

GRIFFITHS

civil engineering and construction



Rail Division Case Study **Swansea Station Platform 4**

At 260m, the extended Platform 4 at Swansea Station is a key component in a major £7.5m refurbishment of the station that will modernise facilities, improve the experience for passengers and will allow GWR's new Intercity Express Trains to arrive and depart from it. The technically challenging project was delivered by Griffiths.

The works to extend Platform 4 were complicated by the particular topography of the site, with the elevated platform sitting approximately 3m above the level of a service road which in turn is 5m above a public highway and was supported on a stone wall with inherent instability.

To make way for the new structure, the original elevated platform needed to be demolished. In total, Griffiths removed 2,400 tonnes of demolition waste from the site. The demolition waste was first separated onsite, with steel being taken to recycling centres in Swansea and Bridgend, while concrete was taken to the Alun Griffiths Ltd recycling centre in Llanelli.

To address risks during the demolition of the existing platform, Griffiths appointed a specialist demolition contractor to assist in the development of the methodology for this high-risk activity. It was identified that the most suitable method for demolition of the concrete parapet and concrete slabs was remotely controlled robotic Brokk machines. The use of these

meant that no person was positioned close to any leading edge during demolition works.

Remote control / robotic demolition is the ideal solution for work in confined or hazardous areas without the emission of harmful fumes. Robotic demolition is efficient, cost effective and powerful. It also eliminates hand-arm vibration problems and 'white finger' traditionally associated with manual work in confined spaces.

Working behind hoarding during normal working hours, the use of Brokk machines at Swansea Station ensured demolition works could progress safely in advance of the Platform 4 rail possession without disruption to the normal working of the platform for approximate three weeks.

Following demolition, the first phase of construction saw 71 concrete piles driven into the ground to form the foundations of the new platform. At the same time work started on the rebuilding of the two walls that run underneath the platform.

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Using 42 tonnes of steel, a new frame was put in place which support 179 concrete slabs to form the new platform surface. Piled foundations were installed to minimise loading to the upper retaining and riser walls allowing for vertical loads to be transferred through a fabricated steel portal frame structure into the piles.

Griffiths employed the innovative use of modular units for the new platform using polystyrene infill and precast and steel frame elements to reduce work onsite. This resulted in fewer journeys, saving on lorry movements and other materials such as concrete. Prefabrication also meant non-weather dependant production and higher quality finish, and reduced construction time and project costs by saving safety and construction supervision times as well as operating times and construction site logistics.

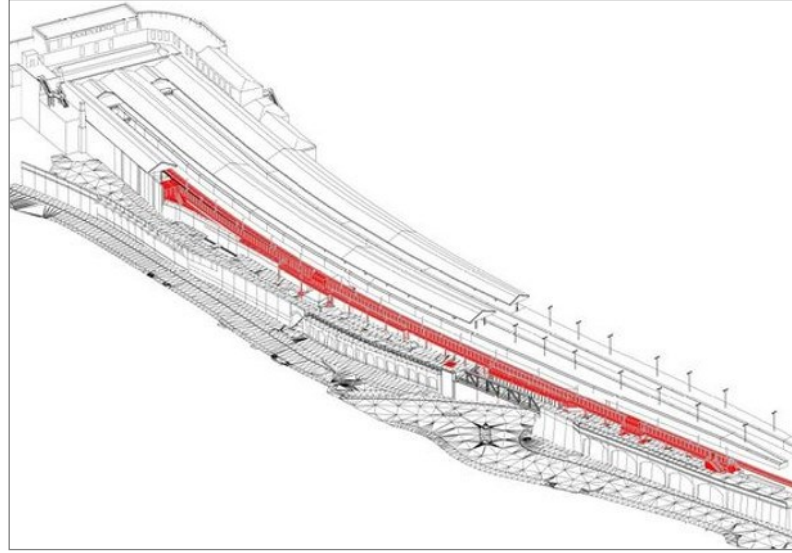
Finally, two waiting shelters, lighting and PA system were installed.

At Swansea Station Platform 4 the designed methodology minimised the 'on or near the line' activity and maximised high street environment activity, which is safer, more productive and more efficient. The ratio of 'on or near the line' work compared to high street environment was circa 15:85 on the scheme, thus reducing costs by circa 40% and improving programme by 50-65%.

'Safe by Design' principles were followed to ensure that buildability and Temporary Works / sequencing influenced the Permanent Works Design. As part of the Permanent Works Design the assessment of existing assets was included to provide a global understanding of how the design would be implemented.

The Project Management Team used the 'Rail Carbon Tool' to plan the delivery strategy for Swansea Station Platform 4 works.

In 2020, Griffiths registered the Swansea Railway Station Platform 4 Works with the Considerate Constructors Scheme. In March 2021 a score of 41/50 was achieved with Griffiths achieving 'excellent' in four categories and 'exceptional' for 'Care about Safety'. CCS Monitor Stuart James commented "Overall, the site is achieving an excellent standard, which was commendable considering the challenges presented by the current national and global crisis."



Pictured above:

TOP: The Swansea Station Platform 4 design showing the platform extension in red.

CENTRE: Pouring lightweight foam concrete as part of the work to rebuild Platform 4.

BOTTOM: 16 May 2021 saw the first service depart from the newly refurbished Platform 4.

Project details at a glance

Client: **Network Rail – IP Wales and Western**

Location: **Swansea**

Completed: **May 2021**

Value: **£4.4m**

Contract: **NR9 Design and Construct**