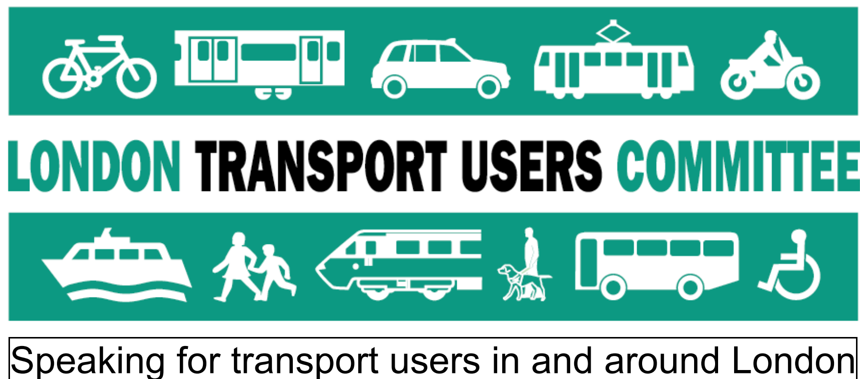

Report of the Inquiry

by the

London Transport Users Committee

into whether:

- **On the basis of the information available to London Underground Ltd in the immediate aftermath of the Chancery Lane derailment, total closure of the line was the only reasonable action open to it; and**

- **There was any action that could or should have been taken by London Underground Ltd which would have resulted in services being restored more quickly**

Published in August 2003
by London Transport Users Committee
6 Middle Street
London EC1A 7JA
Tel: 020 7505 9000
Fax: 020 7505 9003
www.ltuc.org.uk

Summary of findings and recommendations

- It is the Committee's conclusion that immediately following the derailment at Chancery Lane and the clear failure of the special inspection regime of the bolts securing the traction motors, the only responsible action open to London Underground was to withdraw the trains from service. **[Paragraph 30]**

- At the time the decision was made it appears that there was no consideration of how long the closure of the Central Line would last. However, the Committee acknowledges that, even if the time the line would be closed had been appreciated, that would not have changed the decision to withdraw the trains from service. **[Paragraph 31]**

- The Committee recognises the efforts made by many people working long hours to complete the modifications to the trains. However, the Committee has queried whether in two aspects of the way the work was undertaken further delays were encountered that might have been reduced. In order to undertake the work it was necessary to lift the trains. The existing equipment used allowed two cars to be lifted at a time and, therefore, the 8-car trains had to be split into the 2-car units. The re-coupling of these 2-car units back into trains caused significant problems and delayed trains being ready to return to service. It was known that uncoupling and re-coupling of the 2-car units caused reliability problems, but it appears that the likely extent of the impact of this difficulty on returning trains to service was not anticipated and no particular consideration was given to any pro-active measures. **[Paragraphs 33 & 34]**

- The Committee find it surprising that resolution of this technical problem, which was likely, sooner or later, to have an adverse effect on the availability of trains, had not been sought much earlier given LUL's experience of maintaining this fleet of rolling stock over the past decade. The Committee is unable to estimate how much time might have been saved had this problem not been encountered. **[Paragraph 35]**

- The Committee recognise from the evidence presented that to attempt to reintroduce services over the full length of the Central Line earlier on a more limited timetable would not have met the likely demand. Therefore, it considers it was appropriate to wait until sufficient trains were modified and re-commissioned to deliver an acceptable level of service. **[Paragraph 37]**

- The Committee welcomes the admissions from London Underground that there are lessons to be learnt from the events that led to the trains having to be withdrawn from service, the design and implementation of technical modifications and, in particular, the pre-planning of the actions necessary to more effectively manage the disruption caused. Again the Committee expects the new management of the Underground to take these matters forward. **[Paragraph 39]**

Background

1. On the 25th of January 2003 a westbound Central Line train derailed as it entered Chancery Lane station. The derailment was caused by one of the train's traction motors becoming detached. On previous occasions traction motors had become loose and a special procedure had been introduced under which the bolts that secured the motors to the under-side of the trains were checked for tightness every five days.

2. On learning of the derailment, London Underground's Rolling Stock Engineer made his way to the site and on seeing what had occurred decided that the inspection regime had not been sufficient to ensure the bolts would not fail. He decided that the whole of the Central Line fleet of trains should be stopped.

3. As a result the Central Line remained completely closed until the 14th of March 2003 when a shuttle service was introduced over the reopened section of line from Bethnal Green to Leytonstone. The whole line did not reopen with a through service until the 12th of April 2003.

