

RailEngineer

by rail engineers for rail engineers

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ELECTRIFICATION – THE NET-ZERO IMPERATIVE

As the Government moves forward with its zero-carbon agenda, a rolling programme of electrification is now essential.

COLLIS HITS 50 NOT OUT

Derby-based multi-disciplinary contractor Collis Engineering celebrates 50 years in business and is still introducing innovative new products.

OVERCOMING THE OBSTACLE

Steventon Bridge was a seemingly insurmountable problem for Great Western electrification, until Atkins came up with a solution.

TECHNOLOGY
INNOVATION

SIGNALLING
TELECOMS

From to Awkward Straightforward



GRAHAME
TAYLOR

Rhomberg Sersa's in-line excavator comes out of the mines to sort out the Railway's 'difficult list'

Imagine, if you will, a single-track terminus platform. To one side is a platform surface with expensive block paving. On the other side is a high boundary wall. Above are the overhead electrified lines. Ahead are the buffer stops. Underneath is an elderly piece of track with truly filthy ballast laced with everything that can descend from a passenger coach. Below that, well out of sight, are the drains linking the smart platform facilities with the outside world.



Now imagine that you have the task of removing the said unsavoury ballast and replacing it with nice new clean ballast.

A straightforward job? Well, in that this is not a novel scenario dreamt up as a test for aspiring engineers, it is a straightforward job - although not necessarily pleasant or one that can be achieved efficiently or cleanly.

Dozers, dumpers and people

The conventional method would be to use a mixture of dozers, dumpers and 360° excavators - all of which will tramp up and down the narrow strip of way, and all of which are liable to nick the coping stones or to crush the hidden sewer. The work will need two or three machines, maybe more,

with their movements carefully checked by staff on the ground trying to minimise the inevitable damage.

For old hands this may seem very familiar. Not much is achieved in the limited possession apart from oil/grease/dust and other substances scattered on the otherwise pristine platform surface and a notice on the waiting room door that the toilets have now been closed until further notice.

Jobs like these are on the 'difficult' list. Perhaps the ballast will last just one more year until after retirement!

Other 'difficult list' contenders include renewals in single line tunnels, single lines with a narrow formation and island platforms.

From the mining industry

There is hope, however. Technology from the mining and quarry industry has come to the rescue, but it has taken some bold kit conversion for the transition from mine to rail.

A tunnel in a mine has all the same problems. That is, how is the spoil gathered up ahead and then discharged to the rear, all the time keeping both the materials and the machinery within the envelope of the tunnel? Tunnelling machines and mining machines have one thing in common. There is a conveyor belt taking the spoil through the machine and accessible to the means of excavation at the front.

The ITC has been used in mines all over the world. It, too, has a means of excavation at the front end of the machine and a conveyor belt that extends from front to rear. The bucket of the excavator portion at the front gathers up spoil and loads it into a scoop assembly that is joined to an integral conveyor belt. The analogy is the dustpan and brush.

Everything that is placed on the conveyor is then taken through the machine to appear at the rear where it can be onward handled away. In a mine, there would be another conveyor belt to take the spoil the long distance back to the materials handling facility. »





The conveyor at the rear of the ITC BL4 discharges into the MFS+.

Road/rail conversion

Rhomberg Sersa's solution, the ITC BL4, which is RIS 1530 compliant and Network Rail Product approved, is an inline ballast-excavator with a custom-fitted Rototilt R6 15-24 tonne tiltrotator at the end of its jib. Just like its mining counterpart, it moves forwards and backwards on a pair of caterpillar tracks, which give an element of steerage for fine positioning.

For a rail excavation site, this may seem fine, except that access to the site may not be possible for a solely tracked machine. This has been solved in large part by the mounting of road/rail equipment to the chassis of the ITC BL4. The transition from rail to "in the hole" dig is via RRAP (Road Rail Access Point), for which a lightweight TAMS (Track Access Matting System) is preferred.

The power for the rail wheels and braking is taken from the Deutz six-cylinder diesel engine and is all hydraulic. Thus, the ITC BL4 can travel both by rail and by caterpillar track.

