Investigating old foundation in South Korea

The Susan Bridge crosses the Nak-Dong River in South Korea, connecting the cities of Mil-yang and Chang-won. The bridge foundation was constructed around 1945. Recently the South Korean government embarked on a dredging project on the Nak-Dong River, but found no records on the depth of the foundation. For this, Youngshin Consultant was commissioned to assess the situation. A few options were considered including boring the foundation, conducting a parallel seismic test and conducting a low strain dynamic test.

Despite the higher uncertainty of the low strain test compared with boring, that method of investigation was selected. The company attached the accelerometer to the exposed part of the foundation, and impacted it with a hand-held hammer (the hammer was instrumented with an accelerometer). Data from the accelerometer and the instrumented hammer were analysed using a Pile Integrity Tester and its associated analysis software PIT-W Professional.

The company tested four piers, analysed data on both time and frequency domains, and combined its findings with historical knowledge of the type of foundations typical in South Korea during the 1940s. It then estimated that the depth of the piers varied between 14 and 18 m.

The low strain dynamic test is traditionally associated with assessing the integrity of foundation, but believed to be able to reveal unknown depths under certain soil-foundation conditions. The findings should be corroborated by soil borings that could reveal if the depths are compatible with the geotechnical conditions of the site. ■

Above: A Pile Integrity Tester working at the Susan Bridge in South Korea.

Left: The Susan Bridge connects the cities of Mil-yang and Chang-won.

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