

Jointly Awarded for Excellence in the Technical Development Category in the 8th Infrastructure Maintenance Awards from the Ministry of Land, Infrastructure, Transport and Tourism of Japan

Taiheiyo Cement Corporation (headquarters: Bunkyo-ku, Tokyo; President: Yoshifumi Taura) and Kyowa Concrete Industry Co., Ltd (headquarters: Sapporo-City, Hokkaido; President: Tadashi Kitamura) received a joint award for excellence in the technical development category in the 8th Infrastructure Maintenance Awards, sponsored by the Japanese Government, from the Ministry of Land, Infrastructure, Transport and Tourism, for their project for advanced river revetment repair and maintenance using Ductal Form and RFID Corrosion Environment Sensing System.

■ About the project

Concrete sheet piles of special embankments located in the lower reaches of the Abashiri River have been experiencing rapid concrete spalling and steel reinforcement corrosion due to brackish water conditions and contact with ice blocks. It has been urgently needed to provide appropriate repair and preventive work to them.

In this project, we have established an advanced maintenance technique by combining the Ductal Form® made of ultra high strength fiber reinforced concrete (UFC) and the RFID Corrosion Environment Sensing System, one of our RFID diagnosis technology for concrete structures “WIMO®”. Ductal Form is a thin-walled, embedded-type formwork with high strength and high durability and has advantages in construction period reduction and labor saving. The RFID Corrosion Environment Sensing System is used for monitoring to assess the integrity between the existing structures and Ductal Form as well as to detect internal reinforcement corrosion which can be caused by chloride penetration.

■ Advantages of the technique

The preventive work was applied to the concrete sheet piles for a total length of 5,000 m during the construction which was carried out from 2013 to 2021. The Ductal Forms used in the project were fabricated by Kyowa Concrete Industry, with the durability designed to provide a service life of 50 years to the revetments after the repair. The use of precast Ductal Forms resulted in a significant reduction in the labor required for transportation, assembly and other tasks in the revetment work under the very restricted conditions, which further led to a shortened construction period.

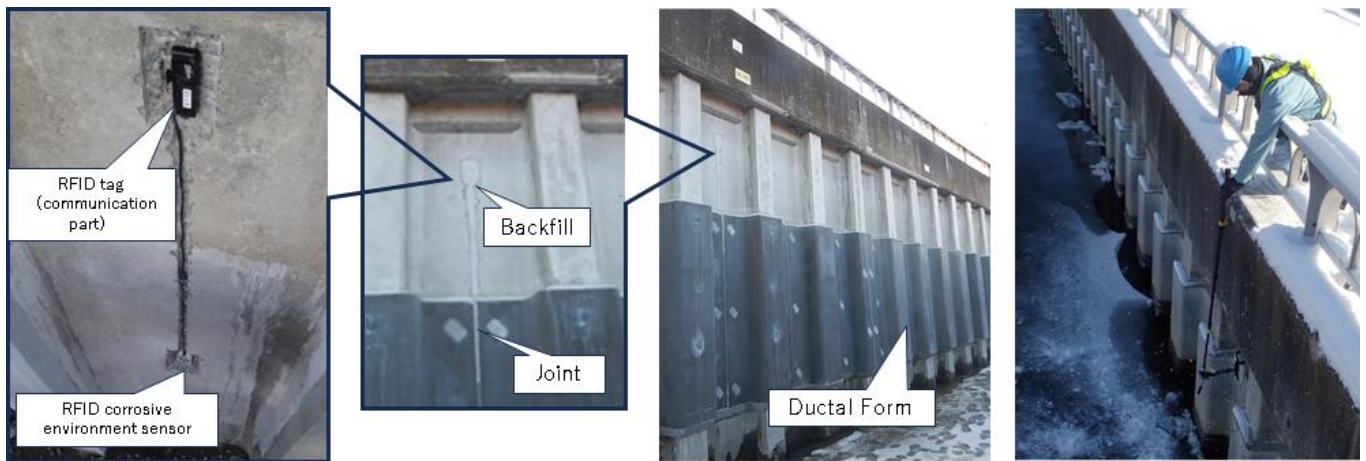
Up to about fifty RFID Corrosion Environment Sensors have been installed for the assessment of the integrity between the existing structures and the Ductal Forms, as well as for the preventive maintenance against internal reinforcement corrosion due to chloride penetration. We can carry out preventive maintenance management on the river revetments through monitoring of the invisible corrosion risk of the steel reinforcement embedded in the Ductal Forms, which also contributes to reducing the labor required for and improving the efficiency of inspection activities.

This technique can have a wide range of applications, not limited to river revetments under complex deterioration conditions including salt attack, freeze-thaw damage and impact abrasion by contact with ice blocks like those in this project. It will be very useful for repair and maintenance of many river and coastal structures located in severe environments.

Under Taiheiyo Cement Corporation's 26th Medium-Term Management Plan, the company plans to strengthen its efforts to cope with the severe disasters that have been occurring frequently in recent years. The company aims to further expand the use of this technique as an infrastructure maintenance technology that will greatly contribute to both preventive maintenance and post-disaster early recovery.

■ About the Infrastructure Maintenance Awards

The purpose of the Infrastructure Maintenance Awards is to honor and introduce outstanding Japanese domestic efforts and technological developments related to infrastructure maintenance for revitalization of the maintenance industry. The Awards have been held since 2016 and, in this 8th time, presented to 45 projects out of a total of 302 entries. The awards ceremony is scheduled to be held on January 27, 2025, at the Ministry of Land, Infrastructure, Transport and Tourism in Central Government Building No. 3.



From the left, the photos show the RFID corrosive environment sensor installed, a view after backfilling, a full view of the revetment after repair, and measurement made from the top of the revetment.

Note: Ductal Form and WIMO (standing for Wireless Monitoring System) are registered trademarks of Taiheiyo Cement Corporation.

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