

CHANGES IN TRAIN MAINTENANCE ON THE LONDON UNDERGROUND

by Dr. Piers Connor

A report of the LURS meeting at All Souls Clubhouse on Tuesday 13 March 2018

Our speaker opened his presentation by explaining that his talk was based on a lecture he gave at a larger conference on 'Railway Work Then and Now' held at the National Archives on 26 September 2016.

The lecture opened with a 1908 version of the London Underground map showing the extent of 'tube lines' opening and the newly electrified Metropolitan and District Railways. In those days, rolling stock procurement was a rather different affair from what we see today. Originally, car bodies were ordered and delivered without equipment. Everything else was procured separately and most of it was fitted out in-house including electrical equipment, brakes, lighting, bogies and, sometimes, seating. Commissioning was also done in-house. This was the situation until the 1970s. From 1973 onwards, there was a move towards supplier equipped trains and performance specifications, where the suppliers took responsibility for delivering a working train, shifting the risks away from the client.

It was noted that doing it yourself had advantages, such as being able to design the trains to your own requirements. There was also a big benefit from the staff learning all about the equipment as they fitted it, making it easier in the long run when it came to fault finding and repairs. Disadvantages included the need for a lot of depot space and the necessity to recruit and retain in-house design and procurement people.

Today, in 2018, commissioning is done by the supplier with long, strictly regulated verification and client acceptance processes that usually take over a year – in 1938 it took six weeks. What hasn't changed very much is the need for a range of modifications, which can be due to poor specification, ignorance of operational requirements or experiences in testing. There are also a number of issues related to political interference (e.g. lack of power sockets on Class 700s and bad seating design on a range of trains).

Photos were shown of several of the different types of rolling stock procured over the years, starting with the Central London Railway electric locomotives built in the USA and then dismantled for shipping to the UK, and reassembled at Wood Lane Depot in 1899-1900. The first locomotive was found to be too big for the tunnel so its height was adjusted by removing the axlebox springs and by fitting shallower running rails on the whole route. This made for a poor ride and greater wear and tear, so it was decided to scrap the whole fleet of locomotives and replace them with new cars. These were used for many years from 1903 to the 1960s using the original motors and bogies throughout their lives.

Many lessons were learned about what did and did not work. In the case of door operation, for example, air worked doors originally provided on the District Line would slam shut catching the long skirts of women's dresses or injuring passengers. As a result, the system was abandoned after only three years and converted to hand-worked doors.

A number of slides were shown of new stock being prepared for service in Neasden in 1907, Ruislip in 1960 and Neasden again in 2010.

The next part of the presentation provided a comparison of train maintenance in 1907 and 2017. Originally rolling stock was owned and maintained by the operator and the type of equipment used required much more frequent checks. Today almost all the rolling stock is owned by one party, leased to a second (train operating company or TOC) and maintained by the operator or a third party with maintenance inspections required at increasingly longer intervals. On LU it is mostly maintained in house.

Some more slides showed maintenance at various times and in different depots. In 1908, there was a daily clean, check and test of safety devices, a traction control test, and look at lamps, doors and defect correction. Examination was three-daily, including brake blocks & rigging, collector shoes, axlebox lubrication and defects. Inspection was 3-4 weekly where they opened up equipment cases and did cleaning and testing and replacement where required. Lifting was only done when necessary for worn wheels, motor defects, suspension issues and repairing bogie frames. Programmed lifting was only introduced gradually from the mid-1950s. Overhaul was 2-3 yearly, largely because of the life of the paint and seats were done 6 yearly.

Originally, trains were made up of individual cars and could be anything from one to ten cars long with motor cars and trailers on different maintenance cycles. Trains had to be reformed on a daily basis – a five stage process that had to be done correctly and in the correct order – quite labour intensive. The ‘handing’ of hoses and jumpers on tube cars meant that they could only be coupled up one way round, so they were labelled to ensure they were presented the right way round. Eventually progress was made towards unit train formations i.e. groups of cars semi-permanently connected together with auto-coupling between units.

Modern train maintenance as now moved on so that, although the daily inspection is still carried out, most of it involves checking a computer screen. Much real-time information is transmitted from the train in service to the maintenance control centre where action to be taken when the train returns to Depot is recorded. Examination is now three-weekly or more; Inspection 3-monthly; Lifting 3-4 yearly and overhauls are at 9, 18, & 27 years. The 18-year overhaul is at half-life and the expectation is that the train will have its interior stripped and its structure repaired where required and updated facilities provided. In some cases, there will be a renewal of traction equipment or on-board control systems.

More and more now, train maintenance will be based on real-time condition monitoring, wi-fi transmission of data to maintenance controllers and interventions only when necessary. Despite this there will always be a need for regular visual inspections of one form or another and regular changes of some equipment items to ensure reliability.

The evening ended with a vote of thanks to Piers for an interesting insight into train maintenance on the Underground over many years.