

DISTRICT ELECTRIC TRAINS

23 – R FOR RECOVERY

by Piers Connor

LOOKING FORWARD

In March 1942, the Second World War had been in progress for two and a half years and, in spite of a welcome reduction in the level of bombing at home, things were not going well for the Allies abroad. In the east, Singapore had been lost to the Japanese in the February and they overran Manila, the capital of the Philippines shortly after – the British were evacuating their residents and troops from Rangoon, Burma in the face of a Japanese assault and an Allied fleet had been defeated in the Battle of the Java Sea, allowing the military isolation of large parts of Indonesia. In Europe, the Germans began activating their plans to send thousands of Jews to Auschwitz and, on the naval front, they moved their battleship Tripitz into Norwegian waters in order to threaten British shipping. In the meantime, British and Canadian troops conducted a disastrous raid on the French seaport of St. Nazaire, suffering significant losses of men and ships without managing to damage the German submarine pens they were targeting. At home, however, apparently unhindered by the slightest vision of defeat or, more probably, determined to carry on despite the gravity of the military position, a series of meetings was being held at Acton Works to establish programmes for the replacement of rolling stock at the end of the war. At an early meeting, it was decided that new stock "... should be ordered as soon as the end of the hostilities was in view ...". They, somewhat ambitiously, wanted to order new trains before the war had ended. It was intended to replace the 90 cars of Circle Stock and the District's "BTH Stock" – the C, D and E cars of 1910-13.

The plan for the District envisaged the replacement of the remaining 107 old C, D and E cars and the purchase of 24 extra cars to work the East London Line service. At this time, the normal services on the District were reduced because of the war, so the East London service was covered by spare trains from the District plus a 3-car Metropolitan train¹. The resumption of normal services at the end of the war would need the extra cars, hence the expected order for 107 replacement cars and 24 new cars, to give a total of 131 cars.

For a long while, little progress was made but, by early 1944, after two hard years of fighting on several fronts, the tide of the conflict had turned for the Allies and, such was the optimism that the end of the war was in sight, plans for the resumption of rolling stock replacement were revived. As part of the preparations, a number of on-train experiments were initiated. The first of these was mentioned in May 1944, when certain material was prepared for sending to Gloucester, who were to build 4 experimental bogies "for new surface stock". The bogies were built relatively quickly and they appeared in July 1944 on P Stock unit 13268-14239. They lasted in service until November 1949, when they were removed and replaced by standard bogies. We can take it from this trial that there was little faith in the latest bogie design already in use under the O, P & Q Stocks. It was only eight years old but it was already being ditched for something that they hoped would be better.

A door experiment was started in October 1944, when one double door set was converted to hand opening and power closing on a DR 1931 motor car. This was after the fashion of the Paris Métro, where the passengers were expected to open the doors themselves after they had been released by the guard. It isn't known if the car entered service with this equipment but, despite its success in Paris, it was obviously not considered workable in London as it disappeared very quickly.

Another experiment tried out at this time was the mounting of a KLL6 type compressor on P Stock car 14215. This compressor was a larger version of the KLL4 rotary compressor used on the P Stock and on the 1938 Tube Stock. There was only one of them and it had previously been used experimentally on the Piccadilly Line's Aldwych shuttle car. With the lack of any other information, I can only assume that this trial was intended to see if a larger version of the KLL4 would perform any better than the standard one. Obviously it didn't, as no more were ordered.

¹ This train comprised the two 1925-built motor cars, which were the prototypes for the 1927 order and a driving trailer built in 1923 for display at the Wembley exhibition of 1924-25.

Then there was the vexed question of speedometers. They were apparently provided originally on some 40 or so O and P Stock cars but surviving records are not clear. Some of them occasionally worked but they were generally unreliable. They were driven by studs on the wheel spokes passing through a magnetic counter which caused electric signals to be generated according to the speed of the wheels, the signal giving a deflection on a speedometer dial in the cab. Eventually, maintenance on them ceased and they were left to their own devices. They were all blanked off by late 1957. In an attempt to find a more reliable system, a trial liquid-type speedometer was fitted on P Stock car 14209 in December 1944. This proved a better solution and, as we will see in a future article, was to appear on the District's new stock after the war.

