

POST OFFICE RAILWAY – RATHBONE PLACE

by Phil Elmer

The highlight of a recent trip to the newly opened Postal Museum in London was a ride in special passenger carrying trains in some of the former Post Office Railway tunnels. This kindled memories of my involvement in the construction of diversion tunnels 60 years ago. On the return coach journey for this U3A outing I gave a talk to fellow members of the party. This is my story ...

I actually worked on building some tunnels for the Post Office Railway but not the original as that would make me be about 120 years old! In 1957, having just finished at Uni as they now call it, with a degree in civil engineering, I got a job as a site engineer with John Mowlem & Co., the firm of contractors who built the original tunnels in about 1917.

In the early 1950s, due to increasing traffic congestion, the Post Office wanted to build a new sorting office in the west end of London. The location selected was just north of Oxford Street and to the west of Tottenham Court Road. Rathbone Place, as it was to be known, is a road running north from Oxford Street. This area had been heavily bombed during the Second World War and had been undeveloped since then. Here the railway passed under a corner of the site about 70ft below ground level. The solution adopted was to dig a very large hole about 200ft x 100ft x 70ft deep which would form the basis of a new station (rather like the Jubilee Line at Canary Wharf) with a sorting office built above it. Tunnels would then be excavated in either direction until they came alongside the existing tunnels. At each end of the contract, large tunnels as big as 23ft diameter would then be built around the new and existing tunnels to form a junction (called a step plate).

At times when the Post Office trains were not running, the existing tunnel was gradually dismantled and the tracks propped up on heavy timbers. On a special weekend, the old tracks were diverted and joined to the tracks that had been laid in the newly-built tunnels. This allowed the trains to pass through the new still being constructed Rathbone Place station and sorting office, and then back again on to the old tracks. In fact, the whole new set up was not operational until 1965, some seven years later.

Many of you will have travelled on the older section of the London Underground and if you have stopped in a tunnel you may have noticed its construction. The tunnel lining consists of cast iron rings about 2ft long. Each ring is made up of six or eight segments, or many more on a really large tunnel, and a small wedge-shaped member at the top. All the rings are bolted together to form a long tube (hence the name of the underground) a bit like baked bean cans with the ends cut off and laid end to end. The rings support the earth and buildings above and prevent subsidence.

The Victoria Line and the new Crossrail tunnels which you may have seen on recent TV programs use precast concrete rings and not cast iron. Nowadays, most tunnels under London are drilled by giant boring machines but these diversion tunnels for the Post Office Railway were built in 1957 using methods just like the original London tube tunnels – in reality they are just scaled down versions from 12 ft. down to 9 ft. diameter. They were dug by strong burly miners, as the men were called, using tools like a pneumatic hammer but with a small spade shaped tool on the end.

Most of the tunnels under London are far enough below the surface to be in the hard dark grey London clay. This is a bit like hard plasticine (not like sticky yellow garden clay) and will support itself for a while before the rings are installed. Many a miner has the odd finger or two missing from when trying to line up bolt holes with the next segment. After installing three or four rings, the small gap between them and the clay is filled with liquid cement called grout.

As to my involvement in the job, I arrived on the site in September 1957 and at that stage the huge hole in the ground, 200 x 100 x 70 ft., had been excavated and was heavily propped up to prevent the surrounding buildings from falling in. All we had to do now was to dig away merrily and find the existing tunnels. That was easier said than done! About 3-4 years prior to this, a firm of consulting engineers called Sir William Halcrow & Partners, who had been involved in the original 1917 tunnelling, were appointed to do the design for the project and the layout for the new tunnels. These had to thread their way through a labyrinth of Underground 'tube' tunnels, cable tunnels and sewers, both large and small. Much information was available on old plans of the existing works, but on a project of this magnitude an accurate survey of the line and levels of the existing Post Office tunnels had to be carried out. To understand the survey work you need to know a bit about a civil engineer's basic tools. A theodolite is an instrument mounted on top of a tripod and is basically a telescope sitting on top of a 360 degree

protractor (not like the small 180 degree ones you may have used at school). The field of view in the telescope has a thin black lined cross which indicates its centre point.

A survey is made up of a number of imaginary lines connecting a series of reference points which may be studs cemented into the pavement or centre punch marks on the frames of manhole covers, in fact anywhere that is well defined and is unlikely to move. The distances between all these reference points was measured very accurately and by setting up the theodolite at each point in turn, the angle between the imaginary line to the previous point and that on to the next point was measured. The survey went from the site, along Oxford Street and other roads to the next sorting office to the east, then down a lift shaft and into the existing tunnels. It all had to be done at the dead of night when there was little road traffic or pedestrians about and the Post Office trains were not operating and the power was switched off. The survey went along the running tunnels, passing under the site as far as the next sorting office and station to the west where it came up the lift shaft and hence back along Oxford Street returning to the site above ground. The position of the existing tunnel could then be calculated and the plans made for how the layout of the new tunnels would fit. Today, no doubt all these laborious calculations would be done using computers. Back in the 1950s, all this had to be done using log tables. These were not the four-figure one that you may have used at school but with seven figures to give sufficient accuracy.

