

# RESTEK

Louth County Hospital Refurbishment

September 2016

*Client:*

**NHS Property Services**

## ***The Problem:***

This building constructed in the 1920s with large pre-cast concrete window sills and ring beams at the top of the building was showing signs of spalling to many of the concrete sills and in some cases large pieces of concrete had begun to fall off the building posing a serious concern for the safety of both the staff and members of the public using the hospital.

The NHS subsequently instructed a condition report on the current condition of all concrete elements of the County Hospital in Louth.

The report confirmed one of the reasons for the problems was due to a lack of cover to the reinforcement that had resulted in the accelerated deterioration of the concrete components.

The relative depths of cover to the reinforcement and carbonation indicated that in most of the areas tested, the carbonation front had encroached upon the reinforcement.

The chloride ion contents were found to be less than 0.1% by weight of cement recalculated from the determined percentage by weight of sample, assuming a cement content of 14% by weight. For concrete of this age, i.e. probably 100 years old, with the carbonation recorded above and containing chlorides in the above proportions.

On the basis of the above results, the externally exposed concrete forming Block 27 at Louth County Hospital, had deteriorated and become distressed mainly as a result of generalised, carbonation induced corrosion.



**A neglected structure requiring extensive repairs and refurbishment**



## The Solution:

### Increasing the service life

One of our client's main objectives was to extend the service life of the concrete components to the building, considering that the majority of the sills and lintels were at high level and it would be unlikely their in-house maintenance team could carry out these maintenance works without specialist access equipment.

We recommended a system for all concrete where rebar is present, to treat the reinforcement with the application of *Sika FerroGard 903+* multifunctional corrosion inhibitor to all unrepaired concrete areas to reduce existing corrosion rates and delay latent damage corrosion in carbonated and chloride contaminated concrete by penetrating the concrete up to 65mm depth to form a protective monomolecular layer on the surface of the reinforcing steel.

Protection with *Sika FerroGard 903+* delays the start of corrosion and reduces the corrosion rate thus increasing the service and maintenance life cycles by up to 15 years when used in conjunction with an anti-carbonation coating and repair system.



### Concrete Repair:

The abundance of concrete repairs needed at Louth Hospital which included re-profiling of all concrete sills and lintels required the use of hand applied techniques with *Sika R3* Cementitious High build concrete repair mortar three-part application.

*Sika MonoTop 610* is an ecologically designed reinforcement primer meeting the requirements of BS EN1504-7 and a bonding primer. It contains active corrosion inhibitors and is specifically formulated to provide a highly alkaline and protective coating to steel reinforcement. It also gives excellent adhesion of *Sika MonoTop* repair mortars to the repair site.

#### Concrete Repair Materials

*Sika MonoTop 615* is a single component high build repair mortar meeting the requirements of Class R3 of BS EN1504-3. It is suitable for repairing substrates at thicknesses ranging between 3mm and 30mm in one application. Formulated for hand or machine application using the wet spray process; repairs may be profiled and float finished where necessary.

#### Smoothing Mortar

*Sika MonoTop 620* is a one component, cementitious, smoothing mortar containing silica fume and polymer. Applied in thicknesses between 2mm and 5mm, it is designed to give increased effective cover by providing a dense, highly alkaline and pore-free surface, ideal for the subsequent application of coatings.



## Properties:

### Crack Bridging Protective Coating

As part of the full system to extend the service life of the structure, Restek also recommended that the three-part *Sikagard-550W Elastic* system be used for its excellent crack bridging properties as well as its high diffusion resistance against  $\text{CO}_2$  reducing the rate of carbonation.

This system coupled with the application of *FerroGard 903+* has enable an extended service life for over twenty-five years.



### Sika FerroGard 903

Surface applied mixed corrosion inhibitor designed for use as an impregnation of steel reinforced concrete and is an improved formulation of the original *Sika FerroGard*.

*Sika FerroGard 903* is based on organic compounds. It penetrates the concrete and forms a protective monomolecular layer on the surface of the reinforcing steel.

Protection with *Sika FerroGard 903* both delays the start of corrosion and reduces the corrosion rate.

It also increases the service and maintenance life cycles by up to twenty-five years when used as a part of a complete *Sika Concrete Repair and Protection System*

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