

## Avoid expensive concrete repairs

– Apply “power” to the reinforcement



Many reinforced concrete structures suffer from premature degradation. The most widespread cause has been found to be chloride contamination of the concrete at the level of the steel reinforcement. Cathodic protection is an established repair method for reinforced concrete.

### Chloride contamination

Often the chloride has come from the structures environment such as marine conditions, de-icing salts or swimming pool disinfectant. The presence of chloride does not normally directly affect the concrete but allows corrosion of the steel reinforcement to occur. This corrosion is normally prevented by the alkaline nature of the concrete.

There are several approaches to stop ongoing corrosion of steel reinforcement in concrete which is contaminated with chloride. The simplest and most direct solution is to demolish the structure and replace with a new, and hopefully,

improved construction. Another approach is to remove the areas of concrete where the chloride concentration is greatest and replace with uncontaminated mortar or concrete.

### Why cathodic protection?

Cathodic protection of an existing structure does not require that the concrete or masonry is removed which has important implications for the strength of the structure or in buildings its listing, which requires you to keep the structure as original as possible. The effectiveness of cathodic protection is well documented with various European standards defining how effective it is in preventing future corrosion.

### Why the durAnode system is a world leader

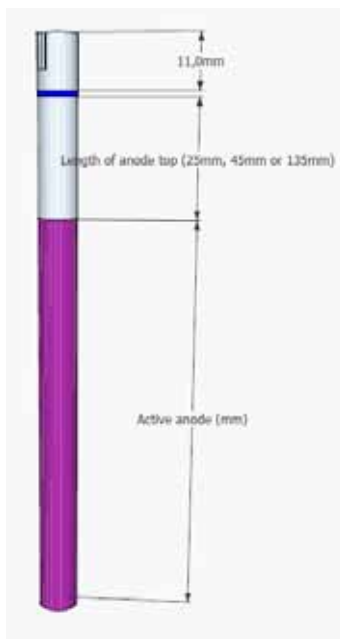
The hardest part of applying the CP to a concrete and masonry structure is finding a suitable anode material and design as there are many particular requirements and the concrete or stone is a relatively poor electrical conductor. Over the last 50 years many types of anodes have been tried in many different countries. The durAnode is the only anode system to have been evolved over a long period of time and is now in its fourth generation.

### Advantages

- The durAnode® system can be installed using few tools: cover meter, hammer drill.
- The durAnode® system does not increase the weight and dimension of the structure. This is of particular importance in car parks where the height is very limited and on some type of bridges.
- The durAnode® system can be completely hidden. Thus it can be used in historic buildings to protect steel girders.

### DurAnode4 standard

The **durAnode4** consist of an anode head and an active anode. The active anode can be made in any length from 50 mm to several meters.



*durAnode4 with definitions and measurement*



*Connection to durAnode4*



*durAnode4 vertical*

Several durAnodes can be connected on a single feeder wire which reduces the installation work.

The **durAnode4** has a build-in pre-resistor to prevent short of all anodes on a string in case of one single short, and offsets the output in concrete with various conductivity which reduces the number of zones.

The **durAnode4** has a screw of Titanium that penetrates the insulation and makes a connection to the feeder wire. This means that the wire shall not be stripped but just placed in the anode top.

### DurAnode4 vertical

The **durAnode4** is designed to be mounted in the soffit of structures. The interference fit plug has a hole in it through which the grout is injected with a syringe. The clear plastic pipe allows the air to escape and leave a vacuum holding the grout until it cures.

The **durAnode4** has a titanium grub screw that penetrates the insulation and makes a connection to the coated feeder wire. This means that the feeder wire does not have to be stripped.

A special torque screwdriver and spanner are made by CP International for the connection

The **durAnode4** can be made in any length from 50mm to several meters.

The **durAnode4** has a built in pre-resistor which can have several resistances depending on the anodes length.

### Further information

Frits Otto Grønvold: Tel. +45 43 56 06 10 / E-mail: fog@force.dk.