



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

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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. To date we have produced more than 100 technical publications and have both the technical and practical on-site knowledge to offer our clients optimum corrosion mitigation solutions.

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 and coastal, industrial and civilian structures. Our products have been installed on over 160 projects in 7 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.

I 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.



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CPT offers a full package for Corrosion Mitigation

CPT supply a range of cost-effective products for electrochemical mitigation of steel reinforcement corrosion

PRODUCT SUPPLY

We supply everything you need to install our products, from the anodes themselves to the ancillary materials such as embedding mortar, screw connectors and connector wire.

Our core product range



PatchGuard™



DuoGuard™



RebaGuard™

Whilst CPT is primarily a product supplier, we recognise that our overall service is key to our customers. We are on hand to guide, advise and to ensure that your corrosion problems are cost-effectively addressed.

Corrosion evaluation and assessment
Prior to any work taking place CPT can identify the parts of your structure which require treatment and specifically target a solution. CPT undertake an iterative analysis of your structure to identify the mechanism and extent of corrosion.



Installation Design

Following initial assessment, CPT can produce detailed installation designs for your structure, making the project as efficient and cost-effective as possible.

Site Support

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

Corrosion Monitoring

We can provide monitoring and data logging equipment for the long term assessment of your structure (For more details see page 11).



On-site Data-logging box

The DuoGuard™ Hybrid Anode™ Range



An innovative and powerful anode system applied to the whole 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	37 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



DuoGuard anode range with ancillaries



Peggy Bells Bridge,
Northumberland, UK



South Tyne Tunnel, UK



Kennedy Corniche,
France



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 & 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 7 days before the anodes are connected to the steel galvanically.



4. Install the anode string using Duocrete mortar, XLPE coated Titanium wire and polymeric screw connectors.

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

Features and Benefits

Cost

- Simplicity of system affords significant cost savings compared to traditional protection methods
- No power supply required after first 7 day impressed current phase
- No expensive control equipment required
- Highly cost-effective especially when depreciated over extended life of the structure
- No additional costs associated with ongoing power supply and maintenance
- Eliminates future concrete repair mobilisations



Product

- Each anode is a single unit which is safe to handle & install
- Feeder wires are formed of coated titanium and will not corrode
- Impressed Current phase halts corrosion of steel
- A large charge capacity and a high impressed current density $>1000\text{mA/m}^2$
- Anode size tailored to the amount of steel in the concrete
- Spacer prevents shorts and improves current distribution



Installation

- Installation is simple and straightforward
- The treatment can be targeted at specific or isolated areas or installed over an entire structure
- No need to break-out large areas of good quality concrete
- Rapid installation process over large areas of concrete
- Short on-site treatment minimises down-time and disruption
- DuoGuard anodes offer the advantage of running at low, safe driving voltages during both treatment phases



Long term

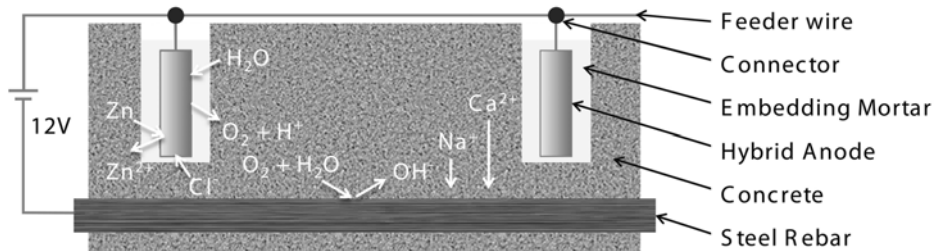
- Ongoing performance can be monitored/measured according to the client's requirements
- Hybrid system can be re-accessed at any future time

The DuoGuard™ Hybrid Anode™ Range

How does DuoGuard™ work?

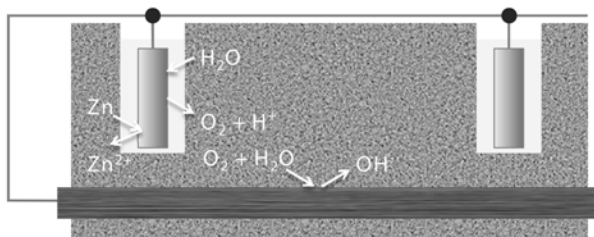
Phase 1 – Short-term Impressed Current

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 via the already installed XLPE coated titanium wire to pass a 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. This means that system lifetime predictions are made on a structure by structure basis; however typical installations will have a lifetime range of between 20 and 50 years.