One feature proposed for the new stock was fluorescent lighting. After many years of development, this type of light had eventually evolved into a workable form in America in the late 1930s and was first commercially available in 1938. In 1943, the system was regarded by W.S. Graff-Baker, the CME, as mature enough to try on a train and a 1935-built M Stock trailer car (No.8784) was fitted throughout with fluorescent lighting. I haven't been able to find out much about the trial so I'm not able to say for sure whether the system was supplied directly off the traction supply but I suspect this was the case. Ideally, fluorescent lights need an AC supply. They will work off DC but the tubes don't last too long. The design people at Acton seem to have realised



this and soon devised a new scheme in which a 2-car unit of P Stock (13244-14244) was fitted with a motor generator set capable of supplying a 50v DC output for the usual low voltage control and battery charging circuits, with an AC supply added for fluorescent lighting. The unit entered service with the new lighting in July 1946 and carried on in service in this condition until May 1955. Early in 1947, Q Stock trailer 013135 had a set of new fluorescent light castings fitted in one bay as a trial to see how they would work on a converted car.

Fig. 1: The interior of 1935-built M Stock car 8784 following its conversion to fluorescent lighting in 1943. Each of the lighting tubes was 2ft long and they were mounted along the edge of the lower roof where it joined the clerestory. The trial was done to see how the equipment would perform with a view to providing it on new stock. LT Museum Photo.

A NEW STOCK PLAN EVOLVES

By the time the war ended in 1945, plans for new stock had been modified. The original intention to order 24 cars for the East London – to make 6 x 4-car trains – was reduced to 18 cars. This allowed the formation of 6 x 3-car trains, which was obviously considered sufficient at the time. This revision meant that the total of new cars expected was now reduced by six to 125.

At this time any plans for building anything new were under close scrutiny, particularly if steel or coal were involved. There was a desperate shortage of both. As new railway cars used a lot of steel in their building and a lot of coal in their use, the government imposed severe restrictions on their construction. However, they were persuaded that new cars for the Underground were essential and the LPTB were allowed to go ahead with the proposed order for 125 cars. At the same time, they were told they would not get any more.

There were doubts about how best to use 125 new surface stock cars in a way that would allow the worst of the older cars to be scrapped and, at the same time, permit some integration with the variety of existing types. By now, the Metropolitan and the Circle were included in the deliberations as well as the District. The Circle loomed large in the discussions because its stock continued to give a lot of

trouble. The most serious problems were with the cracked bogie frames already mentioned² but these were added to by troubles with fractured wheel centres and defective sliding door balancing gear. Some wheelsets and bogies were replaced by spares removed from scrapped wooden District cars but there were not enough of them to re-equip the whole stock of 90 cars and anyway, on top of their mechanical problems, the hand-worked doors were regarded as obsolete. As a result of all these trials and tribulations, there was a considerable body of opinion in favour of replacing the Circle stock before the old District stock.

Outline ideas for Circle stock replacement were first embodied in a plan drawn up in June 1945, which suggested a number of new stock train formations. As part of these, the 18 x 5-car Circle trains were to be replaced by an equal number of 5-car Metadyne-equipped trains. The train formations envisaged in this plan were as follows:

	"A" (west) End					"D" (east) End		
Car No.	1	2	3	4	5	6	7	8
Circle	DM(M)	NDM	Trailer	NDM(M)	DM			
H&C	DM(M)	NDM	NDM(M)	DM	NDM(M)	DM		
P Stock	DM(M)	Trailer	DM	DM(M)	Trailer	DM(M)	DM	
R Stock	DM	NDM	NDM	DM	NDM	DM		

DM(M) = Driving motor car with Metadyne machine; NDM(M) = Non-driving motor with Metadyne machine; NDM = Non-driving motor; DM = Driving motor.

In looking at this plan, we should remember that Graff-Baker's pre-war ideal was to increase the power of trains on the sub-surface lines by equipping all cars as motor cars. It had stalled due to the lack of power supplies to match and this forced the introduction of trailers but he hadn't given up on it and it was beginning to take shape again in this plan. We can see that both the H&C and the District were lined up for all-motor-car trains and that some of the motor cars were to be of the non-driving type (NDM), as adopted on the tube lines for the 1938 Tube Stock.

