

# EARLY DAYS ON THE C STOCK

by Piers Connor

## NEW DEPOT & NEW TRAINS

The C Stock is gone. The last one ran in passenger service on Tuesday 3 June, as train 74 starting from Triangle sidings at 05.41 and running to 09.39 at Edgware Road. (*The original plan was to run train 74 until 13.39 at Edgware Road, but this was changed at short notice, much to the disappointment of many*). After some 44 years in service for the oldest trains, they have now all been replaced by new S7 Stock. This article isn't a history of the C Stock, more an appreciation of its early days as seen from my point of view as a driver who worked on the stock for five years from the time of its introduction into service.

My first sighting of the C Stock was of a 4-car train stabled in Ealing Common, some time in the summer of 1970, awaiting testing on the test track between South Ealing and Acton Town. I was on the Piccadilly Line in those days and I was awaiting transfer to Baker Street, my newly nominated home depot. One thing that struck me, from the brief view I got, was that there were no handrails on the outside of the body and the cab door was a sliding door instead of the usual hinged door. Both these were soon to be the source of much trouble.

## ONE ARMED BANDITS

A few weeks after this, I was transferred to Baker Street. By this time, there were several new C Stocks in service. I had stock training on both the A Stock and CO/CP Stocks (these were repeats for me – I had been a guard at Neasden in the early 1960s) and the new C Stock (two days on each). The main feature of the new stock for the driver was the formation of the train into 3 x 2-car units (in place of the 2 x 3-car units of the CO/CPs) and the traction and braking control. All manually operated trains up to this time had separate driving and braking controls – the master controller on the right hand and brake controller on the left. The new stock had the functions combined into one “Combined Traction/Brake Controller” or CTBC, as it was called at the time. They were quickly nominated as “One-Armed Bandits” by the crews.

The C Stock design was a derivative of the 1967 Tube Stock and it was based on the strategy that, following the successful introduction of ATO (Automatic Train Operation) on the Victoria Line, all new Underground trains, tube and surface, would be designed with conversion to ATO in mind. ATO conversion was soon dropped in favour of One-Person-Operation, with manual driving but the original idea was already built-in.

Both stocks were provided with dynamic braking, where the motors are used as generators during braking, providing what is called rheostatic braking. During rheostatic braking, the energy generated by the motors is dissipated as heat through on-board resistors. The resistors used were the same resistors provided to control acceleration and the control used the same camshaft switching system as the power control. Eventually, traction control and braking would be developed on later designs to be regenerative so that the energy could be fed back into the current rails for use by other trains. On the C Stock, it was rheostatic only.

One result of this system was that, since they used the same resistors and control camshafts, the driver's traction and braking controls would be easier to design if they were on the same controller. The Westinghouse and electro-pneumatic braking was also on this controller. It sounds complicated but with a few hours practice and it was soon easy enough to use. It was just how the train behaved that proved to be a problem.

## CAB FURNITURE

Before looking further at the train performance, I should mention some of the original features that affected the driver. To begin with, there were the cab seats. They were not much better than the thinly upholstered, drop down flaps provided on the CO/CP Stocks. They were to the usual, back-breaking, bum-numbing Underground standard and quickly started to droop downwards at the front just like the old ones. They were supposed to be adjustable to three different levels but the difficulty of changing the position meant that they were generally left alone. They were replaced during the stock's refurbishment in the mid-1990s.

Then there was the cab-to-cab telephone. This was a victim of the intention to convert trains to ATO and it included a public address (PA) facility. The handset and push button controls were in a little cabinet on the back wall immediately behind the driver's position. The door was on a spring, so you had to hold it open while accessing the handset. This was OK as long as you didn't want to use the phone while driving (which I guess we weren't supposed to do) but, if you did need to use it on the move, you had to reach behind you with one hand (the other was holding down the deadman), slide your finger into the door to get it open, then knock the handset off its seat. It would then drop to the floor and you could reach down to pick it up. You then stuck it under your chin and used your free hand to push the call button. Of course the door sprung shut onto the handset cable, which eventually got frayed, while the handsets got damaged from all the dropping. Often, the handset would be left hanging down while the train was in service.



*Left: C Stock cab in original condition. The décor was a pale grey. The single "Combined Traction Brake Controller" is visible on the left hand side of the driver's control desk. The air and electrical indications were in the centre of the desk and the reverser key switch, which had an ATO position, was on the right. The door control panels were only provided on the back cab walls. The desk controls for door operation were added later, soon after OPO was introduced in March 1984. The cab light switch was in the row of switches nearest the camera. The relatively clean lines of the design were spoiled by the addition of large amounts of junk added over the years for new controls, communications equipment and safety devices. There was also a side number plate bracket mounted on the cab door. This was to allow the train set number to be read by an external reading system. This was never fitted but it did make train identification from the platform easier and it was a shame that it was discontinued. Set numbers should be added to side destination displays. Note the wooden floor that survived for both passenger and staff areas of the train until it was removed during refurbishment in the mid-1990s.*

**Photo: LT Museum**

Usually, you didn't need to use the handset very much. There was no radio and the PA was rarely used by anyone. There was a taught but unwritten rule in those days that PA announcements should only be used in an emergency, since passengers would learn to ignore them if they were bombarded with them all day long<sup>1</sup>.

