



INNOVATION EDGE™: PROCESS FOR SAFE WORKING IN CLOSE PROXIMITY TO A LIVE RAILWAY

Main Image: Piling works adjacent to the North Kent Line railway at Crossrail Thames Tunnel C310 project

Devised by Hochtief Murphy Joint Venture, in close partnership with Network Rail, this process ensures that piling and diaphragm wall rigs can be used in close proximity to a live railway line.

Description

In order to enable works involving piling rigs, diaphragm wall rigs and other major plant to be undertaken in close proximity to a live railway line, Hochtief Murphy Joint Venture (HMJV) devised a process that enables work to be undertaken safely and without disrupting rail traffic.

A detailed working method is discussed and agreed with the relevant authorities. The working method is accompanied by regular and extensive staff briefings, detailed emergency procedures and regular auditing of the understanding of staff. Practical measures are embedded within the process to ensure the stability and safety of the machinery used on site.

This includes, for example, the construction of a platform to provide a stable base for machinery and limiting the slew of crane booms to prevent encroachment over the railway. It also includes provision of full time railway protection staff for close communication with crane operations.

This process is considered the benchmark for piling and heavy lifting operations adjacent to live railway.

The Benefits

- Enables plant such as cranes and diaphragm wall rigs to operate day or night in close proximity to live railway lines, without disrupting railway traffic.
- Enables the boom of cranes and similar equipment to temporarily slew towards the railway line.
- Saves time, resources and cost in comparison to alternative solutions (such as working within possessions, redesigning work locations, etc).

Application

This process was applied on the Crossrail Thames Tunnel C310 project for the construction of the Thames Tunnel, carried out by HMJV. The £260m project comprised twin-bored tunnels that were 3km long and 6.2m internal diameter, as well as, 1km of associated approach structures.

The process was adopted for the south wall of the Plumstead Portal, which was located less than 3m from the nearest rail of the North Kent Line.

The portal walls consist of part diaphragm, part secant pile, requiring the use of cranes, piling and diaphragm walling rigs. Without the process in place, this arrangement would not have complied with Network Rail requirements that prohibit activity less than 3m away from any live rail.

The track possessions of 2.5 hours midweek and 4.5 hours at the weekend were too limiting on the project, as foundation techniques required longer track possessions.

Had longer, more disruptive track possessions been negotiated, the portal wall works would have taken over a year. The process enabled the works to be undertaken in approximately eight months, resulting in significant time and cost savings.

End User Feedback

“Piling so close to the railway has never been done in the UK before. It took over eight months to develop a workable solution with Network Rail to enable piling to commence, as we were outside the standards.” –

Andreas Raedle, HMJV Technical and Risk

Manager for Crossrail C310 (New Civil Engineer, Issue 12.09.13)

“The negotiation and successful implementation of this derogation to the Network Rail standard was a very significant step. It was the first time that such a derogation had been attempted, and it showed that such a change in approach was achievable by agreement and in action on site.” – **Chris Parker, The Rail Engineer Technical Author** (The Rail Engineer, Issue 106)



Crossrail Thames Tunnel C310 project

Market Potential

The solution can be adapted and employed, with agreement from Network Rail on other projects where the use of plant such as cranes, piling rigs and diaphragm walling rigs is essential in close proximity to a live railway.

Learn More

For more information, please contact Murphy Marketing & Communications Department at communications@murphygroup.co.uk

You can also see [Mark Hansford's, NCE Interim Editor, 'Pressure Job' article on Crossrail Thames Tunnel C310](#) in the New Civil Engineer Issue of 12 September 2013 or [Chris Parker's 'Plumstead Portal Box Construction' piece](#) in The Rail Engineer Issue 106.

This is a brief description of the solution as we have applied it and should not be taken as exact. Its application must take into account the local environment and specific project requirements.