For the subsurface lines, the NDM was to be incorporated into a new type of 2-car unit. It was to consist of a driving motor car and the NDM equipped, like an O or P stock set, with one Metadyne machine controlling the motors on the two cars.

The plan shows that the Circle stock was to have 4 motor cars, with a trailer in the middle, while the H&C Stock was to go from a 3 + 3-car formation to a 4 + 2-car all-motor-car setup.

The P Stock was to be converted into a 7-car formation. This was odd, because one Metadyne in the formation had only its own motors to drive, rather than the 2-car motor arrangement used up to then but I suspect it was designed for greater flexibility in allowing an O Stock motor car, with the guard's controls in the cab, to be used at the outer ends of trains. The new stock, called the R Stock, was to be formed into 4 + 2-car sets. The list suggests that the R Stock was not getting Metadyne equipment.

O/P STOCK RESHUFFLE

After WWII, the O/P Stock fleet was down to 44 x 3 car units of O Stock on the Hammersmith & City, 58 x 3 cars and 23 x 2 cars O/P Stock on the Metropolitan. The original, pre-war plans for the O and P Stock train formations gave a total of 103 x 3 car units and 28 x 2 car units but, because of war losses, they were a total 1 x 3-car and 5 x 2-car units short. There were five motor cars spare, which were either out of service awaiting repair or had no partner available to allow a unit to be formed. This situation wasn't resolved until 1949 when three P Stock trailers were converted to motor cars which allowed the spare cars to be incorporated into complete units as part of a reshuffled fleet. The reshuffle resulted in 99 x 3 cars and 30 x 2 cars being available.

We don't know now exactly how many of each type of train was proposed in this plan but we can guess. The H&C had an allocation of 22 x 6-car trains and the Circle needed 18 x 5-car trains. We can assume that no more Metadynes were to be purchased. They were already regarded as a maintenance headache and it is doubtful that any new ones purchased would be the same as the pre-war versions, which would quickly create more maintenance problems. If the re-organisation of the Metadynes shown above used just the existing machines, there would only be 9 x 7-car P Stock

² In last month's article.

trains available for the Metropolitan. This was 20 trains short of their current allocation. The scheme would also leave 72 O/P cars spare. Doubtless these would have been incorporated into the new R Stock fleet and combined one way or another with the 125 new cars authorised for purchase but there were so many problems with this plan, including a lot of conversion work on existing cars and the need for more power when there was a national shortage, that it was completely recast.

The original authorisation for 125 new cars, which had been confirmed by the government, had not made any provision for cars lost in the war. The plan described above ignored the fact that the government would pay for war losses separately under the war damage compensation scheme. Shortly after the plan had been prepared, somebody realised this and reckoned that more cars should be obtained under the compensation scheme. They were right, and a bonus of 18 cars was quickly added to the original 125. There were now 143 new cars available, so the existing deployment plan was abandoned and various new schemes were put forward offering different ways of using them.

The new schemes juggled with the existing cars of each type of stock to try and get the best combination. They all involved the Metropolitan and Circle lines as well as the District, and they envisaged a future in which the flare-sided cars were divided into two groups – one Metadyne group and the other with PCM traction equipment as used on the 1938 Tube Stock. The old District BTH contactor control system used on the Q and earlier stocks was to be eliminated, eventually. And, as I mentioned above, no more Metadynes were envisaged.

One scheme proposed the purchase of more Q Stock trailers, which were to replace the existing Q trailers so that they could be converted to driving motor cars. The new trailers would differ from the existing ones by having single-leaf sliding doors at both ends instead of the dummy cab doors provided at one end of the existing Q trailers. All O, P and Q trailers had been built with eventual conversion to motor cars in mind and all these post-war surface line rolling stock programmes tried to make use of this feature where possible.

Another scheme put forward at this time proposed the use of the R stock on the Metropolitan as well as on the District. This idea seems to have had its roots in a revival of the Uxbridge – Barking service that had been suspended since early in the war. Pre-war, it had been intended that the service to Barking would be shared between the District and Metropolitan, who would each use their own stock. Under the new R Stock scheme, there would have been some sharing of stock – a train arriving at Barking from the District would then proceed to Uxbridge. It seems to have foundered because it would have caused considerable crew training and rostering difficulties. Also, maintenance would have been split between Neasden and Ealing Common Depots, causing both to have an additional, non-compatible type of stock. Nevertheless the Uxbridge – Barking plans were kept alive all through the various rolling stock programmes and only late in 1949 were they withdrawn because it offered a saving in the number of cars needed. The saving was achieved because Barking to Uxbridge line trains had to be of 8 cars but by retaining the Barking to Hammersmith trains instead, the existing 6-car formation on that route could continue.

