

Rowan Technologies Ltd - Cathodic Protection Case Studies

Rowan Technologies Ltd are experts in the application of cathodic protection to historic buildings and monuments, and have installations in many prominent and listed structures. The following case studies are just some of the cathodic protection systems that Rowan Technologies Ltd has installed in recent years.

For more information, please visit www.rowantechnologies.co.uk or call 0161 748 3644.

Wellington Arch, London **ICCP - Steel Framed Monument**



Rowan Technologies installed an ICCP system on the Grade 1 listed Wellington Arch in London in 2000. Due to previous water ingress, the key steel 'I' beams had suffered from significant corrosion. These steel filler joists had been physically displaced by up to 20mm in places, resulting in the cracking of historic stonework and the jacking up of the quadriga.

Titanium ribbon and discrete anodes were used throughout the installation to facilitate a uniform current distribution. The ribbon anode provides maximum surface area ensuring efficient transfer of the corrosion inhibiting electrical current which is vital to sustain long term cathodic protection performance.

Gloucester Cathedral, Gloucestershire
ICCP - Steel Tie Bar



In the 19th Century, steel inserts were added to the northern transept of Gloucester Cathedral. In recent years, these embedded steels have been subject to corrosion and expansion, resulting in the cracking of the surrounding historic stone.

In 2006, Rowan Technologies designed, installed and commissioned a discrete ICCP system to provide long-term corrosion control to the embedded steels.

Downside Monastery, Somerset
ICCP - Filler Joists



The asphalt roofs of this Benedictine monastery have been subject to water ingress and the embedded steel joists have suffered from corrosion and expansion. The expansion has resulted in cracks as wide as 35mm developing. An ICCP system was designed, installed and commissioned by Rowan Technologies in 2006 to control the corrosion of the embedded steel joists.

**Manchester Town Hall Extension.
ICCP - Steel Framed Building**



Grade II listed Manchester Town Hall Extension was completed in 1938 and forms part of the city's Albert Square Conservation Area. The steel frame of the building has been subject to corrosion at low level, resulting in the development of cracks around the base of the piers.

Two ICCP systems were installed by Rowan Technologies in 2007 to suppress the corrosion reaction and protect the historic sandstone façade from further cracks developing.

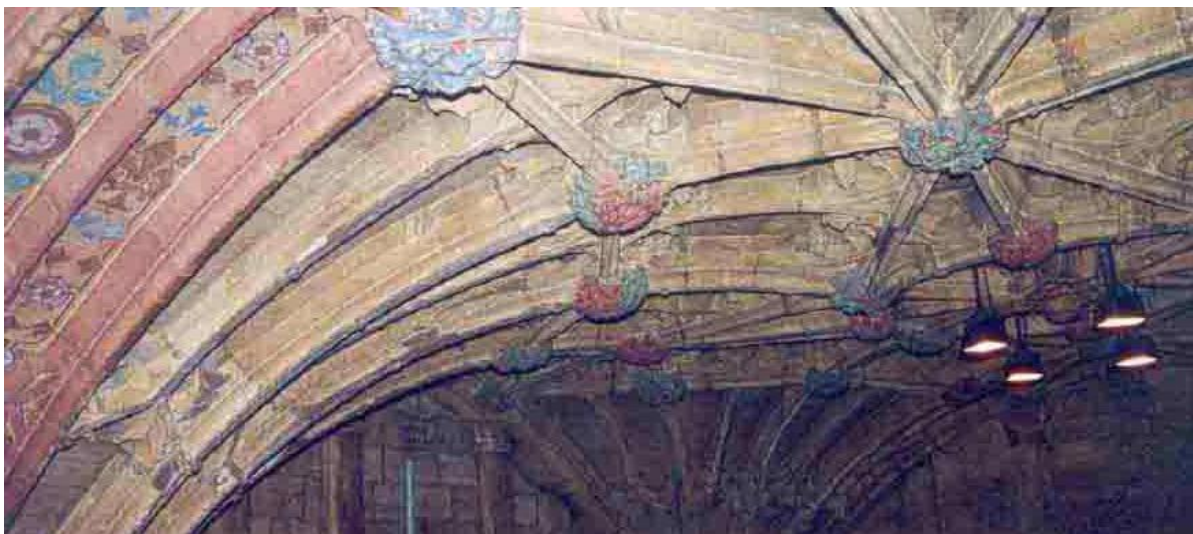
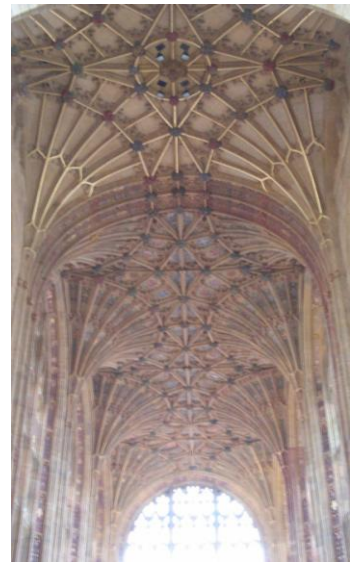
St Catherine's Church, Batheaston
ICCP - Embedded 14th Century Ferrementa



Rowan Technologies was asked to design, install and commission an impressed current cathodic protection system to St Catherine's Church in Batheaston, Somerset.

