

A BETTER NORTHERN LINE

by Jeff Ellis, LU Northern Line General Manager

**A report of the LURS meeting at All Souls Club House on 8 July
2008**

Our speakers usually introduce themselves by outlining their background, but this rarely forms part of the meeting report. However Jeff Ellis traced his career over forty years from its start on the Northern Line as a station guard at Hendon Central, an interesting progression which also reflects the changing railway scene. After a period at the rear of a train, Jeff became a guard shunter at Golders Green depot. The opening of the Victoria Line created many new trainmen's positions, and after two weeks training he became a Northern Line motorman, releasing senior men for the higher paid jobs. Earning £21 a week at the age of 19, Jeff's father, a 40-year mainline man on £19 a week, thought "the world had gone mad!".

In 1972 Jeff was urged to join a "real railway", and transferred to Baker Street to drive to all destinations on the Metropolitan, including Hammersmith, Barking and the Circle Line. This involved forty days of road training, and featured service coupling and uncoupling in those days. After a spell as a motorman trainer, in 1979 he took promotion to railway instructor at the Railway Training Centre in Wood Lane. Back then there were twelve instructors to train all operating staff, including the evening Voluntary Classes which were compulsory for the Instructors, although still unpaid!

The next step was to Area Manager on the District and Piccadilly lines in 1982. It was here that Jeff brought in the first One Person Operation, commencing on the Circle and Hammersmith & City lines followed by the District Line and the East London Line. He then started the One Person Operation project for the Piccadilly Line, the first deep level line to be converted. This work gained him promotion to Traffic Manager on the same lines.

"To broaden his experience" Jeff was then sent to the DLR as Operations Service Manager, a job which included maintenance management. At the time nine of the eleven trains were required for service, but serious wheel wear required all wheels to be removed late Friday for reprofiling in Newcastle, being refitted Sunday afternoon. This took advantage of the weekend closures for upgrade work. When weekend running restarted, tourist traffic was heavier in two days than the five weekday loadings combined!

His return to LU was as Assistant Divisional Manager for the Metropolitan, Hammersmith & Circle, Jubilee and East London lines! A reorganisation split the trains from the stations, and Jeff became Train Service Manager for the Metropolitan, and later for the Hammersmith & Circle lines. From there his maintenance experience with the DLR came in useful as Fleet Manager for the Victoria Line, an operator in charge of engineers! 37 of 43 trains were in service daily when the best engineers were working, but were back in depot for maintenance when they were at home! By reversing this shift pattern, stock reliability went up. In Jeff's experience "with success money becomes available, good staff want to join and bad staff want to opt out. So starts a spiral of success, as you do less and produce more".

Before the PPP started, Jeff became Implementation and Integration Manager, People, which meant union negotiator for the changed working arrangements. Then came the Competence Assurance project, to not only work competently but also

prove it. As Train Operations Standards Manager, Jeff worked with the Railway Inspectorate & National Rail to meet these requirements. Tim O'Toole then brought in the Line General Managers, and Jeff went to the Central Line just after the Chancery Lane derailment. There he spent four years primarily getting the Automatic Train Operating system working well, enabling a peak service of 30tph to return after over thirty years. So in 2007 Jeff finally returned to his starting point, the Northern Line, to bring in the new Automatic Train Operation there. But some preparatory work was first necessary.

THE RECENT PAST

The Northern Line carries a fifth of LU customers, around 840,000 customer journeys daily, and this number is growing as the service improves, increasing station boarding times and slowing trains. The average station dwell time is now around 60 seconds, compared with 35 seconds on the Central Line. Of the 106 trains, 91 are now required in the peaks and 72 off-peak and at weekends, the same number as the Central Line peak service used to be! 12.5 million kilometres are operated annually, controlled from Cobourg Street where a "Heath Robinson arrangement" equipment monitor computers controlling the forty-year old equipment which controls signalling designed up to a hundred years back! There are 1,659 operating staff on the line with a salary bill of £84 million per year.

TIMETABLES

Over the past three years the timetable has been progressively revised in preparation for the 2012 upgrade. The line's service is of great political interest, with many MPs and Councils having a view, so change is only slowly negotiated. On 24 June 2007 timetable 51 provided 20 trains hourly north of Kennington on all branches, and 30 trains hourly south to Morden. This involved arriving drivers stepping back to depart on the second train after next, which is difficult to maintain at times of service disruption, especially with a three platform layout. The through Mill Hill East service was withdrawn outside peak hours.