A feature of the R stock which, when it was finally delivered, bore witness to the District Line's connection with the Metropolitan service to Barking was the destination blind. Apart from the usual District destinations, it contained one for "Hammersmith Metropolitan". This was a throwback to the first Hammersmith to Barking service which was introduced in 1936.

The additional trains needed then (the M Stock – see Article No. 17, *Underground News*, July 2010), were built to an existing District design and it was intended that they should be maintained by the District. As I mentioned in that article, to allow any suitable District trains to be used on the Hammersmith & City line, they were all supposed to be provided with "Hammersmith Metropolitan" destination plates. Nobody ever rescinded the order and it was perpetuated when the design for the R stock was drawn up.

R STOCK

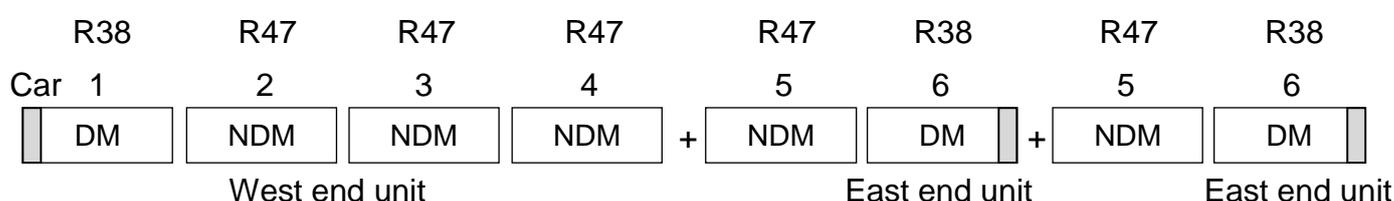
As we have seen (Article 20 in this series), the title "R stock" was not new. It had been suggested first in 1942 as a means of identifying the old Metropolitan car stock. As the withdrawal of this stock was already virtually complete by then, the letter never had time to catch on. Its appearance in 1945 for the District replacement stock was more logical as it followed the letter Q used for the previous batch of new stock. The addition later of a year number after the letter (e.g. R38 or R47 etc.) was designed to distinguish batches.

SCHEME F – R STOCK

It was not until the spring of 1946, some nine months after the first plan of June 1945 had been abandoned, that a new scheme was finally agreed. It was decided that the old Circle stock should be withdrawn and replaced by 18 x 5-car trains of P stock “robbed” from the Metropolitan’s Uxbridge service. The gap was to be filled by bringing in F Stock transferred over from the District. All 99 cars of the stock were to go to the Metropolitan, with 8 x 8-car trains used on the Uxbridge line while some 4-car units were to be used on the East London Line. The removal of the F Stock from the District was to be covered by the purchase of 143 new cars of R Stock. As this was more than the number of F Stock cars transferred, it allowed for the withdrawal of 26 H Stock cars as well.

The plan involved a wholesale reorganisation of the District fleet. All the new cars were to be non-driving motors (NDMs). Driving cars were to be provided by converting existing Q Stock trailers. The long-hoped-for desire to convert 1938-built trailers to motor cars now came to fruition (in part at least) with the conversion of 82 of the Q Stock trailers to R Stock driving motor cars. The trailers, known as Q38 Stock³, were to be classified as R38 Stock upon their conversion. The R38 converted cars were to be placed at the ends of the new trains, which would be formed into units as follows:

R38/R47 Stock Formation 1950:



This formation was just another manifestation of the standard District 4+2+2 train set-up. The cars in the 4-car west end unit were composed of 3 new NDMs of what was to be called the R47 Stock, with a converted R38 driving motor added to its west end. Note that, unlike the 1945 proposal, there was to be no cab at the east end of the 4-car unit. This signalled the intention to run only 6-car or 8-car formations with this stock, as had become standard on the District’s main line since 1940. One or two 2-car NDM-DM units would be coupled to the east end of the 4-car unit to make up a 6-car or 8-car train. The scheme provided for the formation of 31 x 4-car units and 50 x 2-car units plus one spare car. In train terms, this allowed 19 x 8-car and 12 x 6-car sets.

