Providing Safe Working Conditions During the Patchway Tunnels Upgrade

February 2017

Key Facts

- The Patchway Tunnels are over 130 years' old
- Major work being carried out to upgrade it to an electrif ied system
- The objective of Network Rail: faster, greener, quieter electric trains
- Severn Tunnel closed for 6 weeks to install a solid conductor
- Separate single bore tunnels for east- and west-bound trains
- East-bound tunnel is the Great Western's 8th longest
- British Steel's 'Zinoco' corrosion resistant rails offer a 3-10 times life extension
- Four miles of solid conductor rail will be erected above each track
- Electrification of the London Paddington to Cardiff line is due for completion by 2019

Fun Facts

- 40 tonnes of soot were removed from the tunnel
- More than 8 miles of conductor rail was installed
- Over 250 engineers involved in the project

Protecting Site Workers from the Harmful Effects of Dust & Exhaust Fumes

Network Rail's £40 billion Railway Upgrade Plan is in full force across the country, with the goal of providing faster, more reliable, greener rail travel for its passengers.

One line benefitting from this upgrade is the Great Western main line (GWML) that connects South Wales to the British Capital. Electrification of this line is expected to see a major economic boost for the region due to improved accessibility.

However, to carry out the necessary Overhead Line Equipment (OLE) installation that enables the line to be electrified, it was necessary to close the South Wales Main Line for six weeks during September and October 2017, allowing the Orange Army to work 24/7 in the Severn Tunnel and adjacent 130-year-old Patchway Tunnels.

The Task of the Orange Army

As part of this electrification, the Patchway Tunnels needed their tracks lowering to make space for the overhead line equipment, which would allow sufficient clearance between the 25Kv wires and the trains themselves.

A job of this magnitude presented many challenges, not least the machinery being used, the dust and fumes being generated, and the environment in which the work was being carried out.

Key Benefits of RVT Solution

- The Ventex Centrifugal Fans are particularly suited to providing high volumes of ventilation through long duct runs due to the high pressure developed by the fan.
- Their unique design enabled adequate ventilation using the venturi method of tunnel ventilation. This proven methodology is highly effective and importantly keeps the ventilation fans away from the machinery entering and exiting the tunnel mouths - so 24/7 ventilation can be maintained at all times.
- 24/7 air quality monitoring of the tunnels was carried out by RVT to ensure safe working conditions were maintained at all times
- Spare ventilation and power equipment was available on site to be deployed quickly in the unlikely event of a generator or fan breakdown
- RVT supplied all equipment required to effectively ventilate the tunnels, including its power supply, assuring the client that their fresh air system was in safe hands

The RVT Solution

With the main hazard being the restricted space and lack of fresh air, the number one priority for RVT Group was to ensure that the health of the entire workforce was protected at all times.

This required an effective ventilation system. But getting the ventilation system in place was a challenge in itself. Working within a single-track tunnel means space is severely lacking, which makes even the simple tasks more time consuming. Key equipment needs to be shuttled in and out, and due to the limited space, machinery is unable to turn around normally, so reversing out is a frustrating necessity.

The system RVT provided had to take into account the limited space around the machinery, and the need to maintain constant access to both ends of the tunnel.

But overcoming challenges is something that RVT and all the teams involved did extraordinarily well.

As Project Manager Steve Eastment attests to,"The past few weeks have been challenging and exhausting to say the least but also rewarding. There were a number of issues that we had to overcome, most of which were out of our control, and we did exactly that! Not only did we deliver what was planned but we were also able to over deliver on Patchway Down Tunnel and were also able to open at 60mph compared to the planned 50mph on all three jobs."

"RVT were professional from the start to the end of this very challenging project. No matter what was requested of them, they responded quickly and safely, delivering to our every need. From the team on the ground to the team in the office, I fully recommend using RVT and look forward to working with them again in the future."

- Steve Eastment, Project Manager, Babcock International Group