From 27 January 2008 a new timetable 52 provided an increased run time of 3 minutes to aid service recovery after disruption. Only 28 trains now operate hourly south of Kennington, recognising the true capacity of the current system, and avoiding the need for stepping back. The northbound frequency at London Bridge in the morning peak is increased to meet peak demand. A major change was segregation of the northbound morning peak services at Camden Town, Charing Cross trains heading for Edgware and Bank trains heading for the High Barnet branch. If delays occur on one branch they do not infect the other branch. This timetable has achieved a more frequent and reliable service than actually operated under the previous more ambitious timetable. It was sold on the Morden branch by the promise of an empty train to the Charing Cross branch at Kennington northbound, since four out of five trains now start there. It is intended that this timetable remain in operation for three years until the introduction of automatic train operation.

Fears that this is a precursor to a complete split of the service are unfounded, since Camden Town station has no capacity to cope with the numbers that would be forced to interchange there. Already 14,000 an hour leave the station and 16,000 enter in the PM peak, to which would be added 22,000 an hour interchanging! However, in 2015/17 a £90 million redevelopment is promised that could lead to a reconsideration if money is available at this time.

At the end of the peak Morden saw 65% of trains late and 45% out of sequence under the old timetable. This has improved to 11% late and only occasional trains out of sequence, which has led to a big improvement in staff morale, and eased the work load at Cobourg Street control room. A graduate on work placement from America viewed working methods there and advised to only regulate large intervals in the peaks, otherwise let the service run. A held train gets progressively later through the road due to heavier passenger loadings. A train is now only held in the first third of its trip and, if missed at a controlled station, can be advised via train radio to hold elsewhere. Camden Town Junction northbound in the AM peak is normally operated in 'first come, first served' mode and it is very unusual to be held in the tunnels at Camden Town awaiting a train from another branch to cross in front of a train.

The improvement achieved in the Northern Line service by reviewing run times and working will lead to similar changes in the next Piccadilly and Central Line timetables.

RELIABILITY

An improvement programme has been aimed at all areas of infrastructure reliability. The rolling stock has performed poorly. Although now a responsibility of Tube Lines under the PPP contract, maintenance has continued to be undertaken by Alstom under an earlier contract that had insufficient performance controls. This was only renegotiated in November 2007, since when a significant improvement is noticeable.

Almost half of train failures were due to door trouble, a problem not experienced on the similar Jubilee Line trains. 7,000 door bearing seals were replaced in a four week programme completed in February, since when not one has failed. It should be remembered that there are approximately 11,500,000 door operations every 4 weeks on Northern Line trains. Each seat was originally alarmed to detect removal for access to equipment, but frequent failure of the magnetic locks resulted in their removal from seats that could be screwed down for depot access only. The AC traction motors have worked well, no wear being detected after five years of service, but the AC switchgear has been troublesome and Mitsubishi are working on a solution¹. The air system reservoirs have suffered water corrosion, and a solution to this is also in hand. The track-to-train closed-circuit television link, essential for one-person operation of trains, has also proved unreliable. A big proportion of train failures were experienced on Monday mornings, after low weekend staffing at depots, but new rosters have now been implemented, again to good effect.

Within ten months train reliability went from 2,500kms between failures to 11,000kms, but the aim is to achieve 18,000kms before the upgrade works commence, or 2 failures a day instead of 15 a day². This will be achieved with planned preventative maintenance, a heavy overhaul programme to replace all under solebar equipment being planned to commence in September 2009. Solutions to problems have been found through joint partnership working with representatives from all grades, both public and private sector.

A similar signals reliability plan is in place. A protocol now requires all platform based equipment to be checked before a trip to the defect site for a quick inspection. If the problem remains, the Duty Manager will attend and assemble all needed staff,

¹ *Post meeting note* – a trial of new switchgear has been very successful and a full roll out on the fleet has now been approved.

² *Post meeting note* – currently running at 14,000 MDBF.

equipment and diagrams before a 15-minute service suspension for rectification works. If this is unsuccessful, the service will continue under failure conditions for a further two hours before another fix can be attempted. This reduces the impact on passengers throughout the line. A technical officer is now based at Kennington, a crucial site, after a room was found on operational premises for them.

