

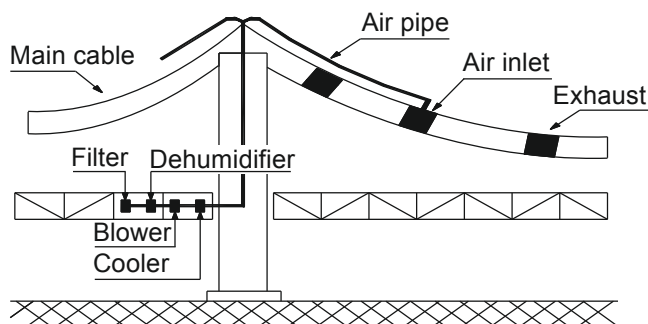
China's World-Famous Taizhou Bridge Uses HMT330 Humidity Transmitters to Extend Service Life

Taizhou Bridge, an important crossing on the Yangtze River in China, has been designed for a service life of 100 years. Almost three kilometers in length, the bridge is the world's longest three-tower, two-main-span suspension bridge. The bridge's lifelines – the non-replaceable main cables – are protected from erosion by a dehumidification system that relies on Vaisala's tried and tested HMT330 series humidity and temperature sensors for reliable data gathering.



Jiangsu Province Communications Planning and Design Institute Limited Company provides consulting services on a variety of construction projects. Their activities include planning, consultation, supervision, and project management for construction projects such as roads, bridges, tunnels, railways, ports, navigation locks, as well as industrial and civil building projects. The company is also involved in environmental, landscape, and intelligent transportation system projects. In 2007 it was solely responsible for the design and construction of the dehumidification system for the main cables of the Jiangsu Taizhou Yangtze River Bridge.

Taizhou Bridge, located between Taizhou, Zhenjiang, and Changzhou in Jiangsu province, is an important crossing on the Yangtze River and part of the province's highway network. In total the road covers approximately 62 kilometers including the river crossing, the main body of the bridge and the



corresponding approaches. The total cost of the project was RMB 9.37B (1B euro), with construction taking approximately five-and-a-half years. The design of the bridge takes account of the local environmental conditions it is exposed to. Energy efficiency was another important consideration during the design phase.

Protecting the Bridge's Lifelines

Designed for a service life of 100 years, the 2,490-meter suspension bridge consists of a main tower, anchors, saddles, main cable, slings, and carrier bars. The main cables are

one of the critical support elements in this bridge type. Known as the lifeline of the bridge, these cables are non-replaceable. Each consists of 169 strands, made up of 91 galvanized high-strength steel wires with a diameter of 5.2mm. The wires are prone to erosion due to continuous exposure to harsh conditions such as high winds and various other types of adverse weather. During their service life, the main cables are also exposed to vapors, rain, and etchant gas – all of which will, over time, reduce their strength. Without sufficient protection, the cables could eventually wear to a point that threatens the safe use of

the bridge. To address this issue, the Jiangsu Province Communications Planning and Design Institute Limited Company decided to install a dehumidification system for the main cables. The system prevents erosion, thereby extending the service life of the cables and the lifespan of the entire bridge. The installation of dehumidification systems as a solution to help protect cabling and extend operational life is a growing trend for suspension bridges.

Vaisala's Proven Technology Chosen for Its Excellent Performance

In the tendering stage, several suppliers were evaluated. In the end, Vaisala's HMT330 series humidity and temperature sensors proved to be superior thanks to their excellent performance. "We chose Vaisala HMT330 to monitor temperature and humidity conditions in the

bridge's main-cable dehumidification system because we pay attention to accuracy and stability, says Zhu Dongqing, Project Manager from the Jiangsu Province Communications Planning and Design Institute Limited Company. "Dehumidification is critical to the maintenance of the cables, so Vaisala's humidity and temperature sensors are critical part of the whole system. The risk is massive additional costs in the form of manual troubleshooting and maintenance." Thanks to the HMT330, the bridge's maintenance teams have real-time visibility of the condition of critical areas and can conduct analysis based on historical data to ensure science-based decision-making in the maintenance of the bridge's main cables.

"The 48 HMT330 humidity and temperature sensors installed function and monitor excellently" concludes Mr. Dongqing.



*"We chose Vaisala HMT330 to monitor temperature and humidity conditions in the bridge's main-cable dehumidification system because we pay attention to accuracy and stability," says **Zhu Dongqing**, Project Manager from the Jiangsu Province Communications Planning and Design Institute Limited Company.*

Challenge

- Taizhou Bridge is the world's longest three-tower, two-main-span suspension bridge.
- An accurate and stable humidity and temperature monitoring solution was required to monitor the dehumidification system of the bridge's critical main cables.
- As the cables are exposed to ambient air and all kinds of adverse conditions for long periods of time, reliable measurement was of critical importance.
- The measuring equipment also needed to be easy to operate and maintain.

Solution

- 48 Vaisala HMT330 series humidity and temperature transmitters were installed to monitor the bridge's dehumidification system.
- Temperature and humidity sensors are used in exhaust and aspiration vents, as well as the filter to monitor the temperature and humidity of the air entering the system. Temperature sensors are also installed in the coolers.
- Sensor data is collected in the master controller using a distributed two-level monitoring mode.
- HMT330 sensors perform accurately in harsh, corrosive outdoor environments, and feature an IP65 corrosion-resistant shell.
- The HMT330 has a minimum battery lifespan of 5 years, ensuring no loss of data, even in the event of a network or power failure.

Benefits

- Bridge maintenance managers can easily make a real-time check of the humidity and temperature conditions. They are also able to check alarms as well as access historical data of up to four years.
- The HMT330 transmitters contribute to a faultless dehumidification process, enabling science-based decision-making in the maintenance of the main cables. This improves stability and security, and contributes to longer service life.
- Manual troubleshooting and maintenance can be avoided, which helps to avoid massive additional costs.

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