

# A NEW GENERATION OF STANDARD TUBE STOCK

by John Hawkins

Complaints were made by LU that the PPP companies were meeting their contract terms by introducing larger conventional trains using greater power and braking more heavily, causing more tunnel heating and carbon pollution, but these were low risk strategies for the companies concerned. It was not until the collapse of Metronet that LU were able to revise their plans for the Spacetrain, originally intended as the Victoria Line replacement stock, to be used for the next line upgrade on the Bakerloo. It was soon revealed that the same design would also be used to replace the Central Line stock, so leading to efficiencies in design and procurement, rather than persisting with individual designs for each line. It seems odd that the 1972 Tube Stock and 1992 Tube Stocks will be replaced consecutively, although the latter stock seems to have built a reputation for unreliability. It actually operates with only 8% spare trains under the current timetable, half that of the Northern and Jubilee lines. 1992 Tube Stock will be the first of the modern stocks replaced under the PPP contracts, which were based on a 30-year lifespan for rolling stock and signalling. The two are closely related, upgrades to either being dependent on the other to improve the service, and modern signalling being partly train-based. Also modern electronics systems do not have the life-span of conventional equipment, with replacement parts becoming difficult to source with time.

More recently, Tube Lines has also been reincorporated into LU, and its plans for new Piccadilly Line rolling stock by 2014 have been put on hold. The planned resignalling of the line by Thales would have been delayed due to their late start on the Northern Line, awaiting completion of the initial installation on the Jubilee. This is now to be part of the sub-surface lines resignalling contract, since it interworks with those lines. It has recently been announced that the new articulated tube stock will first appear on the Piccadilly Line, and that it will also provide the additional trains required for the Northern Line Upgrade 2. If the Battersea extension of that line is constructed as planned, even more additional trains will be required, although both Northern Line schemes are currently scheduled before the first production train is expected in 2018.

This looks like an order of some 240 trains, more than half the tube stock fleet, with only the length varying for the Central Line. This is larger than the Metronet order for 238 trains of 2009 Tube Stock and S Stock, which was claimed to be the biggest single order for rolling stock in the history of Britain's railways. It dwarfs the former Standard Stock and 1938 Tube Stock fleets. Who would have thought that LU was soon to order a fleet larger than the 191 S Stock trains? At a delivery rate of three a month, this could take from 2018 to 2024.

Of course, this all depends on the prototype proving satisfactory when delivered in 2015. But this appears to be a maturing technology, springing from the Spacetrain concept of late last century, but having overcome its problems of cramped bogie design. Computer-aided design now permits much more to be developed and tested before a train reaches the track, unlike the earlier work on 1972/73 Tube Stocks, which were originally envisaged as articulated stock. A couple of 1935 Tube Stock driving motors were even adapted at Acton Works to trial the concept. It will be strange that articulation finally appears as the replacement for the 1972/73 Tube Stocks.

Artists' impressions of the new train show a bogie under only one end of each car, although there must be a car in the middle of the train with a bogie at each end. On the car body beside the bogie position, the conventional single doorway has been replaced by a gangway connection to the adjoining car, which then commences just before the first double-doorway. There will be no congested single doorways. The distance between the bogie centre-pin and the pivot point at the other end of the car is similar to current bogie spacing, leaving the familiar gap at curved platforms. A couple of extra cars will be required to match the length of current stock, and a 10% growth in capacity is envisaged. With no doorway possible over the bogie, whose wheels must be concealed under longitudinal seats in the conventional way, the doors are spaced unevenly down the train.

Each car has two doorways on each side, which results in even passenger loadings at each one, although they alternately receive heavier loadings from the left and right along the train.

With 19 new trains for the Northern Line Upgrade 2 being delivered immediately after the current resignalling, the same ATO will certainly be fitted as on the 1995 Tube Stock. Running alongside 106 trains of the Northern Line fleet, stock training will be doubled for operating and maintenance staff, although perhaps the new stock could be confined to the High Barnet – Bank – Morden route where demand is highest, avoiding the training of staff on the Edgware – Charing Cross – Kennington route. They would still only provide around a quarter of the service on this longer route. But how long will this inefficiency be allowed to continue? A few years back, additional trains for the Northern Line would probably have seen a new fleet, with the 1995 Tube Stock transferred to the Piccadilly Line to eliminate 1973 Tube Stock. However, modifications for a different signalling system may be required, and with only an economic 30 year life span, the 1995 Tube Stock may be due for replacement from 2025 anyway. A qualification to this may be that the 30 year life is based on concurrent replacement of trains and signalling, whilst both the Northern and Piccadilly Line resignalling has yet to be commissioned. This will not reach its 30th anniversary until the trains are well past their 40th, and they would require all their electronic systems to be replaced long before then. Honestly, who uses electronic systems for even thirty years? Who still uses a computer, mobile phone or music system from 1980?

Once Northern Line passengers experience the new, more spacious and air-conditioned trains, they can be expected to push for the current trains to be replaced. And with expected 30% energy savings from the lightweight new trains, a cost that will only continue to grow, and reduced training costs from an homogeneous fleet, an economic case could well be made to avoid rewiring the 1995 Tube Stock. On top of this, the Northern Line fleet was not purchased by LU, but only leased for 25 years on a PPF deal, after which a decision must be made as to its future. This could result in a further order for 106 new trains, delivered 2024-27 which would also operate on the expected Thales signalling system, which might need renewal midway through the new stock's life.

As the new trains become more widespread on the system, passenger pressure will probably arise for them to replace all trains. The case on the Jubilee Line will be harder to justify, with its uniform rolling stock and platform edge doors at extension stations requiring modification. In fact, these doors would prevent a mixed fleet being operated on the extension during a change-over period, requiring storage of new trains until a blockade conversion of some sort. The 1996 Tube Stock will be half-way through its economic life before the new signalling is fully commissioned, so again it will need to be rewired to extend its life into its 40s. It could prove more economic to order new trains with all of their advantages in 2028/29. The TfL masters could also see political advantage in addressing climate change by cutting energy consumption, and resultant tunnel heating, and providing additional capacity.

This would leave only the 2009 Tube Stock energy-guzzlers on the Victoria Line, which would be past the middle of their design life by 2030 and due for refurbishment. I cannot see air conditioning being used on this totally deep-level line, with limited air exchange to expel extracted heat. The case would probably rest on the political advantages, although elimination of a small minority fleet would have some economic value. A similar situation would apply to the Waterloo & City Line, if you thought it had been overlooked, although air conditioning might work at the Waterloo end of the line.

And then there is the S Stock, already offering through gangways, air conditioning and double-doorways throughout. Would a surface stock version of the new train still provide 30% power savings? S Stock car bodies should have a 50 year life like their A Stock predecessors, but both signalling and train electronic systems will require renewal at the half-way mark. I hope I am around to see what transpires!