4. Following the derailment London Underground Limited commissioned Dr Roger Aylward to independently chair a technical inquiry into the cause of the derailment. London Transport Users Committee (LTUC) provided one of its members, Katrina Hide, to be an observer at the inquiry. Two interim reports of this technical inquiry were published on the 21st of February 2003 and the 11th of April 2003. The final report was published on the 11th of July 2003. The conclusions of this technical inquiry was that the cause of the motor becoming detached was an earlier failure of a gearbox that in turn resulted in the failure of bolted brackets supporting the motor.

The London Transport Users Committee (LTUC) inquiry.

5. The extended closure of the Central Line caused extensive disruption and in response to the widespread concerns expressed by users, the LTUC, as the statutory representatives of the users of transport in and around London, decided to undertake its own inquiry. The Committee recognised that the technical cause of the failure was being investigated through the London Underground inquiry chaired by Dr Aylward but the Committee considered it should hold its own inquiry to consider the length of time the Central Line remained closed.

6. The remit for the LTUC inquiry was to consider two specific aspects:

    - Whether, on the basis of the information available to LUL in the immediate aftermath of the Chancery Lane derailment, total closure of the line was the only reasonable action open to it; and

- Whether there was any action that could and should have been taken by LUL, which would have resulted in services being restored more quickly.

7. The Inquiry was undertaken on behalf of the full Committee by a panel of five members under the chairmanship of Suzanne May OBE, Chair of the Committee. Alan Cooksey, formerly Deputy Chief Inspecting Officer at Her Majesty's Railways Inspectorate, advised the Panel.

Evidence to the Inquiry.

8. The Committee heard evidence in public on 13 May 2003 and subsequently clarified some aspects of that evidence in correspondence. Evidence was given by Paul Godier, the then Managing Director of London Underground, Eddie Goddard, Train Systems Engineer, David Crawley, who at the time of the derailment was the Managing Director of a London Underground subsidiary company Infraco BCV but from April 2003 had become Managing Director of Metronet Rail Subsurface Ltd, and Andy Cooper who had taken over Mr Crawley's previous role at Metronet Rail BCV.

9. **Mr Godier** explained that as Managing Director he was accountable for the safety of London Underground but that the Underground relied on a great number of suppliers including the infrastructure company involved in the maintenance of the Central Line trains. In discharging his responsibilities, he had the advice of a Director of Safety, Quality and Environment, a Chief Engineer and Mr Goddard, the Train Systems Engineer.

10. Mr Godier said that he had not been personally involved with the immediate decision to suspend the operation of the trains but later on in the day and the following day he reviewed that decision. With the failure of the inspection regime to prevent the derailment, there had been no choice but to suspend the use of the trains and then devise an engineering based means of restoring the safety of the fleet. He said that the technical inquiry (which at the time had not been concluded), had not persuaded him that any other alternative would have been adequately safe to allow restoration of the service in any other way.

11. Mr Godier said that immediately after the suspension of the service he was very concerned for the implications this was going to have on the users of the Central Line and other services. Whilst there had been a limit to what could be done to mitigate the effects of the closure, by Monday morning 40 extra buses were running to supplement other public transport services in east London. By later in the week this was up to an extra 100 buses. However, he recognised that the scale of the closure completely outstripped the ability of buses to provide adequate replacement services. He accepted that the information given to the public about the alternative bus services had not been good enough in the early stages of the closure.

12. London Underground made its tickets available on other alternative services, existing bus services and national rail services. Central Line staff had been redeployed to assist with the management of the very long queues of diverted passengers. However, Mr Godier said that he accepted that many thousands of customers had a “pretty rough period of time” until the Central Line services were restored and it was understandable that many passengers became extremely frustrated.

13. He said that risks, particularly of overcrowding, from diverting passengers to other parts of the tube network were taken into account, but they in no way overrode the risks that would have been involved with running any services on the Central Line. He acknowledged returning to full service had taken much longer than he had initially believed would be the case and had initially told customers. He said that everything had not gone as well as LUL had anticipated but lessons had been learnt.

14. Mr Godier acknowledged that people had found it difficult to understand why it had taken so long to open the first shuttle service and why it had only gone to Bethnal Green and not Liverpool Street. He explained one of the key concerns was that when a very limited service was re-introduced, it should not overwhelmed by demand. There was a lot of planning that went to the introduction of each of the shuttles. A shuttle service could not be introduced until there were enough trains to run it. After the introduction of the shuttle, it was about ten days before enough trains were ready to make the next shuttle viable.

