

Wind Effect Monitoring System



System installed 1998 for Pell Frischmann Consultants on behalf of Railtrack.
Contract included dynamic live load monitoring (see application note B303)

The Tay Bridge is one of the longest rail crossings in the world. It was constructed approximately 120 years ago following the infamous collapse of the original bridge during high winds. The structure comprises a series of wrought iron trusses supported on riveted wrought iron and masonry piers.

STRAINSTALL were appointed by Pell Frischmann to devise a monitoring regime to measure the effects of wind loading on specific parts of the sub- and super-structure at the centre of the river channel. The sensors were also used as part of a dynamic load test of the structure (refer to Application Note B303). The installation required work under live railway conditions and roped access to IRATA standards.

The STRAINSTALL system comprises a PC based data acquisition system with 32 data channel capacity. Wind pressure sensors and strain gauges were installed at key positions on truss members, wind pressure sensors and inclinometers on piers with wind speed/ direction and temperature sensors.

The logging system was programmed to scan at 200Hz on each channel. Provided the windspeed was lower than a preset value (14ms^{-1}), readings were recorded once every 30 seconds to create a 'continuous' data record. When windspeed exceeded the trigger value, the system recorded at its full scan rate in order to capture dynamic responses. This included a pre-trigger period. Each trigger event is created in a unique data file, and trigger files for later analysis are chosen with reference to the continuous data record.

The system records data onto removable hard drives, which are swapped at weekly intervals by the Client and despatched to Strainstall for processing and reporting.

Strainstall's team of experienced engineers operate from offices in Cowes, Bath and Aberdeen (UK) and Tønsberg (Norway).



Strainstall

The monitoring system comprises:

- Spot welded shim mounted strain gauges
- Wind Pressure Sensors
- Inclinometers
- Anemometer (Wind Speed sensor used as trigger)
- Temperature Sensors
- PC based data acquisition system configured for unattended, selective dynamic data acquisition

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