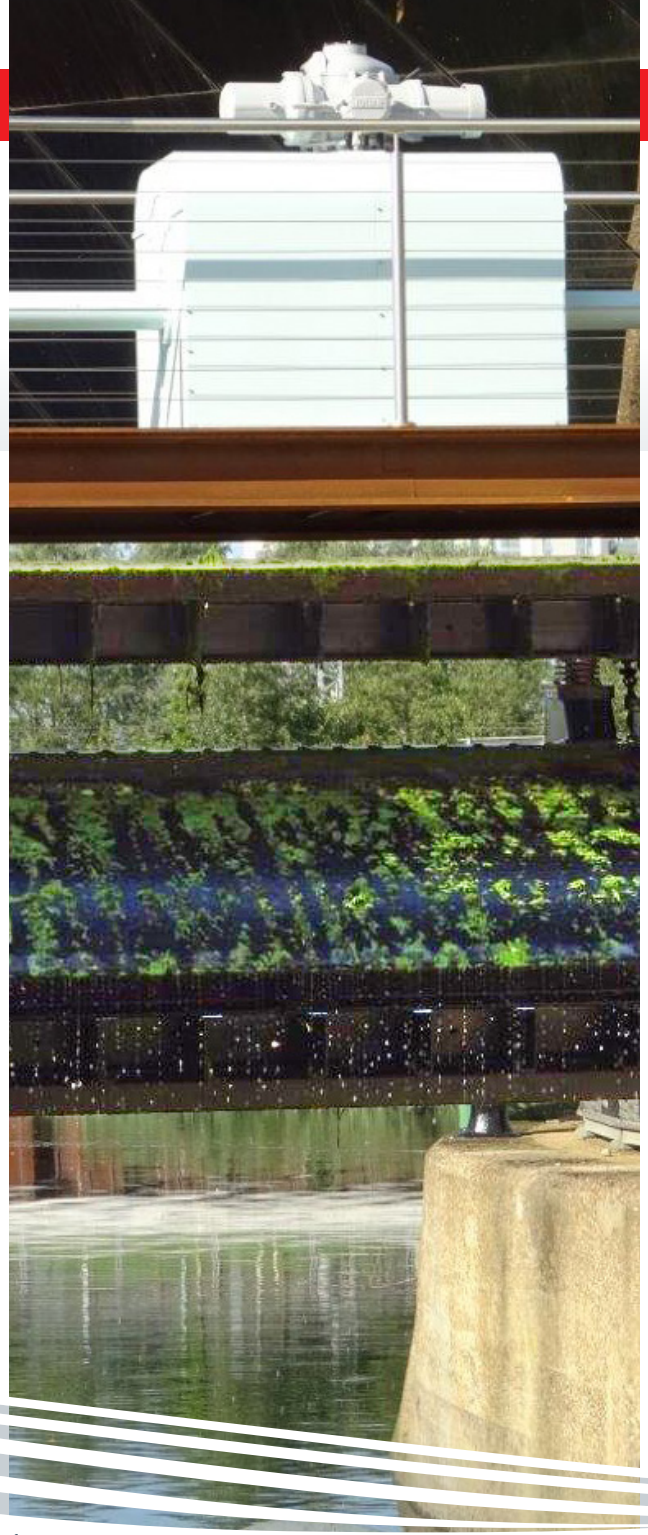

A bespoke solution for London's Carpenter's Lock

Industry: Environmental Protection
Client: Canal & River Trust, United Kingdom
Product: IQ3, MTW

Summary

As part of the Carpenter's Lock restoration project, Rotork provided a bespoke solution involving IQ electric actuators installed with MTW worm gearboxes and electromagnetic brakes. This enabled a solution which was both electric and capable of providing fail-safe functionality, meeting the requirements for safety and performance for this application.

Overview

Carpenter's Lock in London was constructed in 1934 and, at the time, was considered revolutionary. The giant radial gates allowed a lock keeper to regulate the flow of water from the Waterworks River to the City Mill channel and keep the water level on both sides below the danger point.

Unfortunately, in the late 1960s all further investments in the lock and its surrounding area were brought to an end due to a decrease in business-oriented canal use.

There was renewed interest and investment in the area in 2005 when the International Olympic Committee voted to hold the 2012 Olympics in London, not far from the location of the lock. Although the lock was not restored in time for those Olympic games, in 2017 the Canal & River Trust invested £1.9 million into restoring it to the modern day.

Challenge

This particular application required a solution which involved an electric actuator, but which was also able to provide fail-safe functionality. Without an intelligent electric solution, it would not have been possible for the actuator to accurately respond to data about the water levels, but without a fail-safe solution, the radial gates would pose a clear threat to the people in the boats passing below them.

Solution

In order to ensure that they could find the right solution for this problem, Rotork engineers came up with a bespoke design. This involved the installation of IQ range of intelligent electric actuators, along with MTW gearboxes which had been modified with the addition of a ROBA-STOP electromagnetic, spring-applied brake which was attached to the back of the gearbox.

When powered on the brake would be disengaged from the compressed internal springs, allowing the output shaft to turn, when powered off or if the actuator were to lose power, the springs would be released and the brake

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activated, meaning that the gate would not fall under any circumstances.

The holding brake was supplied with a removable manual override leaver option, that can be used to compress the spring and so disengage the brake, if required in the event of a power failure. It was attached to the input shaft of the MTW gearbox to ensure that the gearbox will not allow it to back drive on loss of power.

With this in place, there was now an electric actuator with a fail-safe solution installed at the Carpenter's Lock, meaning that the gates could be opened and closed when required, with no risk posed to the people passing through on canal boats, in the rare event that an error should occur.

Following the successful installation of the actuators and their gearboxes, the Carpenter's Lock has been able to reopen and has since become a popular tourist destination in London.

Rotork's IQ range of intelligent electric actuators monitor the actuator output position at all times, even without power and have a torque range of 10 to 3,000 Nm (7 to 2,200 lbf.ft) and when combined with an MTW range multi-turn worm gearbox, that torque range increases up to 162,000 Nm (119,000 lbf.ft).

Above: Carpenter's Lock, with IQ intelligent actuators and MTW multi-turn worm gearboxes installed.