The removal of 82 trailers from the Q38 Stock fleet and the withdrawal of 26 cars of H Stock induced a reorganisation of the District’s existing stocks so that a balance of compatible cars could be maintained. The idea was to replace the Q38 trailers going to R Stock by upgrading a number of hand-worked door trailers of 1931-35 origin with air doors and e.p. brakes so that they could work with their contemporary air-worked door motor cars and the remaining Q38 cars. They were to move from being H Stock to become Q Stock. A total of 64 of the 1931-35 trailers were converted to Q Stock and became known as Q31 or Q35 Stock accordingly. The loss of these sixty-four trailers from the H Stock trains caused a reorganisation of this stock too – some motor cars became trailers and 26 of the remaining cars were earmarked for withdrawal. The number of trains of this stock was considerably reduced as a result. There was a complete revision of the stock totals on the District as follows:

Type	Old Total	Change	New Total
F Stock	99	-99 to Met.	Nil
H Stock	184	-26 to be withdrawn, -64 to Q Stock	94
Q Stock	374	-82 to R Stock, +64 from H Stock	356
R Stock	Nil	+143 new, +82 from Q Stock	225
Totals	657	+18	675

The whole scheme was described as “Scheme F” in official documents, demonstrating just how many attempts there had been to get an acceptable programme. The above totals show how the scheme

³ See Article No.20 in this series, “More Refurbishment”, *Underground News* No.586, October 2010.

gave an increase in the District Line's stock by 18 cars, which exactly matched the 18 additional cars that had been agreed were needed for the East London Line under the original programme. The final part of the plan involved the rearrangement of the O and P Stocks, with the re-instatement of the 5 spare motor cars and the conversion of the three trailers to motors designed to allow for the extra two-car units needed for the Circle Line. The new allocation became 42 x 3 cars for the H&C, 18 x 3 cars and 18 x 2 cars for the Circle and 39 x 3 cars with 12 x 2 cars for the Uxbridge line.

MORE MODS & EXPERIMENTS

We've already seen how modifications and experiments were continued throughout the war, although at a reduced rate compared with what you would expect to see in peacetime. Once hostilities ended, the pace picked up a little. It began with the rapid removal of the anti-blast netting stuck to train windows and the disposal of anything to do with air raid precautions. Lighting restoration to normal levels was a priority and we've already seen that trials of new lighting had been started.

Late in 1945, work started on fitting a 300 watt heater to each of the guard's gangways on P Stock motor cars. It was never going to provide much heat for the poor guard standing at the open door at the north end of the platform of Northwick Park on a wet and windy night but it was better than nothing and it showed that "they" were doing something. "They" did a little more for motormen a year or so later by providing electric window wipers on pre-1937 (F, G, K, L and M) stocks. Before this, they were hand operated by a lever arrangement in the cab. There was also a campaign to draughtproof driver's cabs on the old Circle stock. Perhaps the word "campaign" suggests a degree of urgency, but it started in January 1947 and was stopped in March 1949 as it was intended to scrap the cars the following year. Only 11 had been done by that time, so progress had been very slow. From July 1947, more comforts were provided for guards in the form of a combined letter rack and writing tray fitted to P Stock motor cars. These proved quite useful for resting your tea can, instead of leaving it on the floor, where it always had to sit before.

Experiments in connection with the forthcoming R Stock continued too. In January 1946, a new type of experimental ventilator was fitted on the side of a P Stock car "without non-stop indicators", the official instruction said. Some trailer cars had the indicators but it's not certain which ones or when provision of them stopped. Some cars had destination plate brackets fitted to the car side next to one double doorway above where a non-stop indicator would have been if one was fitted. These later disappeared. The new ventilator design was eventually applied to the new R Stock cars.

