



REFURBISHMENT

Sika FerroGard[®] Galvanic and Hybrid Anode Technologies

THE NEXT GENERATION IN REINFORCED CONCRETE CORROSION REPAIR & PREVENTION

BUILDING TRUST



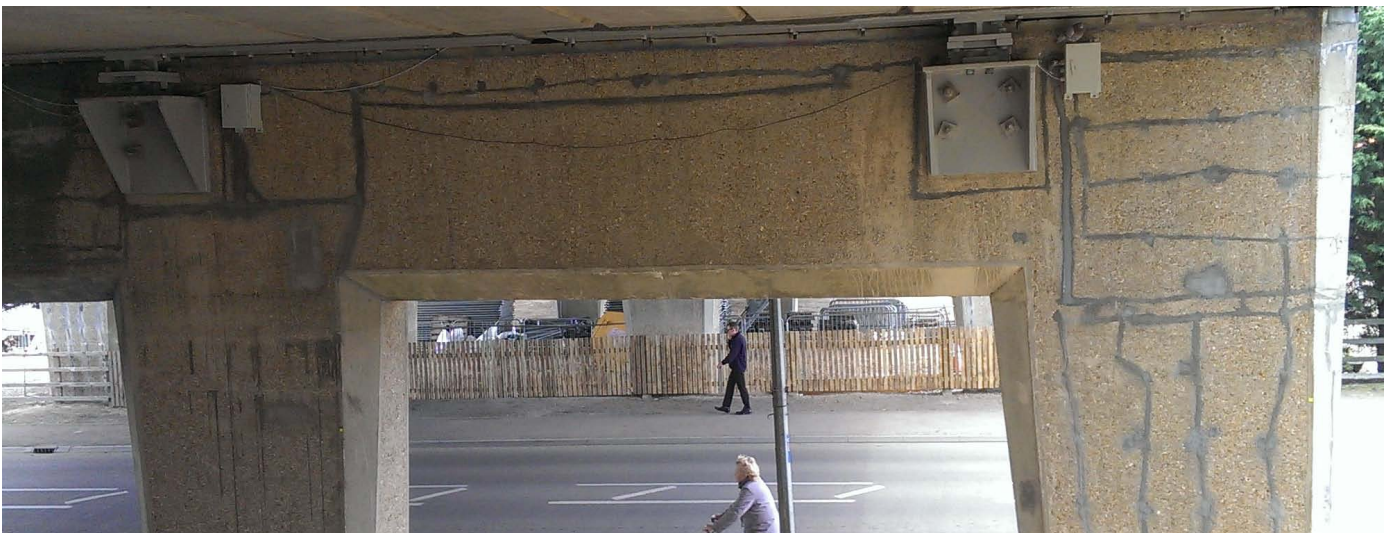
THE SIKA® FERROGARD® PATCH GALVANIC ANODE RANGE

Sika FerroGard galvanic anodes are a cost effective addition to the range of concrete repair options, and can be used locally in patch repairs, targeted at specific high corrosion risk areas of structures, or installed over large areas for widespread corrosion protection and control.

Galvanic anodes redress the electrochemical imbalance induced through removal of the contaminated concrete in patch repairs. Sika FerroGard Patch anodes corrode preferentially to the surrounding steel protecting it from further deterioration due to the incipient anode effect.

Rather than the traditional approach of attaching galvanic anodes to exposed steel in the patch repair, Sika FerroGard Patch 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 Sika FerroGard Patch 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.



Sika® FerroGard® Patch Galvanic Anode Range

- Prevents corrosion from incipient anodes. This **improves the durability** of patch repairs, **reduces ongoing maintenance costs** and **extends the structure's service life**.
- Sika FerroGard Patch anodes are placed outside the immediate repair area and right where they are needed for controlling incipient anode corrosion - **ensures efficient performance and enables bonding primers and high resistivity mortars to be used**.
- Anodes have a lifetime of 15 to 30 years depending on the corrosion conditions - **ensures long term protection against incipient anode corrosion**.
- Connection to power supplies and system maintenance is not required - **no running costs**.
- Sika FerroGard Patch anodes do not require presoaking with water - **ensures reliable installation**.
- Sika FerroGard Patch anodes are installed into drilled holes - **reduces the amount of concrete break out required - and reduces installation costs**.



THE INCIPIENT ANODE EFFECT

The poor performance of traditional patch repairs in chloride contaminated concrete is due to a phenomenon known as the incipient anode effect.