14th Century ferrementa ironwork covering the historic south window had been corroding for a number of years and was causing cracking of the surrounding stonework. The CP system was installed during November and December 2008 to help control the corrosion.

Sherborne Abbey, Dorset
ICCP - Wrought Iron Rib Reinforcements



Sherborne Abbey boasts the earliest fan vault to be built in England (c. 1425). The fan vault had been subject to subsidence over the centuries, and a wrought iron reinforcement system, covering the bottom and top faces of the ribs, was installed in about 1840. Moisture ingress from the North and South walls had allowed the iron reinforcements to corrode, ultimately leading to spalling of some of the stones and resulting in the tower being cordoned off. Rowan Technologies designed, installed and commissioned an ICCP system in 2001 to control further corrosion.

Barton Seagrave Orangery, Kettering
ICCP – Iron Cramps, Dowels, Restraints



This grade II listed Orangery in Northamptonshire has approximately 500 wrought iron cramps, dowels and restraints that have been subject to corrosion. The expanding corrosion product has forced the historic ashlar to crack and spall eventually resulting in a loss of fabric in numerous locations. An ICCP system was designed, installed and commissioned during 2006/07 to control the ongoing corrosion.

The Listening Mirrors, Kent
Remote Sacrificial Anode (RSA) - Concrete Reinforcements.



Rowan Technologies are specialists in providing cathodic protection to historic concrete. The three early warning sound mirrors on the Kent coast were built using reinforced concrete in the late 1920s and the early 1930s to detect the distant sounds of enemy aircraft approaching from over the English Channel. The reinforced concrete has deteriorated in the marine environment and many parts of the structure are suffering from corrosion of the reinforcements and delamination of the concrete cover.

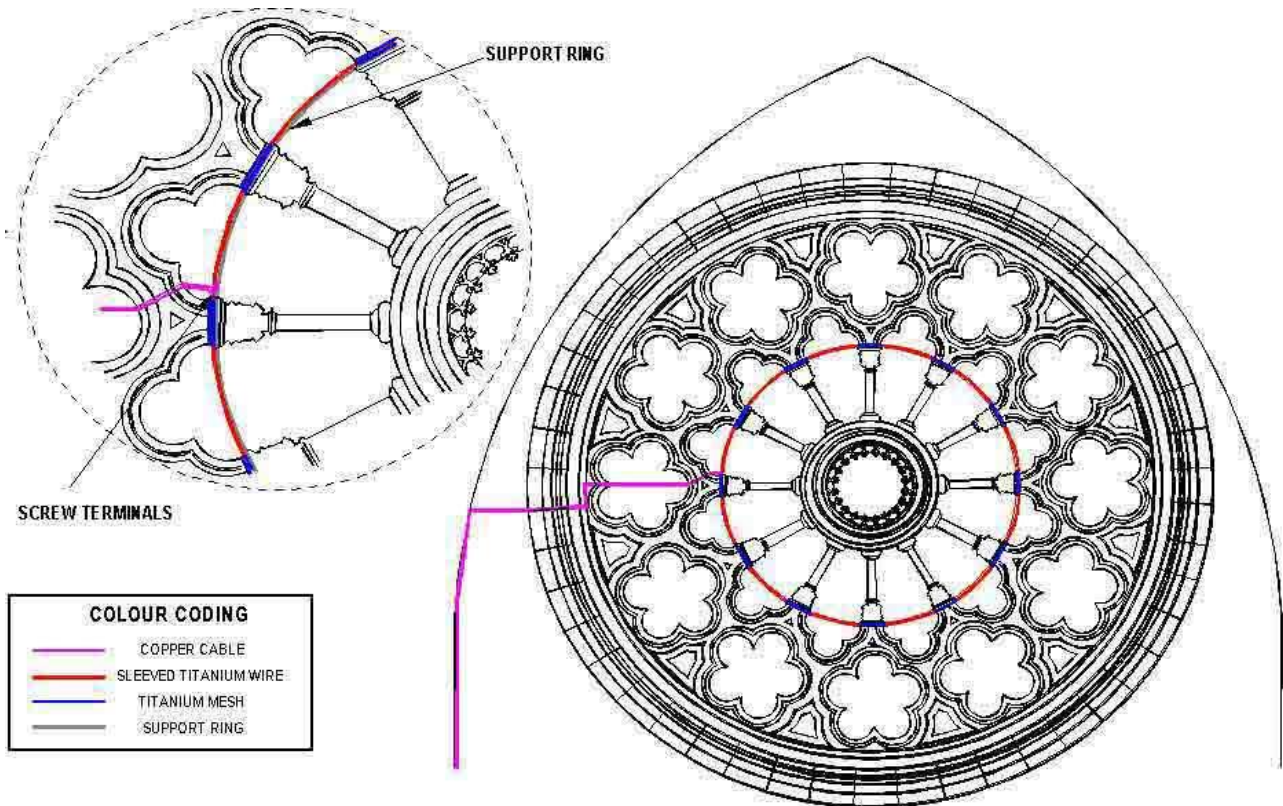
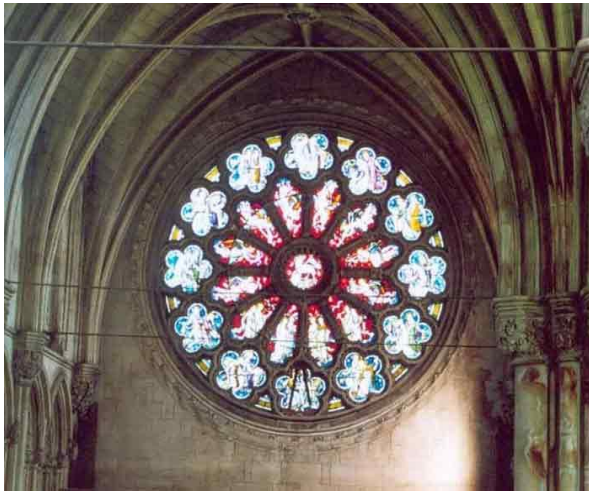
In the latter part of the 20th century, the Listening Mirrors were 'scheduled' by English Heritage as being of 'outstanding national importance'. A recently-developed remote sacrificial anode cathodic protection system was used to control the ongoing corrosion of the concrete reinforcements without the need for mains power.

