**Secretariat memorandum**
Author : John Cartledge

Agenda item : 8
TS038
Drafted 9.7.10

**Potters Bar derailment : inquest report**

## 1 Purpose of report

1.1 To record the conclusions of the inquest into the fatalities which occurred as a result of the Potters Bar derailment, and London TravelWatch's contribution to these proceedings.

1.2 The report comprises a summary of London TravelWatch's role in relation to rail safety, the circumstances of the derailment, and the issues explored in the course of the inquest.

## 2 Recommendation

2.1 That the report be received for information.

## 3 London TravelWatch and rail safety

3.1 Under the terms of the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (commonly known as ROGS), which give effect to the European Rail Safety Directive, prospective operators of passenger rail services – both trains and infrastructure – in the London railway area are required to consult London TravelWatch as part of the application procedure for obtaining the necessary safety certification or authorisation.

3.2 Apart from this, London TravelWatch has no specific functions in relation to rail safety. But as part of its general duties to – inter alia – "consider and … make recommendations with respect to any functions of …Transport for London (TfL) relating to transport" and to "keep under review matters affecting the interests of the public affecting the provision of railway passenger services wholly or partly within, and station services within, the London railway area", the organisation and its predecessors have always kept a watching brief on trends in passenger safety, and have raised matters with the relevant service providers and/or regulatory authorities when appropriate. Issues of physical safety (as distinct from personal security) are relatively seldom raised in appeal cases received from the travelling public, since for the most part passengers are able to take safety of operation as a given. But ensuring their safety is the first duty of the rail companies, and if and when safety lapses occur, it is necessarily the concern of London TravelWatch that the causes should be properly investigated and corrective action taken.

3.3 The first occasion on which the organisation played a formal part in an investigation was the public inquiry which arose from the Kings Cross Underground station fire in

1987. This was closely followed by the inquiry into the Clapham Junction collision in 1989. Other such proceedings have ensued from the collisions at Cannon Street in 1991, Southall in 1997 and Ladbroke Grove in 1999. In each instance, London TravelWatch was one of the "recognized parties" accorded the right to present evidence, question witnesses, and make recommendations, and it was therefore represented throughout the inquiry proceedings. It was also accorded observer status at the industry's own internal investigations into the derailments at Hatfield in 2000, Potters Bar in 2002 and Chancery Lane in 2003.

3.4 As a direct consequence of such involvement, London TravelWatch has become recognised by the government and the rail industry as the formal voice of London's rail users on all safety-related matters. It is represented on the Office of Rail Regulation's (ORR) high-level Rail Industry Advisory Committee (RIAC) on safety, and on the rail safety working group of the Parliamentary Advisory Council on Transport Safety (PACTS). It is consulted by ORR and the Department for Transport (DfT) on all proposed changes in rail safety policy and regulation, including proposals emanating from the European Rail Agency. It receives copies of the findings of relevant accident reports produced by the Rail Accident Investigation Branch (RAIB) and by TfL's rail-operating subsidiaries, and these are the subject of reports to the Board or the appropriate committee when they have significant implications for passenger safety. It also receives and tracks the regular reports issued by the Rail Safety & Standards Board (RSSB) and London Underground on statistical trends in safety performance.

3.5 As far as the Underground, Docklands Light Railway and Tramlink are concerned, London TravelWatch is the sole statutory voice of passengers, on safety as well as all other matters. In relation to the main line rail network, London TravelWatch's role within the London railway area mirrors that of Passenger Focus at the national level, and Passenger Focus has a similar remit. Few, if any, National Rail safety issues are unique to London, so the two organisations act jointly in order to avoid duplication of effort. London TravelWatch's part-time safety adviser acts in an identical role on behalf of Passenger Focus, and although he is formally a London TravelWatch employee, the costs of his post are funded equally by the two organisations.

## 4 The derailment and its aftermath

4.1 At 12.58 on 10 May 2002, the rearmost carriage of a train travelling from Kings Cross to Kings Lynn derailed at high speed as it traversed a set of points immediately south of Potters Bar station on the East Coast main line. Six passengers on the train were killed, together with a pedestrian hit by debris falling from a railway bridge over a road, which was dislodged when impacted by the carriage. In addition, more than 70 people were injured, some seriously.