The PatchGuard™ Galvanic Anode Range

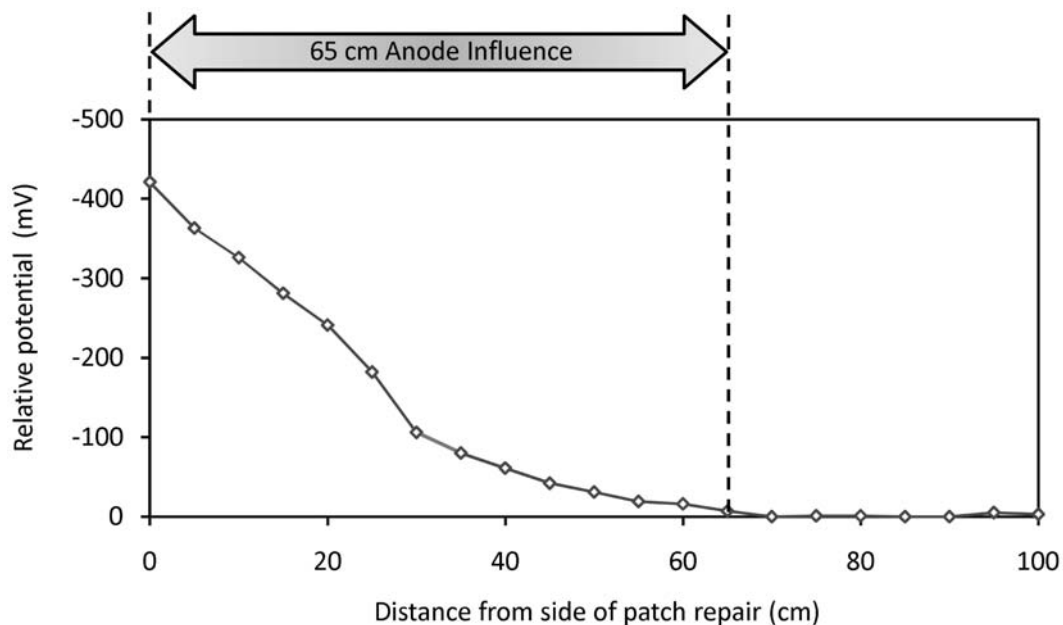


PatchGuard™ - next generation galvanic protection for use in patch repairs

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.

PatchGuard™
Sacrificial Anode,
Superior Performance.



As Patchguard is installed in the parent concrete, there is no compromise in the quality of the concrete repair material 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 treatment
- No long term maintenance
- No power source required
- No specialist repair material required
- Eliminates additional repair cycles

Product

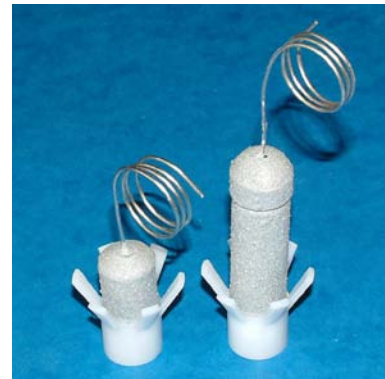
- Simple, single small volume unit
- Corrosion resistant attachment system
- PatchGuard Plus version available for greater anode capacity

Installation

- Rapid installation – no additional break-out required
- Bonding primers can be used
- High resistivity repair mortars 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 >15-20 years*
- Large charge capacity >150kC
- Performance can be monitored



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

Typical PatchGuard™ Installation guidelines



1. Drill the holes 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.

The RebaGuard™ Galvanic Anode Range

For restricted access patch repairs affording a simple and cost-effective solution

RebaGuard anodes are used where isolated areas of a structure are affected by chloride ion ingress. The installed anodes prevent corrosion in steel adjacent to the patch following repair. The RebaGuard anode design is based on responsive behaviour. Thus the anode life is extended as higher protective current is only delivered in warm, moist environments when steel is likely to be active, and is limited at low temperatures and in dry environments which are benign to the steel.