Gloucester Cathedral Crypt, Gloucester
ICCP - Steel Cores to the Crypt Columns



In 2005 an ICCP system was designed, installed and commissioned to provide long-term corrosion control to the steel cores of four piers in the crypt of Gloucester Cathedral. These steel cores, which had been inserted post war, were subject to corrosion and expansion leading to cracking of the 11th century historic stones at the top and bottom of the piers.

Downside Abbey, Somerset
ICCP - Rose Window



The Rose Window in the 19th century Benedictine Abbey has a wrought iron support ring running through the Victorian glazing. This wrought iron ring has been subject to corrosion in recent years, leading to cracks developing in the historic stone. Rowan Technologies designed, installed and commissioned an ICCP system to provide long-term corrosion control to the iron support ring of the Rose Window.

Almshouses, Whitchurch
SACP – Cramps



The wrought iron cramps in the Grade II listed Whitchurch Almshouses have been subject to corrosion ultimately leading to the spalling of the Ashlar façade.

In 1999, a pioneering SACP system was installed to help protect the cramps from further corrosion. Magnesium anodes were buried in the ground and electrically connected to the embedded iron cramps using 'key hole' surgery in order to minimise the damage to the surrounding stone.

Royal West of England Academy, Bristol
ICCP - Embedded Support Beams



This Grade II listed building has a pediment dating from 1913. It was constructed of clinker concrete with a render finish and had 'I' beams within the central construction to provide support. The front of the pediment contained various pieces of statuary, which had been cast into the outer stones, and this important façade would have been seriously damaged if the steel had to be replaced. An ICCP system was therefore installed to control further corrosion and conserve the historic stonework.

Inigo Jones Gateway, London
SACP - Cramps



The Grade 1 listed Inigo Jones Gateway (1621) is located in the parklands of Chiswick House. The embedded wrought iron cramps were corroding leading to expansion and damage of the surrounding historic stonework. Rowan Technologies' Remote Sacrificial Anode (RSA) technology - located discretely in the ground, overcame the requirement for mains powered electronics to power the cathodic protection system.

Lincoln Castle Prison Window, Lincolnshire
ICCP – Cast Iron Window Frames



The west window of Lincoln Castle Prison has been suffering from corrosion of the cast iron window frames for a number of years. The expanding corrosion product has resulted in the cracking of surrounding historic stonework. It was thought that to remove, repair and refit the window frames would be too destructive. Rowan Technologies designed, installed and commissioned an ICCP system during 2009/10 to control the corrosion of the ironwork.