In December 1946 there was a trial of a new type of handbrake system. The handbrake was traditionally provided in the driving cabs of all motor cars and normally acted upon the brake rigging of the leading bogie to put the brake on that bogie or at least on one wheelset of it. This would provide sufficient leverage, or so it was thought, on a full 8-car train standing on a normal gradient. I say normal because I doubt it would have worked on the 1 in 28 Bow Road bank but it was never tested, as far as I know. The provision of 3 cabs on a 6-car train or 4 on an 8-car train offered the opportunity to get 3 or 4 handbrakes applied if necessary. To maintain this on the proposed R Stock design was impossible if handbrakes were provided in cabs only. There were only two on a 6-car train or 3 on an 8-car and the bogie brake rigging design meant that only one wheelset had a handbrake application. In realising that an additional handbrake was required on both formations someone suggested that the logical place to put it was on the west end driving car since there was always only one on every train. To reach the other bogie, the handbrake operating mechanism had to go in the guard's gangway and, to see how it would work in practice, one was tried out on Q38 motor car 4418. It was deemed to be satisfactory and it became a unique feature of all the west end R Stock driving cars.

There were some technical experiments too. One, in particular, made me smile when I read the instruction which initiated it. In recognition of the expense of providing special batteries for trains, and of the London bus business now being part of the same LPTB organisation, it was decided to try out 12-volt bus batteries instead of the usual 24-volt purpose-built batteries used on trains. The trial was started on two F Stock motor cars in November 1945. Why should this make me smile? Because a similar idea was initiated for exactly the same reasons on the 1973 Tube Stock when it

first entered service. It failed simply because so many of the batteries went missing⁴. It even led to trains being cancelled. The bus batteries were soon replaced by standard 24-volt train batteries. What happened to the 1945 experiment isn't known now but train batteries remained at 24-volts so it obviously wasn't considered worth doing then either.

EXECUTION

The new rolling stock project involved three parallel work streams. The new car building programme had to run at the same time as the two conversion programmes. The conversion work involved two fleets, the 1931-35 trailers in the H Stock fleet and the Q38 Stock trailers from the Q Stock fleet. The work had to be carefully managed so that there was always enough trains remaining to provide a service. This was not easy to do, so some of the 1931-35 trailers went through a "first stage" conversion. Equipment for Q Stock operation was added while the cars were still running in the H Stock fleet but without the wiring connected up. This allowed the work load to be spread and provided a "float" of trailers for Q Stock trains if needed to cover for R Stock conversions.

The first car involved in the R Stock programme was Q38 trailer 014141, which was sent to Gloucester for conversion to a driving motor car on 27 November 1947. It was not seen on the Underground again for almost exactly two years and no more cars went to Gloucester's until over a year later in December 1948. A full time production line for the conversions was eventually started in February 1949 and, by the April, it was getting through 6 cars a month.



The long delay in getting started was partly due to the usual "learning curve" of any rolling stock conversion programme but, on top of this, the ravages caused by the war were having a serious effect on industry. There was a shortage of skilled labour and a shortage of fuel. There was also a serious shortage of steel, which had forced the government to impose restrictions on its use. Many engineering firms were struggling under all these difficulties and, at the same time, were trying to turn their production from war materials to peacetime products. In the case of the R Stock, the original programme expected that the first new cars would be delivered in September 1947 but, as we've seen, the first car hadn't even gone to Gloucester by then. In fact it was more than two years later, in November 1949, that the first cars arrived back.

In the meantime, the Underground got things under way at their end as early as May 1947 by taking a trailer car (No.8812) from the H Stock fleet and sending it to Acton Works for a trial conversion to Q Stock. It was overhauled and fitted with air-worked door and electro-pneumatic brake equipment. It was the first of the 64 cars to be done under the programme. As I mentioned above, this car and many of the main batch, were given what was called a "first stage" conversion. This consisted of fitting wiring, push buttons for passenger door control, e.p. brake units, air door piping and door engines but leaving in place the door handles and grab rails for hand operation so that they could continue to be used in H Stock trains until they were needed in the Q Stock fleet. The second stage conversion to Q Stock was done at Ealing Common at the same time that the new R Stock was being commissioned. Some of them ran for quite some time before finally getting into the Q Stock fleet.

Fig. 2: This photo shows a 1931 car just out-shopped from Acton Works after its first stage conversion to Q Stock. The conversion involved fitting air door equipment and e.p. brakes while retaining door handles and grab rails so it could continued to be used in hand door trains until it was needed in the Q Stock fleet. LT Museum photo.

