

# Case Study - Historic Restoration

 Terry's Chocolate Factory, York (2015)



## Background

The former Terry's Chocolate Factory in York, UK which was facing severe structural degradation due to the ingress of moisture and water over its near 100-year life. As moisture and water leak into the fabric of buildings, this destroys protective coatings. Over time, corrosion will propagate and, where the masonry is in intimate contact with the steel or infill mason's mortar, cause the rust packed layers to result in the tensile forces cracking and moving the brick skin. The problem will perpetuate until the failure of the façade as cracks allow more moisture and oxygen to react to form more corrosion forces.

## Restoring Historic Buildings Through ICCP Systems

To tackle this problem effectively, impressed current cathodic protection (ICCP) was used as a method to control corrosion whilst the cracking and movement were repaired. Elements of the installed corrosion management system included: LoCem® and +point® anode mortar, alongside embedded corrosion rate sensors which allowed control and service life tracking through AchillesICP and AiMS open network server.

LoCem® +point

Anode Mortar

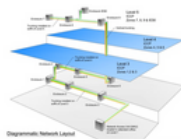


Embedded corrosion rate sensors



AiMS  
C-Probe.com  
The informed choice

online remote control and performance management server



AchillesICP power, control and monitoring electronics



Whole Life Solution!



The photos above show the condition and degradation of Terry's before repair and restoration began.

## A Sustainable and ESG Compliant Approach



LoCem® is produced from recycled and waste by-products with no heat (energy) meaning it had a low carbon profile



Installation of an ICCP system eliminated the need for reconstruction or demolition. Both involve carbon-heavy processes.



Each year the UK produces 200k tonnes of waste and 2/3 of this comes from construction waste. The reuse of this building significantly reduced the construction waste and retained the existing embodied carbon

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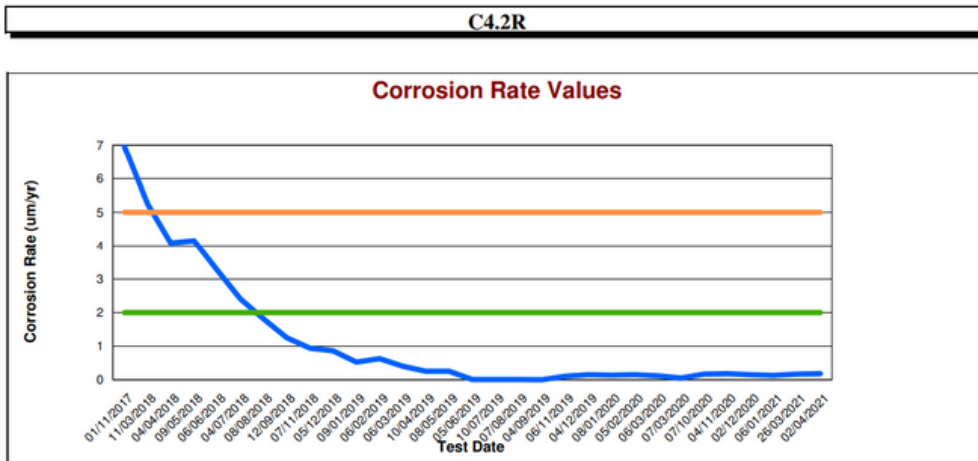


## Post Restoration Performance

The graph below shows the reduction of corrosion rate (blue) experienced over 4 years following energisation of the +point® anode ICCP system in 2017. The corrosion rate values are compared to threshold values of 2µm/yr (green) and 5µm/yr loss of steel (orange) as proof of control of corrosion condition of the steelframe. These values also relate directly to service life extension for the property where the lower the corrosion rate the longer the service life of the structure, tracked with real data.

## Long-Term Benefits

- Building's service life is extended for another 100 years.
- Cost-effective, non-disruptive installation of ICCP system that preserved aesthetic of the building.
- Asset owners have full transparency of corrosion data with AiMS, meaning they can make informed maintenance decisions, reducing cost and social disruption.
- Sustainable and ESG compliant – embodied carbon of the building would have been retained and the materials used (LoCem®) would have reduced CO2e of the mortar by 80%.
- Technically and financially preserving value of the asset.



**RISE Awards 2021**

**Winner of the Leeds Beckett  
RISE Award (Heritage Award  
for Restoration)**

"I have worked with C-Probe over many years and have continued to be impressed with their entrepreneurial spirit and awareness of the importance of finding affordable and sustainable solutions to problems in the built environment. ICCP offers a durable route to extending the life of structures almost indefinitely and frees the owner from an endless cycle of repairs to make good corrosion-induced damage. Geopolymer-based anode systems, developed by C-Probe with SHU, and with input from Mott MacDonald, has proved to be particularly suited to the life extension of sensitive structures such as heritage buildings, and is itself manufactured in a sustainable manner from industrial by-products. A uniquely sustainable technical solution, employing sustainable materials."

Prof. Paul Lambert.  
Head of Materials and Corrosion Technology, Mott MacDonald.