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Galvashield™ - Embedded Galvanic Anodes

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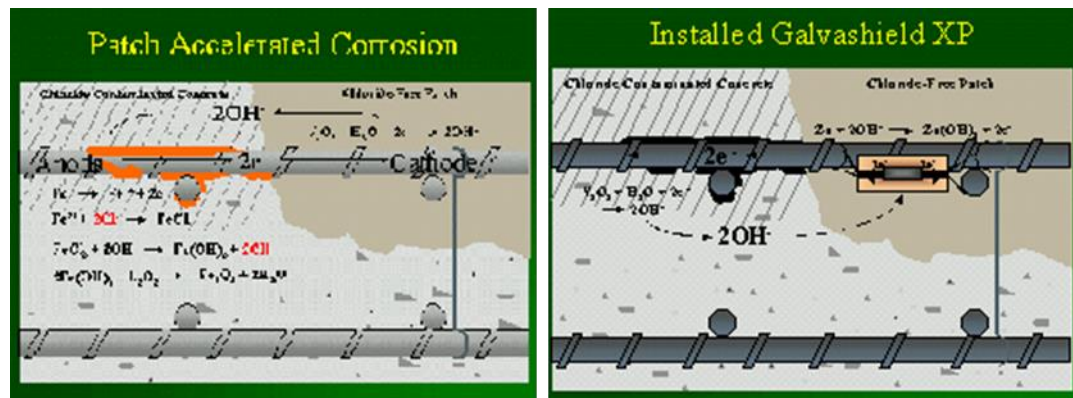
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GALVASHIELD™ - EMBEDDED GALVANIC ANODES

THE NEED

Repair of chloride-contaminated or carbonated concrete structures can result in accelerated corrosion problems on the reinforcing steel in adjacent concrete areas. This phenomenon is often referred to as the “Ring-Anode” or “Halo” effect, because it typically produces new damage in the concrete surrounding a repair area. These new corrosion cells may require additional patching in as little as three to five years. Installation of galvanic anodes embedded into the patch repair will corrode “sacrificially”, reducing corrosion of the reinforcing steel. The result is an extension of service life for the patch repair, and reduced maintenance and shutdown costs for other areas of the structure.



THE TECHNOLOGY

When two dissimilar metals are connected in concrete, the metal with the higher potential (more negative voltage) for corrosion will corrode in preference to the more noble metal. When used in a concrete repair, the zinc core of the galvanic anode will corrode instead of the reinforcing steel. This action causes the rebar to be protected and prevents the subsequent deterioration to the concrete structure that normally follows.

Galvashield XP anodes provide localized corrosion protection in reinforced concrete buildings and structures. The palm-sized anode consists of a galvanic zinc core surrounded by an active cementitious matrix. These anodes are designed to reduce the ring anode corrosion commonly associated with concrete patch repairs and delay the



onset of future corrosion. Ring anode corrosion is caused by differences in corrosion potential between areas which have been patched and the remaining portions of the structure. Galvashield XP anodes are incorporated into patch repairs by tying them around the reinforcing steel. Large repairs will require multiple anodes to be spaced around the perimeter of the repair area. Once installed the zinc core corrodes preferentially to the surrounding rebar.

The Galvashield service life is dependant on a number of factors including steel density, concrete conductivity, chloride concentration, humidity, and the number of anodes installed and their spacing. Depending upon site requirements, a service life of 10-20 years can be designed.

THE BENEFITS

The benefits from applying this products are:

- Suitable for prestressed, post-tensioned and conventionally reinforced structures
- Can be used in corrosive environments including chloride contaminated and carbonated concrete
- Extends service life of patch repairs
- Beneficial where all chloride contaminated concrete cannot be removed
- Reduces need for constant re-patching and the possibility of secondary repairs
- User-friendly and easy to install

STATUS

Initial research into the development of an embedded galvanic corrosion protection system began in 1994 at Aston University in the UK. Installation in field trial projects began in 1997-1998 with full scale commercial production and sale in 1999. Fosroc International Limited, UK and Vector Construction Group, Manitoba, Canada have been involved in the development of a commercial product.

Currently Galvashield anodes are being specified and used by government agencies and private owners throughout North America. Projects vary from small industrial and parking garage repairs to bridge widenings, pre-stressed concrete girder protection, and coastal buildings and bridges.

BARRIERS

Adds a small incremental cost to chip-and-patch type repairs.



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REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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PUBLISHER

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