

# TUNNEL TRAVELLERS

Innovative moving formwork is helping to speed construction of High Speed 2's Cophall Tunnel in north west London.

**C**ophall Tunnel is one of five green tunnels being built along Phase 1 of High Speed 2 (HS2) between London and Birmingham. Situated between HS2's Northolt Tunnel and the Colne Valley Viaduct, the 880m long reinforced concrete Cophall Tunnel will blend into its natural surroundings, covered with trees and plants once construction is complete.

The project is being delivered by Skanska Costain Strabag Joint Venture, with Kilnbridge appointed to complete the reinforced concrete works. Making the tunnel a concrete reality has been possible with custom formwork travellers engineered by Peri's specialist infrastructure team.

As the travellers were expected to be in use over an 18 month period, the main drivers influencing their design were durability, productivity and sustainability.

To support the specified construction sequence, Peri's engineers designed two carriages which enabled the site team to cast the walls and roof slab simultaneously, ultimately accelerating the programme. These carriages comprised four units in total, two for the wall and two for the roof.

The carriages are designed to reduce material, manual labour and craneage as the main operations such as striking, positioning and travelling are completed hydraulically.

The wall forms are built from special modular steel panels. Each set is designed to build 20m long and 7.5m high walls.

The panels are suspended from a carriage which is designed using off-the-shelf components from Peri's Variokit range, with some specially fabricated connection parts. Variokit rails provided additional support for the formwork, reducing through ties to less than half the quantity required in a traditional panel system.

"We've been able to save around five

External view of the wall traveller



The wall traveller moves on wheel units and travels directly on the base slab, eliminating the need for rails



The design of the roof traveller accelerates construction and replaces standard falsework requirements

days per wall in comparison to traditional formwork systems, as we can complete installation and prepare the system for concreting in one day," says Kilnbridge project manager Teresa Martin.

The internal and external formwork on the wall carriages raise, lower and retract hydraulically, eliminating crane use and reducing labour requirements and cycle time by over 80%.

The roof carriage is built from a mix of special and standard components. In addition to fully supporting the rebar and concrete load, it features hydraulic cylinders which enable the traveller to be lowered, collapsed, pushed under the carriage in front

and repositioned to allow rebar fixing and pouring operations to be concurrent.

Peri senior sales engineer Dan Biggs says: "Special steel formwork was ideal for this project as the forms can be reused up to 30 times, so there is an obvious material saving advantage in addition to time savings, as panels do not need refacing, unlike a plywood faced system."

Following on from the installation of the roof traveller, the next steps will be progressing the tunnel so all three elements – base slab, tunnel walls and roof slab progress concurrently without conflicting. Tunnel construction is expected to be completed by February 2025.

PHOTOS: HS2 LTD