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Building the Tyne and Wear Metro

The Tyne and Wear Metro is a light rail system with 78km of track and 60 stations, many of them interchanges with bus and other rail services to give an integrated public transport system.

It was conceived in 1971, opened in 1980 with the first phase completed in 1984. Two major extensions to Newcastle Airport and Sunderland have since been completed.

The Metro was the first comprehensive light rail system in the UK outside of London. Planning and building it is a fascinating story and its completion paved the way for other cities to follow.

The Original Metro

The Tyne and Wear Metro is a light railway rapid transit system and was initially built on 55km of track with 44 stations and 90 Metrocars serving parts of North Tyneside, Newcastle, Gateshead and South Tyneside. Detailed planning of Metro was started in 1971 as a core element of a planned integrated passenger transport system.

Construction of the original Metro commenced in 1974. A large part of it used the existing (then) British Rail line which ran in a circular loop from Central Station around eastern Newcastle and North Tyneside and the existing rail line from Newcastle to South Shields. New track was provided on those original lines, the existing stations were refurbished and new stations added.

The British Rail lines bypassed the centre of Newcastle and a fundamental change was achieved by tunnelling under the centre of Newcastle, across a new river bridge and under central Gateshead. This ran from Jesmond Station north of Newcastle to Gateshead Stadium Station. This gave passengers direct access to the shopping and commercial heart of Newcastle and Gateshead.

Significant tunnels were also provided from Chillingham Road Station to Byker Station and then through Manors Station to St James Station at the western end of the system.

The Metro lines ran parallel to the (then) British Rail lines on the Palmersville to Shiremoor section and from Gateshead Stadium eastwards. They were segregated and operated as separate systems. In one or two locations, flyovers were constructed to take the Metro under or over the railway line.

As well as tunnels, three major viaducts were constructed – the Queen Elizabeth II Metro Bridge over the Tyne, the 'S' shaped Byker viaduct over the Ouseburn in East Newcastle, and the Crossgate viaduct over land between Chichester and South Shields stations.

The overall cost came in at £284m, 75% of which was funded by a central Government grant. The country suffered a major financial crisis in 1976 and much Government spending was frozen, resulting in a strict review of costs and some changes to the proposals. For example it was originally intended to run three-car trains but this was reduced to two-car trains with savings on station costs. That and strong local political support kept the project on track.

Major interchanges which served Metro and bus services and provided significant car parking were built at Regent Centre, Gosforth, at Four Lane Ends in North Tyneside and at Heworth in Gateshead on the route to South Tyneside. Connections with significant bus services were also provided at Haymarket, Monument and Central Station stations in the centre of Newcastle, at Wallsend and Byker stations, at Gateshead, Jarrow, Chichester and South Shields stations. A further number of stations had a park and ride facility. Central Station also provided connections with the (then) British Rail network.

The intended purpose was to provide a system where travellers in Tyne and Wear would have an integrated service enabling them to travel anywhere in Tyne and Wear in a convenient and affordable manner.

Bus services were regulated at that time and very few were permitted to cross the River Tyne, but were directed to Gateshead and Newcastle stations where passengers were expected to change to Metro. Similarly many services from outlying areas were terminated at Four Lane Ends, Regent Centre and Gateshead stations for the same reason. Bus regulation was subsequently removed and many aspects of ‘forced’ interchange ceased to operate. The essence of an integrated system nevertheless remains and was expanded in later years.

Level crossings on the original Metro system were located at Kingston Park, Fawdon and Howdon. They are open crossings, having no barriers or gates, just traffic signs, flashing red light 'stop' signals and an audible alarm. This caused some debate at the time, with arguments they were unsafe and, early on, there were one or two incidents of cars colliding with Metro trains. However this quickly subsided as drivers became more familiar with the crossings.

The system runs entirely on a 1,500v DC power supply delivered through an overhead catenary wire system. The original 'Tyneside Electrics', opened in 1904, had run on a 'third rail' electric system, but was replaced by diesel trains in the 1960s, before Metro heralded a return to electric traction.

Civil engineering consultant Mott MacDonald designed the underground sections and Ove Arup two major re-alignments at Byker and South Shields. Mason Pittendrich designed the interchanges and other surface stations.

The first section opened to the public was from Tynemouth to Haymarket in August 1980. The public readily took to the system and there was the immediate success of high passenger numbers. Other sections opened in succession and Her Majesty the Queen formally opened the Metro in 1981, crossing the new bridge from Gateshead to Newcastle. Work continued on the other sections and the final phase of the initial 55km Metro was opened to South Shields in 1984.

Extending the Metro

There have been two extensions to the Metro. The first was to Newcastle International Airport in 1991. New stations were built at the airport and Callerton Parkway, which included a park and ride facility as the name suggests. On the opening day, 10,000 people used the Metro to visit the airport as the North East's newest tourist attraction. The airport had made a financial contribution to the extension of the Metro line, along with European funding, and it proved to be an important investment for attracting more airlines to the airport.

In 2002, the Queen, in her Golden Jubilee year, officially opened the Metro line through to Sunderland, so completing a long-held aspiration. The 18km extension to the network, from Pelaw in Gateshead through Sunderland city centre to the suburb of South Hylton, has carried more than 40 million passengers since 31 March 2002.

The £149m project involved unique engineering challenges. Around 13km of Network Rail heavy rail track from Pelaw to Sunderland was converted to Metro use by installing overhead power lines and some of the most advanced signal systems in the UK. Moreover, the line marked the first time in the UK that light and heavy rail (which have different operating standards) had shared the same tracks – a forerunner to modern trials with the tram-train concept.

The advanced train protection has also paid off as the shared route is busier than ever, being used by Northern regional services, Grand Central intercity from Sunderland to London, and for increasing heavy coal and other freight traffic from the Port of Tyne.

The new line included three level crossings in the East Boldon area which had existed on the Network Rail track.

At Fellgate Station, lift shafts were built without disturbing the 160-year-old railway embankment on the route of the original 1839 Brandling Junction Railway. St Peter's Station, north of the River Wear, was built without damaging the listed stone viaduct it sat upon. The challenge led to construction of an eye-catching glass building which has become one of the icons of the whole line.

A further 4.5km of line was built out to South Hylton using a disused railway route, which until then, was a cycle path. In total, 12 stations were added, including a major bus interchange at Park Lane and, at Sunderland, the only UK railway station that directly serves both light and heavy rail.

The success of the Metro cannot be overstated. It is a major transport provider in Tyne and Wear, used by thousands of commuters, shoppers and visitors every day. As a light railway it is very flexible, operating with frequencies not possible with traditional heavy rail. And while Metro may not have 'solved' road congestion, due mainly to car ownership in the region catching up with the rest of the country over the last 30 years, it is hard to imagine how worse our roads could have been without it. It is well used, well appreciated and an essential element of life in Tyne and Wear.

More information on the Metro and other Nexus services can be found on the website www.nexus.org.uk.

Thanks to Huw Lewis at Nexus, for preparing this article.

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