

Managing noise and vibration during major pipeline diversion project at Erskine Bridge, Scotland

March 2019



Case Study Key Facts

- Scottish village of Old Kilpatrick sits under the Erskine Bridge on the banks of the River Clyde
- The bridge is a huge steel construction used by all types of vehicles
- The bridge crosses the Clyde, the Forth and Clyde Canal, and the North Clyde railway line
- Kilpatrick railway station is situated underneath the bridge
- This major pipeline replacement and diversion project, undertaken by J Murphy and sons, is currently underway

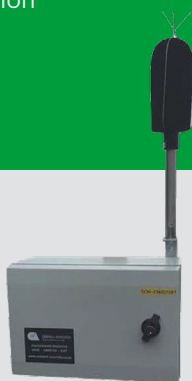
The village of Old Kilpatrick in West Dunbartonshire in Scotland sits under the Erskine Bridge on the banks of the River Clyde on the outskirts of Glasgow. Completed in 1971, the bridge is a steel, cable-stayed bridge used by all types of motor vehicles, cyclists and pedestrians. As well as crossing the Clyde, the bridge also crosses the Forth and Clyde Canal and the North Clyde railway line. A small part of Kilpatrick railway station is situated underneath the bridge at the north side. The bridge forms part of the A898 road and is set at a high level to allow the passage of shipping beneath.

The Glasgow Circular high-pressure gas main currently crosses the River Clyde suspended from the Erskine Bridge at Old Kirkpatrick. In a major project, the current pipeline is being replaced and diverted to an alternative crossing. Complex drilling and tunnelling techniques, including Horizontal Directional Drilling (HDD) and micro tunnelling, are being used to overcome challenges to install 1.9km of new pipeline beneath the river.

Ground conditions mean that the solution is not straightforward, with steep angles for the pipeline route dictated by the river bank geometry and existing buildings and structures. In addition to crossing beneath the river, the new pipeline will also pass beneath a canal, a railway and the carriageway of the A82.

The project, being undertaken by J Murphy and sons, is expected to be completed by the end of 2019.

- Project led by J Murphy and Sons
- Extensive and complex boring, drilling and tunnelling being undertaken
- Pipeline installation beneath a river, canal, railway and a major road
- Near to schools, churches, local businesses and residential properties
- Continual noise and vibration monitoring required
- Vibration monitors essential for assessment of sensitive environmental/ground conditions
- Noise monitoring necessary for managing impact of works on local homes, businesses and services
- RVT's Monitex Noise and Vibration Monitors were the ideal solution



Monitex Noise Monitor: Benefits

- Access data remotely
- Receive automatic SMS and/or email alerts
- Weather data can be integrated into the reporting
- Audio recording available
- 7-day battery life with continuous operation
- Demonstrated compliance with noise regulations

The challenge

The project that J Murphy and Sons was contracted to undertake was complex. The location of the new high-density, high-pressure gas pipeline being constructed and its route across a river, canal, major 'A' road, water main, and live railway tracks, as well as the rocky ground conditions and steep angles of the river bank, all combined to make conditions and logistics extremely challenging.

A wide range of high power, high precision Horizontal Directional Drilling, Auger Boring and Micro Tunnelling techniques were required to replace the existing pipeline with the new 1.9km 39 bar pipeline. Open-cut installation of the pipeline was also undertaken, involving trench excavation using noisy plant.



Monitex Noise Monitor in action at Bowling Harbour, Old Kilpatrick

The fact that the works were taking place in close proximity to schools, churches, local businesses and residential properties, also meant that the potential for noise pollution from these varied and intensive construction tasks was high.

As a result of all these factors, it was essential to monitor noise and vibration levels to ensure that sensitive areas of the environment were not disturbed and that concerns from local residents were alleviated.



Monitex Noise Monitor in action at St Patrick's Church under the Erskine Bridge



Monitex Vibration Monitor: Benefits

- Provides access to real-time vibration data online
- Designed for maximum ease-of-use
- Industry-leading 5-month battery life
- GPRS modem enables remote control of monitors
- Automatic alerts via text and email
- Web based application - no separate software required
- Samples vibration data according to a variety of standards
- Controls field instruments remotely via the internet

The Solution

RVT came to assess the situation, and subsequently recommended the installation of two Monitex Vibration Monitors, and a total of six Monitex Noise Monitors to be positioned around the most critical parts of the site. These state-of-the-art monitors provided the contractors with an accurate and continuous picture of the amount of noise and vibration being produced.

These innovative systems are designed for maximum ease-of-use, even in harsh outdoor conditions. The real-time readings they provided allowed site management to constantly assess the situation, and ensure that workers, the public and the local environment, were not impacted by the major works taking place throughout the project.

“We were very happy with the product and service”

SHESQ Advisor, Murphy



Monitex Noise Monitor in action at Boden Boo park, under the Erskine Bridge