F121-09 J Kirkcaldy refurbishment of the Ross Swing Bridge, Penzance

Metallisation Equipment Key to Refurbishment of Cornish Swing Bridge

The historical Ross Swing Bridge by the Isles of Scilly ferry port on Penzance sea front is currently undergoing a major refurbishment to improve its appearance, reliability and reduce the costs of future disruption and maintenance. The works are being carried out by Cornwall County Council's contractor Cormac and part of the refurbishment includes the thermal spraying of the bridge with aluminium to protect it from corrosion.

Metallisation's customer, J Kirkaldy Limited, a preservation and painting specialist, has won the competitive contract to protect the bridge from corrosion, using Metallisation's MK73 Flame spray equipment.

The original swing bridge was built in 1881 from an old railway turntable to give access to the Abbey Basin and dry dock. This bridge was replaced in 1980, constructed by local Cornish company Visick's Foundry. The new bridge was painted with a multi coat paint system, which over the years has broken down resulting in significant visible corrosion, which if left, would result in potential structural damage. The total refurbishment of the bridge will take about 12 weeks to complete and will include the renewal of the hydraulic actuating mechanism, repair and repainting of the steel structure and the replacement of the timber bridge deck.

The bridge, which opens to allow boats into the dry dock approximately 20 times per year, is not only subjected to the harsh sea environment it's located in, but also the wear and tear of the traffic it carries into the Penzance seafront and harbour areas.

In 2008, while the Planning Transport and Estates Department considered how to protect the bridge long term, Cornwall County Council consulted with Metallisation and TSSEA. The aim of the discussion was to explore and evaluate thermal spraying as an option to protect the bridge from corrosion, instead of a standard paint system.

Scott Perry, Civil Engineer, Cornwall County Council, says: “Following consultation with Metallisation and TSSEA and considerable research into corrosion protection, we opted for the Highways Agency specification for thermal spraying due to its proven durability and long term corrosion protection. We were also very impressed with Metallisation and J Kirkaldy, as both companies inspired confidence and were extremely knowledgeable during our discussions. This was reassuring for us, as it’s our first experience of using thermal spray as corrosion protection for refurbishment.”

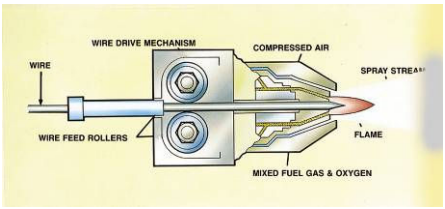
The option to use thermal spray is not only promoted within the industry but is also backed up by its inclusion in independent International Standards (EN ISO 14713), as a system to provide unrivalled corrosion protection in a number of environments. This is why it appears in specifications for key civil and marine applications, as the Highways Agency and Network Rail coating specifications, as well as many offshore oil industry companies.

Before work could start on the major overhaul, the bridge was lifted one metre off the ground to allow access to all areas. The turning mechanism was then dismantled and sent away for refurbishment. Once the wooden deck was removed, which will be replaced by a lightweight aggregate concrete deck weighing the same as the timber deck, the steel structure was covered with a large industrial shrink wrap enclosure, under which all of the thermal spraying took place. The tent was fitted with an extraction system, de-humidifiers and heaters to create the optimum environment for surface preparation, metal spraying and painting of the bridge. The enclosure also ensured that dust generated during the surface preparation and coating process was contained and didn’t contaminate the local environment.

To meet the recommended Highways Agency specifications, surfaces were first grit blasted to SA 3 cleanliness, using garnet, and then sprayed with 100µm minimum of aluminium using Metallisation's MK73 Flame spray system. A single coat of epoxy sealer was then applied at a spreading rate of 15 – 20 metres² per litre to seal the Aluminium metal spray the same day, followed by three coats of paint. The inclusion of an aluminium coating should guarantee a protective, maintenance free surface well in excess of 20 years, which is important considering the harsh environment the bridge is located.

The bridge steel frame is 6.8m wide, 27.5m long and is 686mm high. In total 627m² of steel structure has been metal sprayed including barriers and handrails. Over time the refurbished bridge will require some cosmetic enhancements to the paint system, but this compared to the previous high level, full maintenance, will mean the bridge is closed for less time, which will result in less disruption for local traffic and businesses during the important tourist season. This will also see a significant reduction in maintenance costs.

The Metallisation Flame spray Process



In the wire flame process, mainly used for anti-corrosion coatings, a wire is fed by a driven roller system through the centre of an oxygen-propane flame where it is melted. An annular air nozzle then applies a jet of high-pressure air, which atomises and projects the molten material onto the work piece. The driving of the wire is typically via an air motor and gearbox that forms part of the pistol. Wire is typically dispensed from coils or production packs (drums). Major advantages of the Flame spray process are that the coatings are available for almost instant use with no drying or curing times. There is very minimal heat transferred to the component being spray so damage from distortion, which can be seen with galvanising of thin structures, is not experienced. As the coatings are actual metals (typically pure aluminium or zinc for corrosion protection), they are very durable and hard wearing compared to many paint systems.

Dave Figgins, Managing Director of J Kirkaldy Limited, says: “Thermal spraying the Ross Swing Bridge was the most obvious solution as far as we were concerned. It has been proven time and again that it provides excellent, long term protection against corrosion, particularly for large, exposed steel structures. We are also very proud that we have managed to undertake a project such as this in the heart of winter 2009, one of the coldest we have had for many years. This is a huge advantage of the Metallisation Flame Spray process, as there is no drying or curing time needed. Due to the importance of completing this job on time, we have just ordered another MK73 pistol from Metallisation to ensure we can meet the strict deadlines and ensure no further disruption is caused to the local community.”

Established in the UK in 1922, Metallisation is synonymous with metal spraying to a diverse range of industries around the world. Metal spraying is a technology, which protects and greatly extends the life of a wide variety of structures, equipment and vessels, in the most hostile environments and in situations where protective surface coatings are vital for longevity. The variety of metallised coatings is vast, but can be broken down into two main categories. These include anti-corrosion and engineering coatings.

For more information call Stuart Milton, Sales and Marketing Manager on 01384 252 464 or visit www.metallisation.com