

ABB pressure transmitters help Venice hold back the tide to prevent flooding



MoSE flood barrier uses ABB control system and 2600T series pressure transmitters to raise and lower the flap gates during high tides.

Background

The MoSE flood barrier project for Venice, Italy has recently become operational. The barriers temporarily separate the Venice lagoon from the sea during high tides and storms. Floods have caused damage since ancient times and have become ever more frequent and intense as a result of the combined effect of a rise in sea level and a drop in land level caused by natural and man-induced phenomena.

The barriers consist of rows of adjacent flap gates situated within three inlets to the lagoon. At normal sea levels the flap gates, filled with water as ballast, sit in heavy concrete foundations embedded in the seabed.

The flap gates are metal box-like structures about 66 feet (20 meters) wide for all rows. Their length varies between 61 and 95 feet (18.5 and 29 meters) and from 12 to 16 feet high (3.6 to 5 meters). Each connects to its concrete foundation with huge hinges that constrain the gates to the housing structures and allow them to raise and lower.

ABB's role

When tides rise to the point of expected flooding, an ABB control system pumps compressed air into the gates to expel the ballast water. The ends of the flap gates, hinged at the opposite sea end, rise to a level above the water surface.

The challenge

As the tide recedes the gates are allowed to fill with water again and lower into their concrete slots. The barriers can protect the lagoon from tides as high as 9.8 feet (3 meters) above normal.

The barrier consists of rows of 78 adjacent flap gates in four different inlet sections. The large Lido inlet has two rows of 21 and 20 flap gates linked by an artificial island. The Malamocco inlet has 19 gates and the Chioggia inlet has 18. The system can lift the gates in about 30 minutes and close them in about 15 minutes.



2600T series pressure transmitters are used to measure the pressure of compressed air and water in the flap gates to help control raising and lowering.

ABB's 2600T series pressure transmitters measure water and air pressure in flap gates to help control their position and block high tides.

ABB systems and sensors

ABB's Symphony® Plus distributed control system with the new HPC800 controller serves as the flood barrier's brain, automating and controlling the entire project. This system manages data signals from more than 50,000 devices that monitor the subsea and surface hardware and coordinate the electrical portion of the MoSE project.

Key devices monitored include 190 2600T series pressure transmitters from ABB's Measurement & Analytics business unit. Designed for subsea installation, the transmitters measure the absolute water and air pressures within the flap gates with a range of 1.5 to 90 psia (0.1 to 6 bar).

The pressures within the flap gates serve as an indication of their position during operation. At the low end of the range, the gates will be down and set in their concrete foundations. As compressed air enters the gates to drive out ballast water, the pressures will increase toward the higher end of the range, indicating when they rise to a position sufficient to block high sea tides.

Mounted within a protective bell, the transmitters communicate data with the control system via the Hart 5 protocol. ABB supplied the subsea protective bells for the transmitters in Alloy C276, complete with rotating flanges for installation within the gates. Subsea electrical connectors and cable from ABB complete the transmitter configurations.

A top quality transmitter family

Unrivalled in its expertise and longstanding tradition in transmitter manufacturing, ABB offers the world's most comprehensive range of pressure measurement products.

The 2600T family provides products specifically designed to meet the widest range of applications ranging from arduous conditions in offshore oil and gas to the laboratory environment of the pharmaceutical industry.

- New intuitive HMI for quick commissioning
- Reliable sensor technologies
- Easy to install and configure
- Multivariable version
- All-welded technology for diaphragm seals
- Best-in-class stability
- Wireless versions available

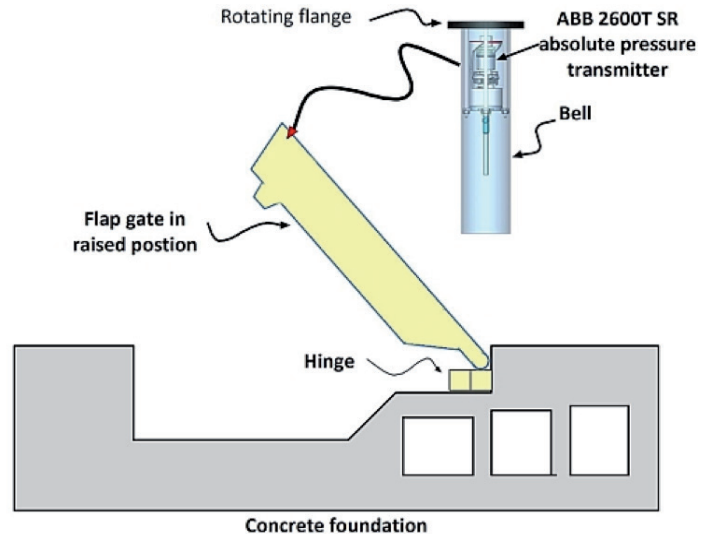


ABB control system drives out water ballast with compressed air to allow flap gate to rise from its own buoyancy. ABB 2600 T measures compressed air pressure to indicate when gate rises to level sufficient to block tide from lagoon.

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