While all of the concrete of a structure may be chloride contaminated, and therefore all of the reinforcing steel may be in a potentially corrosive environment, corrosion is only initiated at specific discrete locations. This is because corrosion of the reinforcing steel is an electrochemical reaction (as shown in Figure 1), in which there is:

- An anode – the 'actively' rusting site where rust forms, eventually cracking and spalling the concrete.
- A cathode – where the steel is protected cathodically and hydroxide ions are produced, further improving corrosion protection.
- A flow of electrons along the rebar from the anode to the cathode, and a flow of hydroxide ions through the concrete from the cathode to the anode.

The steel at the cathode is effectively protected from corrosion by the electrochemical reaction despite it being in a high chloride environment.

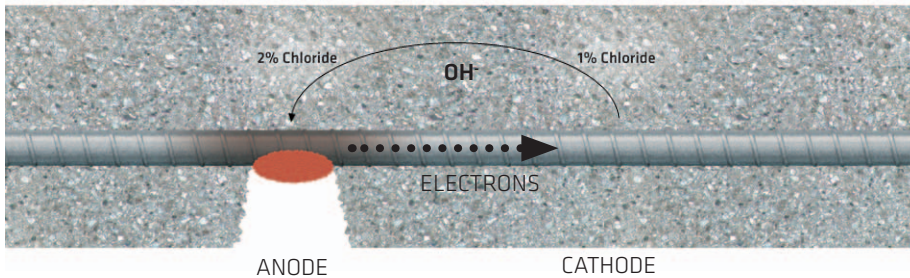


FIGURE 1:
Before repair

AFTER REPAIR

The patch repair of the spalled concrete involves the removal of the damaged, chloride contaminated concrete and its replacement with fresh, non-chloride contaminated Sika MonoTop concrete repair materials. The original anode has effectively been removed and the original cathode is no longer protected by the electrochemical corrosion process. Corrosion of the reinforcing steel adjacent to the patch repair, in what was formerly the cathode, is immediately initiated. This is called the incipient anode effect. See Figure 2.

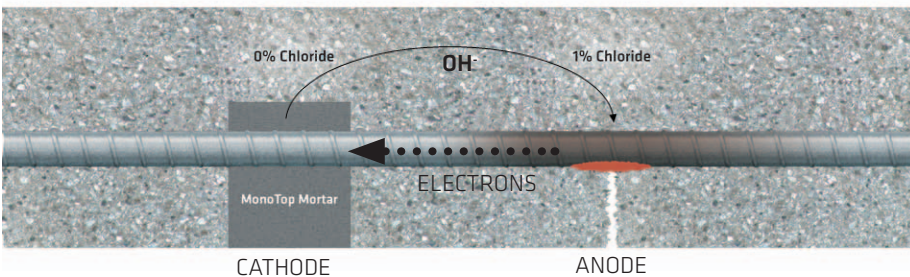
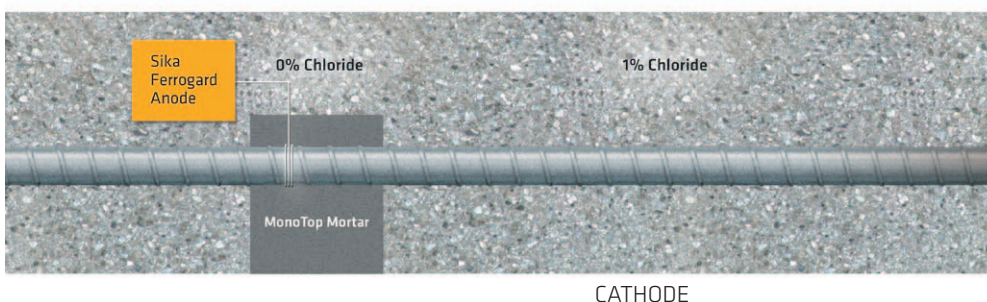


FIGURE 2:
After repair

HOW SIKA FERROGARD PATCH ANODES WORK

Sika FerroGard Patch anodes use the long established principle of galvanic protection to prevent or reduce the corrosion rate of steel reinforcement. When two different metals in a potentially corrosive environment are connected together one of them will corrode whilst the other is protected from corrosion. The relative positions of the two metals in the galvanic series determines which corrodes in preference to the other. By this principle the zinc in the Sika FerroGard Patch anodes corrodes in preference to the steel reinforcement.

