

EPOXY PUMP REPAIR

Belzona composite repair materials and protective coatings were used to repair and coat three pump volutes and impellers suffering cavitation and erosive wear.

Littleton Pumping Station supplies the adjacent Queen Mary Reservoir with water from the River Thames, near Weybridge, south-west of London. The reservoir and pumping station were constructed at the same time and remain fully operational today.

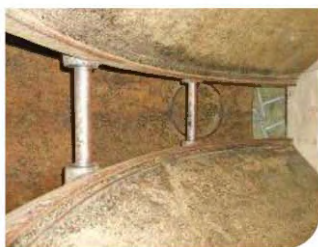
The pumping station is in two parts, with the largest building being the engine hall, and the boiler house adjoining to the rear (south).

The engine hall contains four horizontal 575kW uniflow steam engines close coupled to four centrifugal pumps. In a uniflow engine,

steam is admitted at both ends of the cylinder by poppet valves and exhausted from the middle, so that flow in each half of the cylinder is in only one direction.

Steam-powered pumping ceased in 1970 and three of the pumps were modified to be operated by large direct current electric motors driven through reduction gearboxes. The original mercury arc rectifiers have been replaced with solid-state rectifiers. The remaining steam engine is not used but has been preserved in serviceable condition.

Power for lighting and auxiliary functions



Top 3 pics: Sponge-Jet media was used to remove the previous coating and corrosion to leave a SA2.5 finish with a profile of 4mil (100 microns) for the application of Belzona materials

Bottom: Work on the project started in January 2014, with a pump being completed in each successive month

was supplied by two inverted vertical compound (enclosed) steam engines driving 25kW dynamos, which are also in the main hall. After electrification in 1970 one of the steam dynamo sets was preserved, though it is not useable.

In July 2013, a company was contracted to refurbish three pumps which supply the Queen Mary Reservoir. The project consisted of the coating of three pump volutes, as well a separate repair and protection for the impellers. The lower half of the volutes had to be coated in-situ as they were permanent fixtures, but the upper cases were moved to an area within the pump house where a temporary blast booth was created.

Work on the project started in January 2014, with a pump being completed in each successive month.

APPLICATION

The internal condition of the refurbished pump showed signs of wear on the cutwater, which is located in the discharge casing and directs the product discharge from the impeller into the discharge volute, but the coating was

generally in good condition. Visible signs of cavitation damage were also identified in certain areas of the volutes, which could be due to the age of the equipment and the environment in which they operate.

Sponge-Jet Low Dust Abrasive Blasting technology made it possible to prepare the

surface of the pumps in situ. The low dust properties of the system meant that by erecting simple containment (to capture the media for recycling) around the surrounding pumps, the equipment and building were not damaged or covered in dust, which may have happened if a conventional blasting system had been used. Silver 16 aluminium oxide Sponge-Jet media was used to remove the previous coating and corrosion to leave a SA2.5 finish with a profile of 4mil (100 microns) for the application of Belzona materials. The increase in visibility and worker safety also allowed the operators to safely climb inside the confined spaces of the pump to blast inaccessible areas.

Access to the suction sides is quite restrictive, so the preparation and coating was carried as far as could be reached. The upper cases of the pumps were removed and transported to a pump service centre and underwent a major refurbishment programme.

Due to the extent of the damage, the complete upper and lower casings were shotblasted and metal repairs completed using Belzona 1111 Super Metal to rebuild the damaged areas. The complete casing was then coated with Belzona 1341 Supermetalgilde. Due to the physical size and weight of the top half casing and the craneage available on site, it was not practical to turn the casing over; therefore, the casing was mounted on blocks (supported by the crane for safety.)

PERMANENT FIXTURES

The lower half of the volutes were coated in-situ as they are permanent fixtures. By applying Belzona solutions, the client improved the flow going through the pump. Unlike traditional repair solutions, which are risky and costly, Belzona's coating systems help their clients to solve many of the typical problems encountered by used pumps, thus maintaining/ improving pump performance as well as reducing power consumption costs without any health or safety issues. ■

SPONGE-JET LOW DUST ABRASIVE BLASTING TECHNOLOGY MADE IT POSSIBLE TO PREPARE THE SURFACE OF THE PUMPS IN SITU