When I came to the site, all the layout plans had been made and coordinated just like the National Grid references on OS maps. Setting Out is exactly the opposite to surveying, that is taking dimensions, angles and coordinates from the design drawings and translating them on to the ground or in this case underground. My job as the assistant Setting Out engineer was to provide reference marks that the work force could use to get the tunnel build in the right place.

My immediate boss was Mowlem's chief surveyor. He was a very nice Polish man who had learnt his trade as a navigator in bombers during the Second World War. We worked very well together devising many ways of doing things that are not shown in survey text books. In tunneling, all the reference marks were in the form of plumbobs hanging from the roof of the tunnel as these were less likely to get lost. Hacksaw cuts were made into the soft iron segments, then loops of strong cord inserted and secured by hammering the slot closed again. It was only practical to do setting out in the tunnels during the tea or meal breaks of the work force, or during the 30-minute break at change of shift at 07.00 and 19.00. Often, we had to take some measurements during the 10.00 break and then do a number of calculations in time to get in again at 12.30. The two of us used to do these calculations simultaneously and if we both arrived at the same answer it was reasonable to assume that they were correct. The tunnel environment was very hot, humid, dusty and noisy when all the pneumatic tools were in use. However, at one place when quiet, Central Line trains could be heard stopping and starting at Tottenham Court Road station only a few inches away. A 6 in drain from J. Lyons & Co's tea shop in Oxford Street was in the way and had to be rerouted into the large sewer alongside our tunnel. Survey instruments had to be kept in a locked-up box in the warmth of the tunnel to prevent them otherwise getting covered in condensation and wasting time while they warmed up.

Life was very hectic, as at times there were as many as four faces being worked together. It was, however, a great sense of achievement especially when two tunnels being driven towards each other met up as planned. In addition to the layout in plan, the levels of the tunnels also had to be considered. As is the case of the London Underground, the tunnels slope upwards when approaching a station and downwards when leaving. This helps with the braking and accelerating of the trains and conserves energy. Nowadays, tunnels are mostly dug using large boring machines all steered by computers and laser beams. In my day on this job, we did not even have electronic calculators! However, it has to be said that as there were no long lengths of the same size of tunnel, these machines, even if they had been available then, could not have been used on this job anyway. Another interesting fact was that where the new tracks passed over the existing near to the station, there was insufficient depth for a complete 9 ft. dia. ring. The problem was solved by excavating in headings, just large enough to get in and installing two large plate girders over the existing tunnels. Half of a 12 ft. dia. ring was then built on top of these. Also initially, both eastbound and westbound tracks ran across the north side of the station until a second diversion after all the tunnelling and track laying had been finished. One of these tunnels only 7 ft. diameter and carrying a single track was on quite a steep curve both horizontally and vertically. Because construction went very quickly here, new setting out was needed on a daily basis. I got very good at sighting through string lines! A considerable number of cables also had to be diverted on to new routes.

In conclusion I have to say that I learnt a lot about the technical side of setting out, site work in general, and how to get on with a very varied and sometimes cantankerous workforce who, being on piecework, just wanted to get on with the job. Although rather dirty I enjoyed the job immensely, and being good at maths, found it very challenging compared to working on say a rectangular office building. Some years later, Mowlem's found me an equally challenging job setting out the new elephant house at the London Zoo. It is shaped like a multi leaved clover and was very complicated and this time I was on my own – but that's another story!

EDITOR'S NOTES:

Once the railway had been diverted onto its new alignment and served the new station, the old tunnels were abandoned – for a while. When the new Greenbat Stock was entering service in the 1980-82 period, 18 of the old 1930-36 English Electric cars were put into store on the one remaining track of the disused tunnel. And that is where they stayed until work on Crossrail required them to be moved so the engineers could access the tunnel. All 18 trains were thus moved and stored at West Central District Office at High Holborn. This involved moving the 1980-82 Greenbat cars.



Above: Two (admittedly rather poor) views of 1930-36 trains stored in the abandoned tunnel at Rathbone Place.

Below: (Left) The westbound platform at Rathbone Place, during an inspection of the line in September 2007. This shows the spacious nature and box-shape of the station.

Below: (Right) The east end of the westbound platform at Rathbone Place, showing the platform track on the left and the through track on the right.



Overleaf: (Top Left) A line-up of some of the 1930-36 stored English Electric cars removed from the disused tunnel at Rathbone Place, in the westbound platform at West Central District Office at High Holborn.

Overleaf: (Top Right) One of the 1980-82 Greenbat cars that was stabled in the platforms at West Central District Office has been moved and stabled west of the station on the westbound line.

All photos: Brian Hardy

