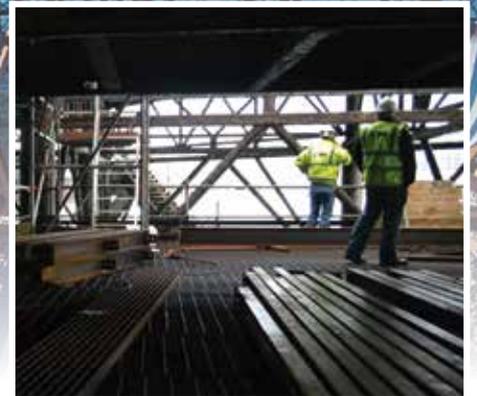


# Maintaining that holiday gem



Stanton Bonna's bespoke pile encasement rings provide strength and durability to help extend the life of Palace Pier.

Palace Pier, also known as Brighton Pier, has benefited from significant investment in the last 10 years - part of which came from a £14 million lottery fund to develop a sea front complex adjacent to the pier to help boost the Palace Pier's own footfall.

Further investment, into the ageing structure's renovation, was commissioned by the current owners Brighton Marine Palace Pier Company (owned by the Noble Organisation), to help ensure its future.

The 100 pier piles, which support the extension to the pier head and all the attractions on it, are made from steel and are suffering from corrosion.

The ICE Marine Board reports that in general steel piles now experience higher corrosion rates due to "Accelerated Low Water Corrosion" (ALWC) and state that "Although unclassified, varying rates of corrosion by ALWC up to 4mm/ side/year have been recently reported..."

Corrosion rates can be affected by environmental influences including higher temperatures, low pH levels, pollution and/or salt water currents.

Edwards Diving Services (EDS), an expert team of marine and civil engineers, was called in as the Principal Contractor.

They specified a system of precast concrete encasement rings to be used with a special

underwater grout to form a protective sleeve and help protect and secure the pile against continued ALWC as well as wearing caused by mobile sea bed debris and sediments.

EDS worked with Stanton Bonna to develop the design, manufacture and supply the precast concrete encasement rings and fixings.

Stanton Bonna's technical team provided expert input to update the design drawings to ensure the efficiency of the product manufacture and suitability for underwater installation by divers.

The size and buoyant weight of the product was carefully designed to ensure they could be managed by a dive team in the difficult marine environment beneath and around the pier.

#### PREPARATION

Prior to installation, a hole is dug a minimum of 0.5m deep in the chalk bed, with sufficient clearance to allow for the encasement ring and the grout bag to be put in place and filled.

The pile is prepared by scraping off the marine growth. Ultrasonic thickness readings of the pile are also taken at various positions for record purposes.

#### INSTALLATION

The encasements are lowered into the water using the workboat crane. They are attached to an air bag which suspends them in the water. The crane is released and then the encasements are towed, using a smaller work boat, to the pile to be repaired.

Once at the pile, chainblocks are attached to support the encasement weight and the air bag

is removed. The encasements are then lowered and manoeuvred in to the correct position using the chainblocks. The second half of the encasement is put into position using the same method. Once in place, the bolts are inserted and tightened up, effectively creating the circular concrete section around the pile.

The special grout bag is then installed around the base of the encasement and pumped with micro concrete - this bag is used to create a seal around the base of the encasement to prevent grout leakage and pollution later.

When the grout bag has cured, the encasement is pumped with specialist underwater grout, which displaces the water as the level rises. The underwater grout is then allowed to cure, and the pile repair is complete.

For safety and operational reasons the team had to exploit the best weather conditions so the skilled diving team worked both night and day during suitable weather windows. This flexible approach helped limit the impact on the Pier's day-to-day busy operations and general public usage.

Steve Richings from Edwards Diving Services commented, "Working with the team at Stanton Bonna enabled us to derive and successfully implement a solution which helped us overcome both the technical and logistical challenges that this project presented. The product quality was always well controlled and an organised just-in-time delivery schedule allowed us to make the best use of the limited space available."