Installation of the RebaGuard anode

1. Mark positions for pre-soaked anodes on exposed steel.



2. Attach the anodes to the clean reinforcing steel by using the connectors provided.



3. Confirm electrical continuity between the anode and reinforcing steel before applying a low resistivity bridging mortar around the unit, ensuring that the anode surface is completely covered. Complete the installation with a patch repair mortar.



Peace of mind for years to come

Our monitoring systems can be installed on a stand-alone basis to monitor a structure for active corrosion, or installed to monitor system performance and steel corrosion rates/potentials following the application of an anode system.

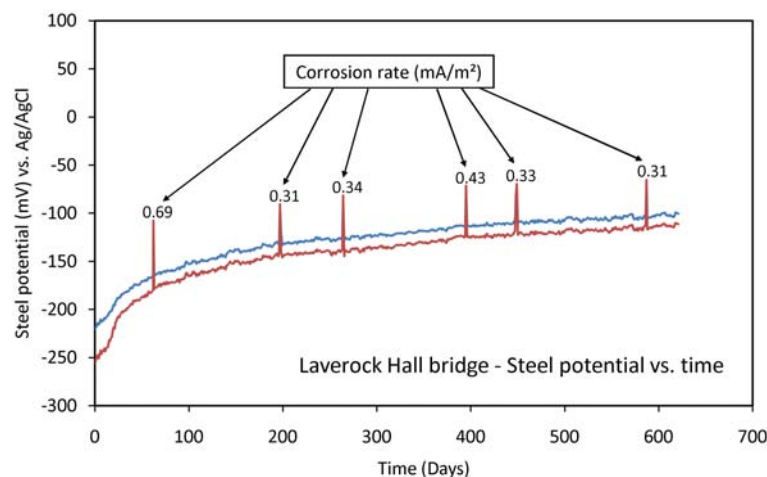
STRUCTURE HEALTH MONITORING

CPT's Monitoring equipment allows long term assessment of corrosion susceptible areas of a client's structure. Not only will the client be informed by CPT 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 by clients using our remote data-logging systems. Our systems allow the client to observe any changes in the state of the steel by recording steel potentials (using CPT MN15 reference electrodes) and the current passed to the steel by the anodes.

It is also possible to calculate corrosion rates and anode lifetimes using features of the data-logging system and collected data, giving the client peace of mind in knowing that his structure is fully protected from corrosion.



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 is provided in a standard spreadsheet format
- Ongoing monitoring facilitates timely repair intervention

Project Profiles

Whiteadder Road Bridge, Berwick, UK

Applied treatment: DuoGuard Hybrid Anode™ System

Number of Anodes: 2200

Monitoring System: CPT Remote Monitoring System
(using MN15 Reference Electrodes)

Project Length: January - April 2007



Power Generation Plant, St. Malo, France

Applied treatment: DuoGuard Hybrid Anode™ System

Number of Anodes: 4300 (DuoGuard 500)

Project Length: March - October 2007



Arousa Bridge, Galicia, Spain

Applied treatment: DuoGuard Hybrid Anode™ System

Number of Anodes: 9000 (DuoGuard 500)

Monitoring System: CPT Monitoring System
(using MN15 Reference Electrodes)

Project Length: January - October 2010

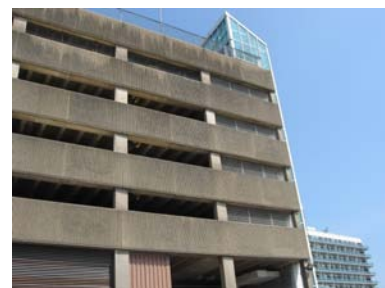


Grovesnor MSCP, UK

Applied treatment: PatchGuard Galvanic System

Number of Anodes: >700

Project Length: December 2010 - March 2011



Current and Previous Clients



Concrete Preservation Technologies

Aecom
Aone
Arup
Atkins
Bouygues
Carillion
CEBTP
Dragados
Freyssinet
Halcrow
Hammerson Property Group
ING Real Estate
LMDB
Network Rail
Northumberland County Council
Renofors
Resolution Property PLC
Sandwell Council
Saudi Government
Savills
Southampton City Council
Vinci
Waterman
WSP
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