⁴ You might speculate as to why the batteries went missing but if you considered the fact that they were the same as those used in many road vehicles you might come to a realistic conclusion!

No.8812 was finally commissioned for Q Stock work in September 1950, more than 3 years after its first stage conversion. As part of the Q Stock programme, three of the existing Q35 motor cars were converted to trailers to provide the necessary stock balance⁵.

The Underground had begun preparations for the withdrawal of Q Stock cars for conversion by borrowing 6 x 6 cars of P Stock from the Metropolitan. These trains, the first of which was transferred on 21 July 1947, were to cover the loss of District cars under conversion. The number actually in service on a day-to-day basis varied but some of them remained working on the District until the early summer of 1950.

Further depletions of District stock took place during the main R Stock programme of 1950-51. The loaned P Stock was not enough to cover losses to conversion work. To overcome the problem, it was suggested that the H Stock working on the East London Line should be transferred to the District main line and the gap thus created should be covered by using Metropolitan compartment stock. This idea was soon scuppered when the operating department objected to the compartment stock, so the East London kept its H Stock and the District reduced a number of peak-hour trains from eight cars to seven instead and some 6-car trains were reduced to 5-car formations⁶. The trailers released from these trains became available for conversion work. There was also a slowing down of the C, D & E Stock withdrawals. Only half of the planned 26 withdrawals had taken place by July 1951.

The original plans for the R Stock allowed for the conversion of a block of Q38 trailers, 013161-013166 and 013168-013192. These were to become 31 "A" driving motors of R Stock and were to be numbered 21100-21130. A total of 51 "D" driving motors were to be provided from Q38 cars 014141-014182 and 014184-014192 and were to become 22600-22650⁷. By the time the programme was started it had been decided instead to send trailers that were due for overhaul. This made more sense and it was later extended to include cars damaged in minor collisions.

The Q38 to R38 body conversion work was carried out by the Gloucester Railway Carriage & Wagon Co. Their charge for the work was settled at £1,100 per car, to which was added £2,500 for the new traction equipment. Before going to Gloucester, the cars were stripped of their upholstery, lamps and door engines at Ealing Common and some modifications were done on the bogies prior to the cars' shipment by rail from Ealing via Lillie Bridge to the Western Region. Six spare K2 bogies removed from scrapped cars were put under some of the early cars to go to Gloucester. This created a float of Q38 bogies so that the modification work could be done on them in advance of their transfer to Gloucester. Normally, Q38 cars were sent from Ealing Common to Lillie Bridge on the Monday night of each week and they then departed for Gloucester each Tuesday morning. Trains were usually limited to a maximum of 4 cars with a match wagon at each end, but one train of 6 cars was despatched on 15 August 1950.

The original R Stock programme envisaged (perhaps rather naively) that the newly-built non-driving motors (NDMs) would be delivered by the builders in such a way that 5 new cars would arrive at the same time – within a day or two – as three R38 converted cars. This would enable 8-car trains to be commissioned at Ealing Common and enter service to a set programme. The programme was designed as follows:

- Trains 1-4 were to allow the release of more cars for Q and R conversions.
- Trains 5-10 were to allow the six P Stock trains to be returned to the Metropolitan.
- Trains 11-22 were to allow the F Stock to be transferred to the Metropolitan.
- Trains 23-31 were to allow some H Stock cars to be withdrawn, and to cover East London Line workings.

⁵ Don't forget that, prior to the start of the programme, all Q Stock trailers were Q38s, while the motor cars were a mix of Q23, Q31, Q35 and Q38s.

⁶ One such 5-car train was derailed approaching Edgware Road on 1 July 1950 and the leading car, No.4043, was scrapped as a result.

⁷ The two missing cars in these blocks of trailers were both war damage casualties. No.013167 was damaged at Plaistow and partly used to rebuild P stock motor car 14233, and 014183 was scrapped after being damaged at Ealing Common.

The order for the new NDMs was split between Gloucester and the Birmingham Railway Carriage and Wagon Co. Gloucester, who already had the R38 conversions to do, were to build 54 cars while Birmingham did the other 89 cars. The total of converted R38 cars and the new R47 cars amounted to 225 vehicles. The suppliers and numbering of the first batch of R Stock was as shown in Table 1 below.

