PRESS INFORMATION

Belzona Repairs and Protects Water Pumps at Historic Reservoir

Every day, the Queen Mary Reservoir holds 910,000,000 litres of water. The water is drawn in from an intake channel fed from the Thames, before it is turned into enough fresh water to supply one of the busiest cities of the world. After nearly a century of activity, and following several refurbishments to machinery and equipment throughout the years, the centrifugal pumping system was ready for another major upgrade.

Image 1- Pump casing before and after Belzona application

Background of the project

The pumps were originally commissioned in 1924 for the Metropolitan Water Board and were driven by uniflow steam engines. Since the Reservoir was officially opened in 1925 by King George V and Queen Mary, the machinery has been upgraded several times and the pumps are now driven by electric motors. Whilst the reservoir is situated in Littleton, a Saxon place name meaning ‘a small settlement’, the reservoir itself bears little comparison to its location’s namesake. Covering a water area of 723 acres and a circumference of roughly 4 miles, at the time of its completion the reservoir was the largest free-standing reservoir in the world and to this day continues to supply water to a large area of London as well as the surrounding counties.

Application situation

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After years of frequent use, certain areas of the pumping equipment were suffering from cavitation damage, which in turn was seriously hindering the efficiency of the pumping system. This needed to be promptly addressed and so a thorough inspection including a hydraulic profile was arranged.

Due to the physical size and weight of the top half of the pump casing, it was not practical to turn the casing over, therefore, the casing was mounted on blocks (supported by the crane for safety) and scanned from underneath. During this inspection, each casing was identified as having Substrate Corrosion To Rust Grade D. This is the highest level of corrosion grade on the scale, indicating severe rusting of the cast iron and pitting. (ISO-8501-1)

Image -2 Pump casing mounted on blocks

Image 3- Pump casing severely corroded

Once the hydraulic profile was completed and all the equipment had been scanned, it was decided that several refurbishment applications should be carried out on three of the pump volutes, totalling a surface area of 282m². Due to the extent of the damage (some areas of each volute exhibited up to 50% corrosion) complete metal repairs were prescribed followed by a protective coating. Rebuilding and protection were required to restore the heavily corroded cast iron substrate so the pump could continue to perform at its maximum efficiency. After inspecting the impellers, each of them consisting of a surface area of 44.5m², it was decided that once each had undergone a thorough cleaning, they could be put back into service.

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Image 4&5- Lower casing being scanned to capture hydraulic details

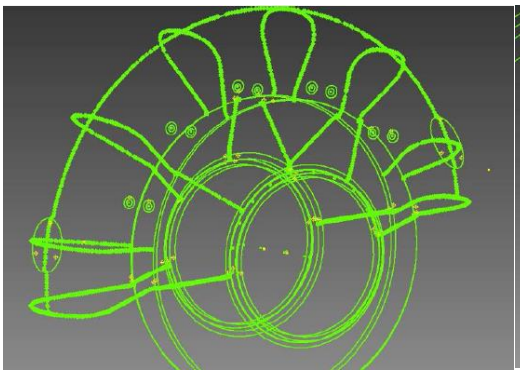
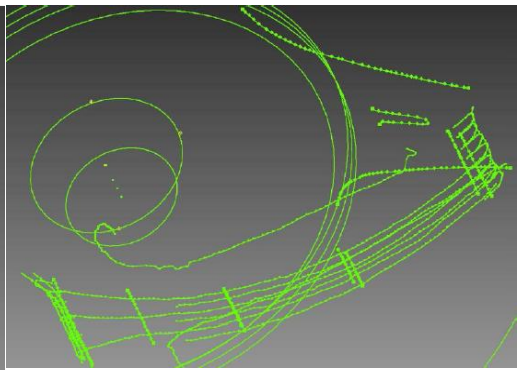

Image 6- Hydraulic profile of casing upper half Image 7- Hydraulic profile of impeller vane

Application method

Firstly, all machined faces were protected from the blasting process before Sponge Blasting equipment was used on the upper and lower casings. This was used to remove the previous coating, create a substrate cleanliness of at least SA 2 ½ and produce a surface profile of no less than 75µm. The application area was then vacuumed and examined to make sure it was dust free and all the blast media was removed.


Image 8- Pump casing prior to removal of existing coating Image 10- Sponge Blasting in progress

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Once the substrate had been tested for salt contamination, the application areas were masked out ready for the application of Belzona 1111 (Super Metal). Applied using a Belzona applicator, this material was used to rebuild the areas of undulation and pitting damage. A solvent free epoxy resin reinforced with silicon steel alloy, this repair composite provides robust corrosion resistance and will ensure the substrate will remain protected when it comes into contact with abrasive material.

Images 9&10- Substrate rebuilt with Belzona 1111

After Belzona 1111 had cured and within the two-hour coating window, the first coat of Belzona 1341 (Supermetalglide) in a grey colour was brush applied. This was followed by the second coat in blue to achieve a total dry film thickness of 400 microns. This coating was specified as it will provide long-term erosion and corrosion protection to the equipment and improve the efficiency of the pump. In fact, Belzona 1341 has been proven to increase efficiency by up to 7% on new equipment and up to 20% on refurbished equipment. It does this by using hydrophobic technology which repels process fluids and reduces the turbulent flow. Once cured, the coated surfaces were thoroughly checked over for any misses or pin holes.

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Image 11- Pump casing after Sponge Blast

Image 12- Completed application

Image13- Completed application

By using modern polymer technology, Belzona was able to restore the centrifugal pumping equipment and ensure the historic Queen Mary Reservoir was back to running as smoothly and efficiently as possible.

For more information visit: www.belzona.com
By-line: Chloe Hirst

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Notes to Editor;

About Belzona:

- Established in 1952, Belzona has pioneered innovative polymer technology that has revolutionised industrial repair and maintenance procedures.

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- Belzona is a leading company in the design and manufacture of polymer repair composites and industrial protective coatings for the repair, protection and improvement of machinery, equipment, buildings and structures.
- At Harrogate, the full Belzona product range is manufactured to stringent quality and environmental control guidelines complying with the requirements of ISO 9001:2008 and ISO 14001:2004.
- Belzona has over 140 Distributors in more than 120 countries ensuring not only the availability of Belzona materials, but also specification support, project management, application and supervision services. Distributorships and their teams are supported by Belzona Corporate offices in Europe, North America and Asia.

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- High resolution images, if not supplied with the email, are available on request.
- The article can be altered, lengthened or shortened upon request.
- Can we contribute to the article you are writing? We can provide images, technical data, case studies or an interview with one of our technical service representatives. Please let us know if this would be of interest.
- Do you have an upcoming topic that we could contribute an editorial on? Please let us know the topic, preferable length and the material submission deadline.

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