



# Overhauling reinforced concrete with cathodic protection

**Reinforced concrete structures can be compromised if corrosion occurs in the reinforcement. This may be caused by poorly processed concrete, inadequate concrete cover or exposure to chloride ions.**

If no preventative measures have been taken to protect the reinforced concrete structure, sooner or later the reinforcement will corrode. The resulting cross-sectional losses weaken the static strength of the reinforcement and can, in severe cases, lead to the failure of the supporting structure. Cathodic protection (CP) offers economical and cost-efficient corrosion protection for reinforcements in concrete.

## **Alternative overhaul**

The principle of cathodic protection relies on preventing the anodic partial reaction, in other words iron disintegration, by using a direct current moving in the opposite direction. This is achieved by installing a permanent anode on the concrete surface. A point on the reinforcement is exposed and is connected to the negative pole of the rectifier that is serving as a source, while the anode is connected to the positive pole. Once the source is activated, the flow of electrons causes cathodic polarisation of the reinforcement. This prevents anodic disintegration of the metal. The reinforcement is also re-rendered passive through the cathodic partial reaction and the associated increase in pH value.

## **Systems**

Reinforced concrete structures can employ a range of anode systems adapted to suit the different reinforced concrete parts requiring protection:

- Titanium strip anodes
- Titanium mesh anodes
- Conductive coating
- Discrete anodes



Titanium strips installed on a column base



Installing titanium mesh

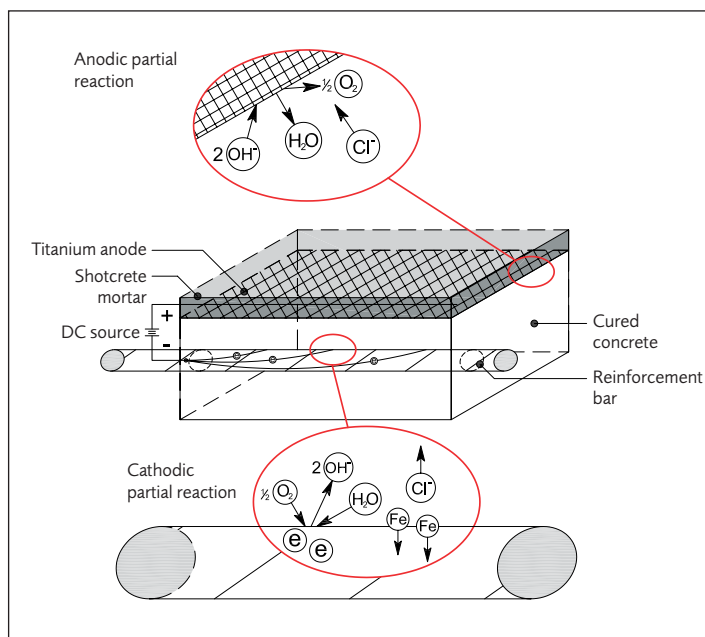


Diagram showing cathodic protection for reinforced concrete structures

## Benefits

The advantage of this method compared to conventional processes is that carbonated areas of the concrete or areas containing chloride ions do not need to be removed. Closures of, for example, parking areas or bridges are kept to a minimum and maintenance times are reduced. Noise pollution is minimal because nothing – or much less – needs to be removed (no extreme pressure water jets required). There is also no need to close off other parts of a structure, for example, the area underneath a parking level requiring repair, as it is not necessary to underpin the area that would be weakened through removal and no water from extreme pressure water jets can penetrate through. Using discrete anodes allows the anode system to be installed from the far side (e.g. the underside of a bridge to protect the road surface). This completely eliminates the need for closures or similar restrictions on use.

## Quality assurance

Monitoring is carried out via integrated sensors that are used to continually assess the performance of the system as well as internationally standardised anti-corrosion protection criteria.

A special feature is the ability to monitor the protected reinforced concrete parts from within and take action where required. This also enables the right point in time for further repair tasks to be identified. Given that this is not something provided by other overhaul processes, CP offers clients in construction real added value.

## Experience

Our team has over 40 years of combined first-hand experience. So whatever the application, we can draw on an enormous amount of expertise.