15. He said that he had taken care to ensure that progress was not inhibited or complicated by any financial issues. Special arrangements, including arrangements at the introduction of the PPP contract and transfer of BCV into the private sector, were put in place to ensure that financial constraints did not impede the progress.

16. Mr Godier explained that London Underground had generic emergency plans for foreseeable emergencies such as fires, overcrowding, derailments, etc. He said that London Underground could not keep stockpiles of spare parts that might be needed for any foreseeable failure. He said that London Underground did have contingency plans for closures of part of the network but currently did not have a plan of what to do if a whole line was lost for, say, three months. He said that London Underground would now be turning its attention to planning just that and to making sure, in so far as these things can be planned for in advance, that they are.

17. In response to the Committee’s request for further information on the benefits of contingency planning for a prolonged closure of a complete line, Mr Godier suggested that had such a plan existed, the things that might have been planned in advance were:

a. Arrangements for securing alternative transport on the maximum feasible scale

b. Pre-planning of the routes for alternative bus routes

c. Pre-planning of the pressure points elsewhere on the system, and the staffing and other arrangement to mitigate the effects (such as crowding)

d. Refund arrangements

e. Customer service centre contingency plans for longer opening hours and higher call volumes

f. Possibly special timetables pre-written to enable a phased re-start.

18. **Mr Goddard** said that as soon as they heard of the derailment, the London Underground Limited duty engineer and rolling stock engineer went to Chancery Lane. It was evident to them that the cause of the derailment was the motor falling out. He explained that the motor was attached to the bogie by a number of bolts and in addition there was a safety bracket intended to prevent the motor falling onto the track should it come detached from the bogie.

19. Two previous incidents had occurred when motors had become detached from the bogie and these had been investigated. All the evidence had shown that the cause was loose bolts and a five-day inspection regime had been introduced to ensure that the bolts were tight. He said that London Underground Limited were not complacent but were monitoring the situation and were on top of it while a long-term solution was sought.

20. Mr Goddard said that when the London Underground engineers arrived on site and found what had happened it was clear that the bolt-checking regime was not working. It was not clear why that regime was not working. It was clear that another similar incident could occur and could lead to another derailment. More frequent inspection was unlikely to be effective and the rolling stock engineer made the decision that the trains should be taken out of service. Mr Goddard said that both he and the Chief Engineer had been consulted and fully agreed with the action. Representatives of the Health and Safety Executive, who were on site, supported the action once taken.

21. **Mr Crawley** said that had the decision to withdraw the trains not been made by London Underground he, as Managing Director of Infraco BCV, would have withdrawn the fleet and not offered it to London Underground for service. He said that he had available to him the additional information that the bolts on the vehicle had been checked two days before the derailment and it was evident that the mitigation

that had been put in place had not worked. He also concluded that the failure mechanism was not understood.

22. He explained that in addition to replacing the bolts that secured the motor to the bogie with bolts, which gave an indication of tightness, a revised safety bracket had been designed, tested, manufactured and installed. It had required getting suppliers geared up to making the parts and delivering them. Production lines to modify the trains were set up and many hundreds of staff recruited and trained to undertake the work. It was also necessary to attend to problems with gearboxes.

23. He explained that the 8-car trains are formed of four 2-car units. The trains were separated into these 2-car units so that they could be lifted so that the modifications could be made. When they were re-coupled they did not work and several days of running were required to get them to operate reliably. The problems were mainly with the electrical control circuits of the train connected through the couplings between the 2-car units. He said that this task was quite unlike that which had originally been expected.

24. He said that, in general, 2-car units were not uncoupled and reformed because it was a problematic process. Uncoupling and reforming them in a different formation sometimes discovered latent faults that only came to light in the new coupling arrangements. Therefore, the original formations had been retained where possible.

25. Mr Crawley said that alternative courses of action to bring the trains back into service more quickly were considered. All of these alternatives involved an earlier detection of failure occurring but it was considered that it would not be possible to guarantee a sufficiently speedy response to prevent another derailment. In attempting to answer the question as to what could have been done differently to restore services more quickly, he said that it was recognised that what was required was far from being a simple modification. London Underground effectively had to re-commission the whole railway.

