FRANKHAM GROUP

Immingham Jetty Inspection

Frankham were appointed to carry out a structural inspection on a jetty on the River Humber

Client:
Associated Petroleum Terminals

Value:
£10m

Services:
Civil Engineering
Maritime Engineering

Start and End Dates:
October 2022 - December 2022

Overview

The jetty site falls under the upper tier COMAH regulations and is used for the import and export of petrochemical bulk liquids.

The jetty head was 106m long x 13.5m wide with mooring dolphins upriver and downriver. The deck is formed from in-situ reinforced concrete and bears on to steel tubular piles to form an exposed jetty construction. The fendering system was made up of timber piles on the shoreward, riverward and downriver sides of the jetty head.

In advance of the inspection works the following activities were completed to aid the effectiveness of the time spent on-site:

- A desktop site reconnaissance visits via satellite imagery.
- Preparation of base drawings of the marine assets (based on as-built drawings provided by the client).
- Review of existing data, as built and previous inspection records.

The timings of inspections were targeted to maximise the amount of time spent at periods of low and high tides where required. This provided the best opportunity for our inspection engineers to identify accelerated low water corrosion (ALWC).

The inspection was carried out in October 2022 where a condition report with recommended remedial repairs was issued to the client.

Challenges

The conditions on the River Humber were the biggest challenge. The Humber has a tidal range in excess of 6m.

Inspections were targeted during both low and high tides to ensure that the piles were inspected within shifts, with our dive team utilised for any below water inspections.

The challenging weather conditions also proved difficult. Our team members took safety precautions and came prepared with appropriate clothing to persevere through the conditions.

Innovation and Added Value

Part of the inspection was conducted from a workboat to inspect the jetty at both high and low tides where it extended into the river. A hovercraft was used to inspect the jetty on mudflats that otherwise would have been difficult and unsafe to access. Drones were also used to inspect areas that were difficult to access by vehicle or foot. The chosen methods of access were cost effective and/or safer than traditional rope access methods or accessing via foot on mudflats.

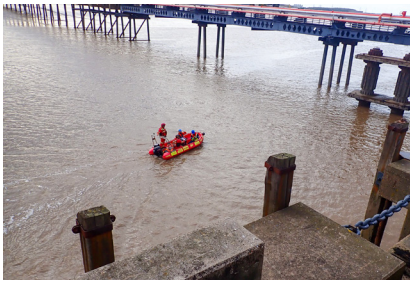
Ultrasonic thickness gauging techniques and tap testing were used to determine the condition and thickness of steel and concrete structural elements.

Sustainability

The inspection formed a vital part of asset management of the jetty. The inspection and subsequent condition report highlighted defects and recommended repairs to the jetty that would help extend its design life.

Extending the design life is a solution for a more sustainable approach to asset management. Since it prolongs the need for a more extensive refurbishment or demolition of the jetty, which could waste materials and contribute to the climate crisis.

ALWC example



Knowledge Sharing

Our engineers discovered accelerated low water corrosion (ALWC) or microbially influenced corrosion (MIC) on some steel piles during inspections. ALWC is a lesser known phenomenon which can cause catastrophic damage if left unchecked. Frankham takes the opportunity to raise awareness of this defect where we can.

ALWC is an aggressive form of corrosion caused by bacteria that can severely impact structural integrity of marine infrastructure. It can be found in unprotected areas of tidal waters and is typically found at the lowest astronomical tide level and below, hence the long-winded name.

1.5 mm loss of steel per annum has been recorded in some extreme cases which could prove to be catastrophic for structures that have thin walled steel such as sheet piled walls. However, 0.3-1mm per annum is considered typical, which is still a significant loss. Damage and loss of section is typically localised and will appear in discrete spots which can be plate repaired.

MIC is best identified by visual inspection; giveaway signs include bright orange corrosion over a black film material which if you scrape away will reveal shiny pitted steel beneath as pictured. Spotting these tell-tale signs can be difficult as they are sometimes obstructed by marine growth, so it's important to remove as much marine growth as possible during inspections.

Remedial strategies are driven by the extent of damage caused. Low damaged areas can be protected by cathodic protection systems or coating whereas highly damaged areas may require local plate repairs in addition to protection.