On occasion, I would be paired with a guard who didn't mind a chat whilst we were working. One guard I remember in particular was formerly a mortuary attendant. He often regaled me with stories of what went on in such places and had a habit of answering the phone with. "City mortuary here. Can I get you anybody?"

The cab light switch was another hostage to fortune. Being designed for ATO, where the driver does not have to sit in the seat and hang onto the controller whilst the train was moving, the switch was located on the offside control desk. To use the switch, you had to stretch across the central doorway whilst hanging on to the controller. The controller itself was located on the left hand side of the desk. This was not a problem for a leftie like me, but many right-handed drivers had to drive with their right arm across their chest to make it usable. I once asked why it was decided do arrange it like this and was told it was because the brake was traditionally on the left so it was considered important to leave

<sup>1</sup> This was proved to me recently when I was at Baker Street when the station went into evacuation mode and, despite persistent loud announcements and sirens, people just ignored them and I had some difficulty persuading people the alarms were real and that they had to leave.

it in the traditional place. Trouble was, they didn't realise that the learning process for the new arrangement was so radical that it would have made no difference where the controller went. The right hand side would have been more logical. I managed to get this sorted for the D Stock, where my idea to have the controller handle on the right was adopted.

Since those days, several increasingly unpleasant abortions have been adopted for controller handle designs, which is unfortunate, since the driver's power/brake controller must be the single most important feature for a driving cab. In my view, it is time to adopt the main line deadman pedal reset system and get rid of the twist grip feature currently in fashion on the Underground. I suppose it's too late now, as it is the intention that future trains will be built without driving cabs. I think there are several important reasons why this also could develop into a problem unless it is carefully thought out but space does not permit here.

The usual cab related issues on heating and draughts were not improved with the C Stock. The C Stock had air operated cab doors and, to try to prevent draughts, the door had inflatable air seals around the edge. When the door reached its closed position, a valve opened and let compressed air into a rubber tube positioned all around the door, sealing it. Unfortunately, it wasn't very reliable, partly because the seals used to get punctured – not always accidentally – and they soon became a maintenance liability. Later stocks dropped the idea in favour of a sculptured rubber edge on the door meeting a mating edge on the frame. However, the air operation of the door remained, its main advantage being that the cab seat can be fixed because it doesn't have to tip up to allow a door to swing inwards.

The draught problem was not resolved, even when the door seals were working, since there were a number of holes in the space below the driving desk where pipe runs entered the cab and the wind whistled through these until persistent complaints from drivers over some years finally persuaded the management that we had a case and they later blocked up the holes. Prior to that, we did it ourselves with newspaper stuffed liberally around the kneespace heater and its adjacent gaps.

## **PARKING BRAKE**

The parking brake was another problem. Traditionally, each train had several parking brakes, or handbrakes as we called them. They were applied manually if the train was being stabled, or if it was stuck on the running line with no power. With ATO in mind, the C Stock was equipped with hydraulic parking brakes. The idea was that the driver, working on his own in the cab, could apply sufficient manual brake power to hold a fully loaded train on the steepest gradient. We got a modified version of the 1967 Tube Stock system.

The driver was provided with a lever on the back wall of the cab that operated an electric pump (the 1967 Tube Stock pump was manual). The pump distributed fluid to a brake cylinder on each wheel through a set of pipes under the car. It had an ON/OFF indicator. You were supposed to hold the lever in the ON position until the indicator showed ON. There was also a sight gauge to show the level of fluid in the handbrake pump system. Of course, the lever was too close to the cab wall and would easily take skin off knuckles if you weren't careful. Although it was only necessary to apply one on the train, sometimes one got left on in a middle cab and the train was dragged until someone noticed, usually because of the smell of overheating tyres.

Despite the manufacturer's claims that the hose couplings were "non-leaking", fluid leakage was always a problem and occasionally a hose connecting a brake cylinder to the underframe piping would come adrift. This would allow all the fluid to drain away and lock the brakes on the car. The train would have to be dragged back to depot to fix it, although there were occasions when a brave fitter would get under the car to temporarily re-attach the hose so the train could be removed at a reasonable speed. On one celebrated occasion, a fitter fixed the pipe and then nipped out to a local garage to buy more hydraulic fluid. He got enough to allow him to get the brakes off and the train was able to get back to Hammersmith depot without further damage or delay.