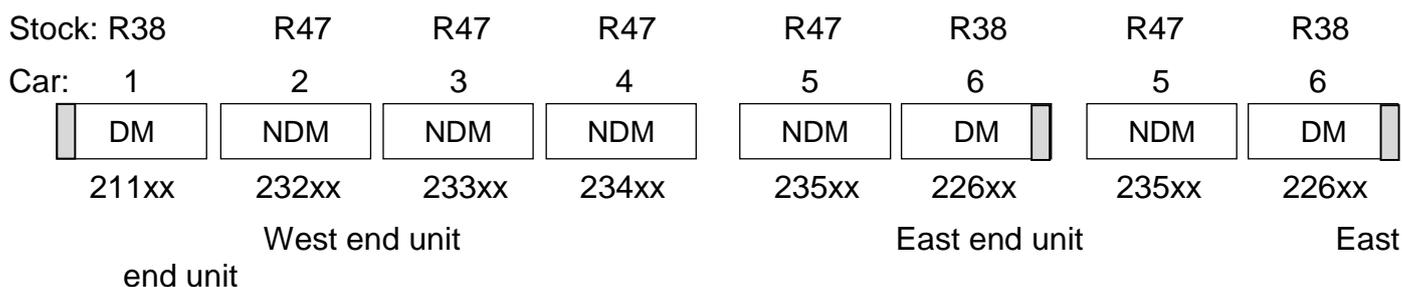
All the new and converted cars were delivered to Lillie Bridge, usually in batches of three or four, although, towards the end of the programme, some were delivered five at a time because of shortages of the right type of cars to make up complete trains.

Table 1: Suppliers and Numbering of R Stock – 1947 Batch

Position of car	Stock	Builder or converted by	Car numbers	Total
A (west) end 1	R38	Gloucester	21100-21130	31
2	R47	Birmingham	23200-23230	31
3	R47	Birmingham	23300-23330	31
4	R47	Gloucester	23400-23430	31
5	R47	Gloucester	23500-23522	23
5	R47	Birmingham	23523-23549	27
D (east) end 6	R38	Gloucester	22600-22650	51

The aspirational programme never worked out in practice. On arrival at Ealing Common, usually on a weekday morning, the traction motors and shoegear were fitted, lighting tubes and refurbished seats from Acton (on R38 cars only) were installed and trains were made up and tested. All this was done in the long two-road lifting shop at Ealing at the same time as the usual maintenance of existing stock, not an easy task to manage. In the main shed next door, the trailers of 1931-35 vintage removed from H Stock trains were having their door handles removed and final conversion work done to make them into Q stock trailers, whence they became known as Q31 or Q35 cars.

A rather complex numbering system was devised for the R Stock. It had been agreed as early as February 1947 and was based on the 20,000 series of numbers. The first digit 2, indicated the stock, the second digit – 1, 2 or 3 – indicated the type of car, “A” end driving motor, “D” end driving motor or NDM respectively, while the third digit, Nos. 1 to 6, indicated the position of the car in the train formation. As I mentioned above, to get an 8-car train, another pair of 5 & 6 cars was added to the east end of a 6-car set so that the numbering for an 8-car set looked like this:



The cost of each new NDM was £6,800, plus £2,500 for traction equipment and motors. With the £3,600 for the R38 conversions, plus the stripping and preparatory work done at Ealing and the commissioning work, also done at Ealing before entry into service, the total cost of each 8-car train worked out at over £100,000. This is about £2.7million in today’s money – quite cheap compared with modern, but much more complex, trains. There was, I suspect, a lot of project expense which would not have been included in those days but which modern contracts would include and then “risk” would be added today, too.

Commissioning work began in earnest in November 1949. It was in full swing by Easter 1950 and the first 8-car R Stock train entered service on 17 April 1950 made up as follows:

21106 – 23206 – 23306 – 23406 + 23506 – 22609 + 23507 – 22610

Two months later, on 23 June 1950, the first 8-car train of F Stock was transferred to the Metropolitan. Although it had been expected that there would be 11 new trains in service by this time, there were only eight. By this time too, a new development had taken place. They had ordered more R stock.

To be continued...