All equipment in line

When the ITC BL4, running on its rail wheels, reaches the point at which the rails have been removed, the machine is able to lower its caterpillar tracks down to the ballast, lift itself off the rails and then walk itself towards the excavation area. Excavating ahead at rates of up to 100-150 cubic metres per hour, the spoil is discharged to the rear

and into an MFS+ machine that has also walked off the end of the available track. (The MFS+ machine was detailed in issue 182, Jan/Feb 2020).

When full, the MFS+ moves back to a rake of MFS wagons that are parked at the end of the available track and completes the discharge. The MFS+ has a 40 to 60-tonne load capacity and so the discharge quantities are by no means insignificant. With the discharge to the rake of MFS wagons complete, the MFS+ returns for further loading.

There are just two items of Machine Group plant on the site at one time, perhaps supported by a general-purpose dozer, all of which have low ground pressure tracks. Neither of them have any need to deviate from the envelope of the platform line and so can operate without damage to structures or services beside, overhead or beneath the formation. Any operatives that need to clear spoil from awkward niches are all within plain sight of the ITC operator.

The overall system is fitted with comprehensive task lighting and dust suppression.

Large and sturdy piece of kit

The logistics of getting an ITC BL4 to site are straightforward. Weighing in at just under 40 tonnes, it is road-borne for any long distances between sites. It is a large and sturdy piece of kit, especially when it is out of its native environment, having a nominal length of 18 metres and width of 2.23 metres, but it is still transportable without special loads notices. For maintenance and inspection, it does not need to be stabled on a rail site, which frees it from occupying valuable track space or from being trapped-in by other plant.

The ITC is not limited by distance when running on rail wheels, but it has to run under possession to its worksite - at speeds of up to 8mph. Once on its caterpillar tracks, it can progress at a stately 2.3 mph.

Unlike dedicated rail-mounted machinery, it is able to move itself out of the way once its task is complete. This removes the need for critical shunting operations, which can often be delayed in busy station layouts.

The Rhomberg Sersa System

The ITC BL4 is a key part of the Rhomberg Sersa system. Excavation (the ITC), then initial transportation of spoil (the MFS+), temporary storage (MFS wagons) and finally discharge (the UMH). It is this latter machine that Rail Engineer magazine will describe in the next issue.

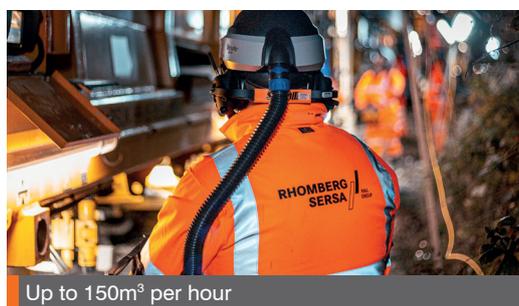
The 'difficult list' gets shorter. ●



// The Rhomberg Sersa Machine Group – a unique and specialist in-line excavation and re-ballasting system



High Capacity In-Line Road Rail Excavator



Up to 150m³ per hour



Continuous Output

// The Rhomberg Sersa Machine Group is a unique and specialist in-line excavation and re-ballasting system that represents a step-change in track renewals in the UK.

ITC BL4

- The ITC BL4 is used to rapidly excavate bottom ballast on S&C and plain line renewal projects.
- When combined with our MFS+ On Track machines and MFS 2000 wagons it can facilitate single bore tunnel and single line excavations with the future potential to be utilised for Adjacent Line Open operations.
- The ITC BL4 eliminates the traditional renewal requirements for a spoil wagon train on the adjacent line and multiple On Track Plant within the excavation.

For more information on this or any other system, please contact us using the information below.

Bringing innovation and engineering excellence to the rail sector

Rhomberg Sersa UK Ltd | T +44 (0)300 30 30 230
Unit 2 Sarah Court, Yorkshire Way, Armthorpe, Doncaster DN3 3FD
www.uk.rhomberg-sersa.com | enquiries@rsrg.com