Adopting Sika FerroGard galvanic anodes in the repair specification prevents the incipient anode effect from occurring. The reinforcement bar is cathodic in relation to the galvanic anode. The active zinc in the galvanic anode corrodes in preference to the steel to which it is attached, ensuring that corrosion is prevented.



The Sika FerroGard Patch anode simply replaces the original corrosion anode, ensuring that the steel reinforcement in the vicinity of the repair remains cathodic - and protected from corrosion.

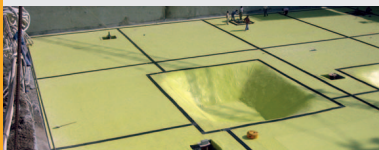
SIKA'S FULL RANGE OF CONSTRUCTION SOLUTIONS

Concrete Production



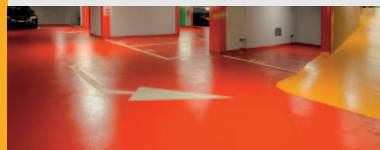
Sika® ViscoCrete®
Sika® Retarder®
Sika® SikaAer®

Waterproofing



Sikaplan®, Sikalastic®
Sika® & Tricosal® Waterstops
Sika® Injection Systems

Flooring



Sikafloor®
SikaBond®

Coatings, Silanes & Siloxanes



Sikagard®
Ferrogard®

Concrete Repair and Protection



Sika® MonoTop®
Sikagard®
Sikadur®

Structural Strengthening



Sika® CarboDur®
SikaWrap®
Sikadur®

Joint Sealing



Sikaflex®
Sikasil®

Grouting

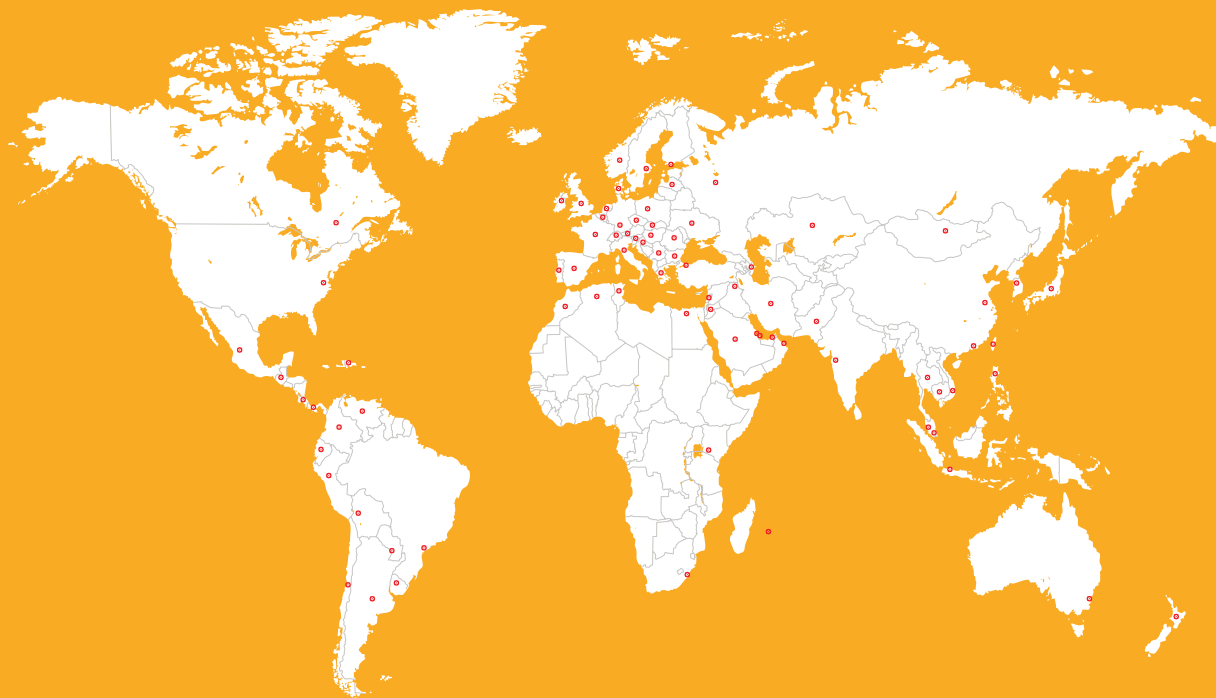


Sikadur®
SikaGrout®

Roofing



Sarnafil®
Sikaplan®
SikaRoof® MTC®



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Please refer to the relevant data sheet prior to any use or processing of Sika products.

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