Track reliability is also the focus of a plan. Ultrasonic testing is undertaken every six weeks. In the past, any detected problems resulted in temporary speed restrictions, which can be very damaging to a close-interval service. A permanent way gang now travels with the ultrasonic testing team, rectifying defects as they are found. Removal of 2,000 tonnes of scrap rail (also known as “strategically placed spares”) has to be completed before the new signalling system can be installed, and this has started.

Station improvement works continue, with up to two hundred contractors at a site overnight at any one station. Improved methods of working are achieving prompt completion.

The Northern Line has gone from the worst to best performing line, with 99.4% of timetabled mileage operated and 99.2% of scheduled trains in service. The highest number of trains in the peaks has been 92 or 93 (timetabled 91) if a required inter-depot stock move can run in service. The kilometres operated is the highest ever recorded, and customer satisfaction has reached 80 compared with a target of 79.

COMING SOON

Transmission Based Train Control is more than a signalling system, it is a train control system. Chosen by Tube Lines to provide 18% shorter journey times and 10% extra capacity as required in the PPP contract, it has been long used on the DLR, in Hong Kong, Singapore, New York and Vancouver. It is not a one-off system, like that being developed for the Victoria Line. Since the same system is currently being installed on the Jubilee Line, teething troubles should be over when it comes to the Northern Line from September 2009.

The automatic train protection system included will replace current train stops and tripcocks, and all block joints will be removed, avoiding the cause of some ten failures weekly. Automatic train operation will mean that the operator need only push two start buttons to commence the run to the next station.

The new system will allow 32 trains or more south of Kennington, but 30 are planned initially to allow recovery time, with 24 trains an hour on all branches north from there. Annual kilometres operated will jump from 12.5 million to 16.75 million, with 96 trains in peak service, an increase of only five but working much harder. The new service control system will allow better handling of incidents, and junction working will improve because computers will track trains for 15 minutes on their approach to plan the best order of working. We must now think what control room signallers will use their time for whilst things run smoothly!

Improved terminal working will use the platform most useful to passengers, depending on the time of day. The current system uses the timetabled platform. There will be improved platform dwell time management. A 30-second count down in the cab will give a four-second warning to close the doors: any delay will sound an alarm at the control centre. Dwell time at stations like Bank and London Bridge may regularly exceed this limit, but will need to be made up at quieter stations, such as at Borough and Elephant & Castle. Higher speed restrictions will be possible: a 30mph signed area is probably safe at 35 or 40mph but allows for possible operator error -

with automatic operation we can be sure of the train speed and so allow the higher restriction.

There are 1,695 staff to be retrained on rolling stock, stations and with signals, including working under degraded or emergency conditions. The new procedures need to be agreed and written. How much manual driving experience should be given, and when? We need to consider beliefs which affect attitude and behaviour when developing training, for the £470 million signalling system will depend on staff to make it work effectively. Currently new staff are being recruited and trained to fill vacancies over the next nine months, and need to be usefully occupied in the meantime. The new Connect radio system is to be commissioned in September 2008, and will require staff training³. Customers will also need educating to expect trains to enter stations at 40mph and not brake until half way down the platform. Train doors will not reopen once closed, and trains will depart in full power, not the degraded power that they currently use with the old signalling.

Phased introduction of the new system will begin in September 2009 with a dual-fitted area from Brent Cross to Colindale northbound. The current signalling will remain available for use as required, but if the driver has been trained and the train has been modified, then the new signalling will be used by service trains. The driver will switch the train to the new system, which will transfer the signalling into the cab and display a target speed. The operator can now ignore the current signalling, and drive to match the actual speed with the target speed. Any over-speed will automatically apply the train brake. At Colindale the train will be switched back to the current system.

By this means eventually all 640 train drivers will have experience of the new system. There are also two simulators for staff training at Edgware and one at Morden. It takes around three months to get used to this way of driving, as currently drivers tend to operate 5 to 10kph below the line speed to provide a safety margin for their reaction time.

Tube Lines have decided the changeover of the whole line will work north from Morden, with the first section to Stockwell, and from there to Kennington. This is the most heavily used section, and is therefore a risky approach if problems arise. At the same time a new Highgate control centre will be commissioned for the first area only, with the Cobourg Street control desk for the old signalling disused. TrackerNet will allow Highgate staff to see the service on the rest of the line. Areas will progressively transfer over until the final area, probably Golders Green, is transferred in December 2011. At some stage line control and management staff will also transfer to Highgate. Training requirements and duplication between the two centres during the changeover will require additional staff.