26. **Mr Cooper** said that he had taken over from Mr Crawley at the beginning of April. He said he had worked very closely with Mr Godier who kept pressure on to make sure that the right things were being done. The staff involved in lifting the trains had been increased from the normal 12 to almost 200, working three shifts, seven days a week.

27. He said some1% of gearboxes needed to be changed and this necessitated the wheel set (the axle with its pair of wheels driven by the gearbox) being changed. The diameter of the wheels of the replacement wheel set had to match the diameter of the worn wheels of the other wheel set of the bogie and similar to the wheels of the other bogie of the car. As a result a gearbox change required many more wheel set changes than just the one affected.

Comment and Conclusions.

28. The Committee's Inquiry has considered the derailment of the Central Line train at Chancery Lane station and the events that followed against its specific remit set out in paragraph 6. In reaching its conclusions the Committee has had available to it the published reports of London Underground's own inquiry that was independently chaired by Dr Aylward.

29. The Committee consider that Dr Aylward's report makes it clear that this derailment should not have happened and unfortunately by focusing on loose bolts, London Underground had been treating the symptoms and not the root cause of the problems. The Committee supports Dr Aylward's conclusions and recommendations. It expects the new management of the Underground to take these matters forward.

30. **It is the Committee's conclusion that immediately following the derailment at Chancery Lane and the clear failure of the special inspection regime of the bolts securing the traction motors, the only responsible action open to London Underground was to withdraw the trains from service.** London Underground recognised that with the failure of the inspection regime further incidents of motors becoming detached and causing a derailment, possibly with far more serious consequences, could not be prevented.

31. **At the time the decision was made it appears that there was no consideration of how long the closure of the Central Line would last. However, the Committee acknowledges that, even if the time the line would be closed had been appreciated, that would not have changed the decision to withdraw the trains from service.**

32. Although the problem was known, it is clear from the evidence given to the Committee's own Inquiry and the more detailed technical information contained in Dr Aylward's published report that the root cause of the problem was not understood. As a result developing an engineering modification took some time.

33. Even after a more robust bolt and safety bracket system had been designed further difficulties were encountered by LUL in making the modifications to the trains and returning them to service. The Committee was told of the employment of the significantly greater numbers of people to undertake the modifications to the trains, the introduction of 24-hours a day, 7-days a week train modification schedule and of the arrangements made with the manufacturers and suppliers to obtain the replacement bolts and brackets. **The Committee recognises the efforts made by many people working long hours to complete the modifications to the trains.**

34. **However, the Committee has queried whether in two aspects of the way the work was undertaken further delays were encountered**

that might have been reduced. In order to undertake the work it was necessary to lift the trains. The existing equipment used allowed two cars to be lifted at a time and, therefore, the 8-car trains had to be split into the 2-car units. The re-coupling of these 2-car units back into trains caused significant problems and delayed trains being ready to return to service. It was known that uncoupling and re-coupling of the 2-car units caused reliability problems, but it appears that the likely extent of the impact of this difficulty on returning trains to service was not anticipated and no particular consideration was given to any pro-active measures.

35. **The Committee finds it surprising that resolution of this technical problem, which was likely, sooner or later, to have an adverse effect on the availability of trains, had not been sought much earlier given LUL's experience of maintaining this fleet of rolling stock over the past decade. The Committee is unable to estimate how much time might have been saved had this problem not been encountered.**

36. The Committee also queried with London Underground if consideration had been given to acquiring additional lifting equipment that would have allowed more than two cars to be lifted simultaneously and avoiding the need to uncouple the 2-car units. London Underground responded that it had not and rather surprisingly suggested that such lifting arrangements would not have been feasible.

37. **The Committee recognises from the evidence presented that to attempt to reintroduce services over the full length of the Central Line earlier on a more limited timetable would not have met the likely demand. Therefore, it considers it was appropriate to wait until sufficient trains were modified and re-commissioned to deliver an acceptable level of service.**

38. During the time the Central Line services were disturbed the structure of London Underground changed with responsibilities transferring from London Underground Limited to the Public Private Partnerships. The Committee noted the assurances given that actions had been taken to ensure the transfer of responsibilities did not delay the work. The Committee also noted the assurances that the re-opening had not been delayed by any financial constraints.

39. **The Committee welcomes the admissions from London Underground that there are lessons to be learnt from the events that led to the trains having to be withdrawn from service, the design and implementation of technical modifications and, in particular, the pre-planning of the actions necessary to more effectively manage the disruption caused. Again the Committee expects the new management of the Underground to take these matters forward.**