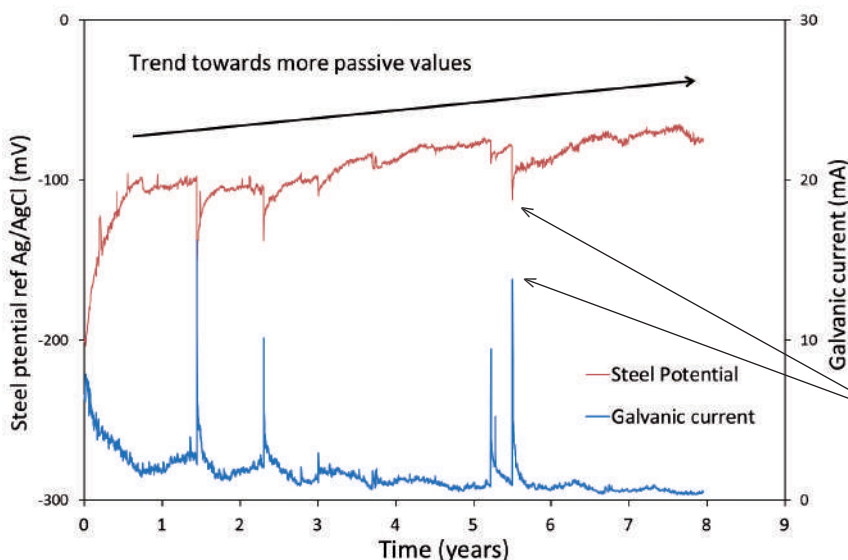
Anode lifetimes can be calculated from the data collected giving the client peace of mind in knowing that his structure is fully protected from corrosion.



On-site Data-logging box



MN15 Reference electrode



In more aggressive conditions, for example during a flood, sacrificial anodes increase their activity (Responsive Behaviour)

Features and Benefits

- The Monitoring System can be installed at the same time as the anodes, minimising downtime
- Allows real-time access to corrosion data from Day 1
- Data provided in a standard spread sheet format
- On-going monitoring facilitates timely repair intervention

Pre-stressed Structures

World's first hybrid installation to pre-stressed structure

Corroding pre-stressed concrete elements are notoriously hard to cathodically protect using impressed current systems due to a threat of hydrogen embrittlement when the system is energised for long periods.

Both DuoGuard Hybrid and PatchGuard Galvanic anodes can be used to protect against the corrosion of pre-stressed concrete elements as there is no need to break out sound concrete to place anodes in the repair, and the variety of shapes and capacities of both ranges allow versatile positioning and installation depths.

Kyle of Tongue Bridge Project Overview

The Kyle of Tongue Bridge, located in the Scottish Highlands, links the Eastern and Western side of the Tongue.

The bridge deck, was suffering from corrosion due to exposure to sea water and de-icing salts. The DuoGuard Hybrid System was applied to the pre-stressed steel T-beams spanning the pile caps.

The use of the DuoGuard treatment facilitated minimal concrete break-out and thus structural impact on the sensitive tendons. Connection boxes allowed monitoring of the system from the top of the bridge deck and the facility to deliver further charge if required.



Project Profiles



Whiteadder Road Bridge, Berwick, UK

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard 500 (2200 units)
Monitoring System: CPT Remote Monitoring System
(using MN15 Reference Electrodes)
Project Length: January – April 2007



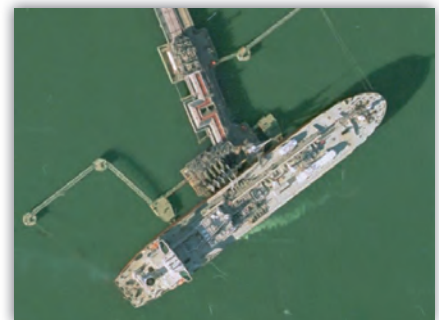
Parliament Buildings, Stormont, N.Ireland, UK

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard 350
Project Length: July - September 2014



Braefoot Jetty, Scotland, UK

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard 175 & 350 (5000 units)
Monitoring System: CPT Monitoring System
(using MN15 Reference Electrodes)
Project Length: September 2013 - July 2014



Birmingham New Street, Gateway Project, UK

Applied treatment: DuoGuard Hybrid Anode System,
Type of Anodes: DuoGuard 500 & 750 anodes
(10500 units)
Project Length: December 2012 – April 2013



Project Profiles



Arousa Bridge, Galicia, Spain

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard 500 (9000 units)
Monitoring System: CPT Monitoring System
(using MN15 Reference Electrodes)
Project Length: January – October 2010



Marina Centre Swimming Pool, UK

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard 350 (1250 units)
Monitoring System: CPT Monitoring System
(using MN15 Reference Electrodes)
Project Length: February - April 2015



Hay Point Coal Terminal, Australia

Applied treatment: DuoGuard Hybrid Anode System
Type of Anodes: DuoGuard Range (8000 units)
Monitoring System: CPT Remote Monitoring System
(using MN15 Reference Electrodes)
Project Length: June 2013 - October 2014



Grosvenor MSCP, UK

Applied treatment: PatchGuard Galvanic System
Type of Anodes: PatchGuard (1000 units)
Project Length: December 2010 – March 2011



Current and Previous Clients



- AECOM
- AMCO
- AMEY
- Aone
- Arup
- Atkins
- Bouygues
- Balfour Beatty
- Carillion
- CEBTP
- Dragados
- EON
- GHD
- Halcrow
- Hammerson Property group
- ING Real Estate
- Kier Group
- MACE
- MPB
- Network Rail
- Northumberland County Council
- Renofors
- Resolution Property PLC
- Saudi Government
- Savills
- Shell
- Southampton City Council
- URS
- Vinci
- Waterman
- WSP
- Xunta de Galicia

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