Once the whole line is being driven manually under the new signalling, then conversion to automatic train operation will be undertaken line-wide over a weekend. This requires Alstom to modify all trains for the higher braking and acceleration characteristics and motoring demands required for the full upgrade.

BUILDING WORKS

The new Highgate Control Centre is complete and being fitted out. At Cobourg Street the Victoria and Northern Line signallers currently inter-work, but this will cease from September 2008 since it will not be possible in the future. The Victoria

³ Post meeting note – successfully commissioned in 4½ weeks instead of 6 as planned.

Line control centre will move into a new building at Northumberland Park called Osborne House. The reduced flexibility will require additional staffing. It is currently uncertain which line will be last to leave the old control centre.

More trains need more train operators, and new crew accommodation will be provided at Edgware and High Barnet. The old Euston and Kennington crew depots will not reopen! At High Barnet building work is to commence in August 2008 for completion in September 2009, when some East Finchley staff will move there together with newly recruited staff. Expansion at East Finchley is restricted by heritage listing requirements. Golders Green has insufficient space for expansion, so a new crew depot will open at Edgware in the old substation building in September 2011, when over half of the Golders Green crews will transfer. The new crew depots require a new depot manager and seven duty managers each, to be recruited from current staff, leaving further vacancies to be filled.

At Tottenham Court Road plans for a new ticket hall under the Centrepoint plaza have been awaiting a Crossrail decision for some eight years, but a start has now been made in anticipation of approval. In the past eighteen months all underground services in the area have been diverted, allowing a prompt start to congestion relief works which will also provide step-free access and interchange. At Camden Town planning permission was lost five years ago due to local council objections. Agreement has now been reached for work to recommence, but work cannot be undertaken during the Olympics, or interfere with the line upgrade works, so completion is unlikely before 2015/16. The new station will remove overcrowding, which currently requires regular station control to be implemented. Step-free access will benefit not only wheelchair users, but also those with shopping baskets, trolleys, or mums with small children.

INTO THE FUTURE

Northern Line Upgrade 2 is a possible further upgrade to follow on from the current upgrade; at little cost it could provide greater service benefits than those promised by Transmission Based Train Control and automatic train operation combined. It would involve splitting the branch services, which is politically sensitive, and so could not be contemplated before completion of the already planned £90 million Camden Town reconstruction. If low level interchange problems there are rectified, the planned service frequency south of Kennington could operate on all branches, with junction management a thing of the past. Pointwork currently subject to 15mph restrictions could be replaced with 25 or 30mph track.

Tube Lines would need to provide another fourteen trains, with 108-110 trains in peak service. Additional stabling would not be a problem, but maintenance may need to be undertaken at Edgware or Highgate in addition to the current Golders Green and Morden depots.

People say that the Northern Line ran 100 trains forty years back, but they mistake timetabled service for actual operations. So many trains were cancelled back then that crews often had to travel in the middle cabs, away from public sight, to pick up the second half of their duty!

It will be challenging for all Northern Line staff to carry on providing high levels of service whilst transforming the tube!

QUESTIONS

Will the enhanced service south of Kennington require a return to stepping back at Morden? If necessary, a new stepping back procedure will probably be implemented from South Wimbledon. A supervisor there would ensure that an extra operator joined the rear cab of each southbound train to allow a prompt reversal at Morden. The original driver would alight at South Wimbledon northbound and report to the manager there. If an additional crew member does not join a southbound train, there is time to arrange a spare driver at Morden. This is simpler than stepping back in three platforms at Morden, although more expensive in staffing costs.

What is the future of the Mill Hill East service? This is a useful short-working destination. The off-peak shuttle guarantees a regular interval service on the branch, rather than through trains being diverted to fill gaps to High Barnet. It is possible that the shuttle may be extended to East Finchley to reverse at Highgate sidings, although this would require an additional train. Cross platform interchange with the main service at East Finchley would avoid the need to cross the Finchley Central footbridge, whilst a staff train service to Highgate sidings and new control centre would avoid a 25-minute walk.

Is there a scheme to replace the narrow island platforms at Clapham Common and Clapham North? These stations are over a hundred years old. If a defective train is forced to detrain here, safety plans require that a train be held at the adjoining platform face, causing delay in both directions. A new northbound running tunnel and platforms has been priced at £120 million some time ago – not easy to find at times of economic downturn, but more travellers will probably be forced to rely on public transport for this same reason.

John Hawkins