## **GETTING IN**

Moving on from the cab comforts, or lack of them, there was a serious problem over the lack of handrails at the cab doorways. Some drivers, used to a pair of handrails on either side of the cab door, struggled to get in the cab from track level, having to grasp the rubber edge of the door with one hand while holding a small grip inside the leading edge of the opening with the other. I was young and fit in those days but I struggled with it. Some of my larger and older brothers had quite

severe difficulties. It wasn't long before some drivers reported back injuries from their efforts and they were eventually rewarded with handrails robbed from scrapped 1938 Tube Stock added inside the doorways. These helped to alleviate the worst of the problems. Nowadays, many stabling points are provided with the luxury of individual steps and platforms! I expect they will employ someone to drive the driver to his train next.

## **ON THE ROAD**

The C Stock was specifically designed for heavy traffic over short distances – a typical inner urban train – plenty of doorways but not many seats. In this respect the stock was generally a success, having four double doors per car side, so it could shift the crowds. In its original layout, the seats were transverse and there were standbacks at the doorways. When the trains were refurbished in the mid-1990s, the seats became longitudinal and the standbacks were lost. This was a mistake, perpetuated on the S Stock, as doorway loading is restricted by people standing at the doorway sides – a lesson learned in the 1960s and, sadly, forgotten in the 1990s.

Driving it was a different matter. As a driver, I was considerably dis-encharmed with the C Stock. I expected it to be better than the CO/CP Stock we'd had, but it wasn't. In some ways it was worse. Accelerating away from stations was often jerky and uneven. Although the C Stock was designed to accelerate quickly, the relays were set too high in the normal forward Rate 2 position so we generally used the lower Rate 1 to get a more even start.

Braking was even worse. A combination of the unreliable rheostatic braking, slow e.p. brake build up and the introduction of load/weight control combined with retardation control made the C Stock brake the worst of all worlds. Selecting braking was a haphazard affair, with a degree of chance, depending on the time of day, the train load, the line voltage and the failure (or not) of the rheostatic brake to operate on any of the three units in the train.

Sitting in the trainmen's mess room at Baker Street, which used to be near Platform 5, you could tell when a C Stock was arriving at Platform 5 because the driver had to apply the emergency brake to stop. The run in was downhill and quite fast. On a CO/CP, the brake always behaved the same way on any train. On the C Stock, it was variable and often didn't behave at all well and the only way to stop was to go into emergency. We got used to it over time and approached with a good deal more caution but many drivers cut out the rheostatic brake altogether to try to get a more consistent brake.

The trains did retain the traditional Westinghouse air brake. This used pneumatic control instead of electrical control and it was a good performer on the C Stock. I often used to go round the Circle using only the Westinghouse brake. The additional skill and concentration kept me awake and the punters got a smoother ride. I did discover that the feed up rate for the brake reservoirs was rather slow and this meant that you had to be careful not to use too much air during braking or there wouldn't be enough for the next stop. I complained about this and tried to get the rate improved but no one wanted to pay for it and I was fobbed off with phrases in reports like "driver misuse of brake" until it was, I understand, eventually corrected as part of the refurbishment programme.

During much of my time at Baker Street, there was a severe staff shortage. Often, Circles would be commandeered to work trains to Uxbridge or Amersham, filling in gaps for cancelled A Stock duties. Although they were nominally restricted to a top speed of 45 mph, a C Stock was sometimes thrashed down the bank from Chalfont & Latimer to Rickmansworth or Kilburn to Finchley Road and this didn't do their rather frail gearboxes any good. They were replaced in the early 1990s, I think.

## **FINAL REPORT**

So, now that it's gone, what sort of score would I give the stock on its report card? I think 4 out of 10. If I compared it with the A Stock, the A Stock would get 8/10. My C Stock's 4/10 is due to its weak braking, poor cab design, over complex traction/braking control, a poor gearbox arrangement that soon became noisy, the hydraulic parking brake, persistent trouble with bogies and suspension (they were eventually replaced) and dreadful passenger heating and ventilation systems. Some of these were corrected in later years and, in the end, the stock was good at what it was designed to do, shifting large numbers of people around the Circle.

One LU manager referred to it as "the workhorse of the subsurface railway". Perhaps a fitting epitaph.



### EARLY C69 STOCK

Three views of C69 Stock when new, with a train awaiting delivery to London Transport just west of West Ruislip (*Above Left*), one in the process of being commissioned (*Above Right*) and the rear of a train newly into passenger service at Westbourne Park (*Left*). It is interesting to note that when new the C69 Stock had provision for train set numbers in the driver's side cab door, in this case being 224, which was another one of those train recognition trials that didn't work. (The Northern and Piccadilly Line side cab doors [1938 and 1959 Tube Stocks respectively, in January 1966 and November 1969 also respectively] were given set numbers in their side cab doors for a short while).

**All photos: Brian Hardy**