

Case Study

Structural Monitoring Tainan Railway Tainan County, Taiwan

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Background

When the Taiwan High Speed Rail was being constructed (for what was the world's fastest train at the time), planners knew that it would run approximately 345 km from Taipei to Kaohsiung, passing 14 major cities and counties and 77 townships and regions. One area of concern was its proximity to the Tainan Science-Based Industrial Park (TSIP), located in Tainan County, southern Taiwan. The TSIP was a new location for many vibration-sensitive high-tech factories.

Challenge

As a high-speed and high-capacity rail line, the THSR causes induced vibration as it passes next to infrastructures, buildings and residential areas. GeoTech Engineering Consultant Co., Ltd., a company who focuses on automated, remote and integrated geotechnical instrumentation monitoring systems as well as the development of corresponding database management software, was assigned by TSIP to mitigate the vibration caused by the THSR at the science park to ensure the high-tech factories would not be affected by passing trains.

Solution

The vibration mitigation project consisted of two specific measures:

- stiffening the elevated guideway structure foundations in TSIP with foundation-stiffening blocks (FSB) that structurally link the pilecaps of the pile-foundations together in the longitudinal direction of the THSR alignment, and
- constructing an underground wave-barrier-wall approximately 30 m to the west and parallel to the THSR alignment.

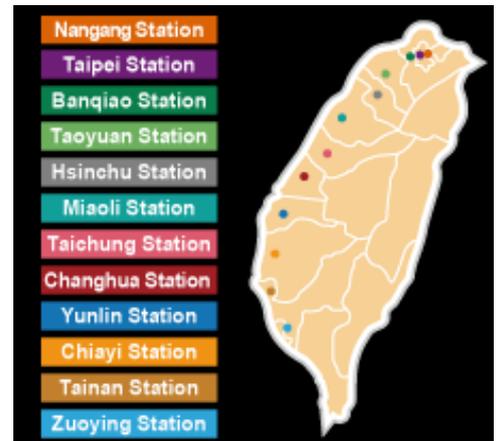
Since the THSR trains were not operational before vibration mitigation measures were constructed, there were no train-induced free-field ground vibration measurements to be used for comparison with the data obtained after mitigation. Therefore, two sites were required for ground vibration measurement -- Site A, in the mitigated section, and Site B, in the unmitigated section.

A total of 14 GeoSIG instrumented recording stations, all from VE-13 Triaxial Velocity Sensors, were deployed for Site A, as well as 14 instrumented recording stations for Site B, to measure the ground vibration. Other GeoSIG technology aiding the project included two CR-5 central recorders, integrated into LAN, data center 1000SP permanent data recording, and GeoDAS software.

The measures were successful, and the THSR boasts trains that are among the fastest in the world.



Taiwan's High-Speed 700T train, which travels at a maximum operating speed of 300 km/hr.



Planning the foundation-stiffening blocks and the underground wave-barrier-wall.



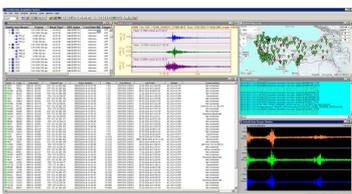
The Tainan Science-Based Industrial Park is located in Tainan County, southern Taiwan.



VE-13 sensors



CR-5



- Integrated into LAN
- Data Center 1000SP
- Permanent Data Recording
- GeoDAS

Product links

[VE-13 sensors](#)

[CR-5](#)

[GeoDAS](#)