4.2 The carriage turned through $90^{o}$ relative to the direction of travel, decoupled, and became airborne as it passed over the parapets of the bridge, causing it to be stripped of all of its underfloor equipment and of its rear bogie and wheelset. It traversed the ends of the station platforms and came to rest lodged under their canopies, bridging the gap across two tracks between them and leaning at an angle of about $45^{o}$. Various items of lineside and platform equipment were destroyed or damaged, including overhead electrification masts and a waiting shelter. The carriage (operated by the train company WAGN) remained structurally intact but suffered external damage including the loss of a door and most of its windows (through which four of the passengers who were fatally injured fell). Nobody on the platforms was hurt. The

remainder of the train was largely undamaged, though partially derailed.

4.3 Subsequent technical investigations established that the direct cause of the derailment was the displacement of one of the movable ("switch") rails in the points as the train passed over them. This was made possible by the loss of nuts clamping two "stretcher bars" to the switch rails to hold them the correct distance apart. As a result, the rails were held in place only by another component (part of the signalling mechanism for detecting when the points were correctly positioned) which was not designed to bear this load and which fractured and came apart under the forces exerted on it by the passage of the train.

4.4 The mechanism by which the nuts had worked loose, as a result of the vibration effect of trains on the points over a period of time, became the subject of extensive research and testing. Because it was not immediately apparent how this had occurred, or why it had not been detected in the course of routine track inspections, some currency was given in the media in the aftermath of the derailment to a suggestion made by Jarvis (the company which held the track maintenance contract from the – then - infrastructure owner, Railtrack) that the defective condition of the points might have been the result of deliberate sabotage. This theory was subsequently discounted.

4.5 Two detailed technical investigations into the derailment were initiated, one by the Health & Safety Executive (HSE), which at the time was the railways' safety regulator, and one by the RSSB on behalf of the companies involved. The substantive report of the HSE's findings appeared in May 2003 and that of the RSSB's inquiry in 2005. Both reports contained numerous recommendations which were taken forward under the oversight of the regulator, a role taken over in 2006 by the ORR.

4.6 Any "non-natural" death occurring in England must be the subject of an inquest, conducted by a coroner. An inquest is not normally held until any other legal proceedings arising from the death, such as a criminal trial, have been completed. In the case of the Potters Bar derailment, the Crown Prosecution Service was not able to reach and announce its decision not to bring charges until autumn 2005, because this decision could not be taken until the state of the law relating to corporate manslaughter had been clarified by the trial arising from the earlier Hatfield derailment, which was held earlier that year. Representatives of the bereaved families then initiated an action in the High Court for a judicial review of the government's decision not to hold an independent public inquiry into the circumstances of the Potters Bar derailment. This case was heard in 2006, resulting in a judgement that an extended inquest (often called a "Middleton"-style inquest, after the leading case) would be sufficient to fulfil the state's duty under Article 2 of the European Convention on Human Rights to investigate suspicious deaths.

4.7 Arrangements were made for the inquest to start early in 2007, and for it to be conducted by a judge who had been appointed as an acting coroner for the purpose. But before the substantive hearings began, a further derailment occurred at Grayrigg in Cumbria. This was also caused by defective points, although these were of a different type from those involved at Potters Bar. The coroner suspended the proceedings and invited the government to consider whether, in the light of this development, it would be preferable to hold a joint inquiry into both events. The government deferred a decision on this until the RAIB (which had only come into existence after the Potters Bar derailment) had completed its investigation into Grayrigg. This report appeared late in 2008, and in early 2009 the government launched a consultation in which it invited all interested parties (including London

TravelWatch) for their views on whether to hold two separate inquests or a single public inquiry. Towards the end of the year, it announced its decision in favour of two separate inquests, but by this time the judge previously appointed to act as the coroner for Potters Bar had become unavailable to serve in that role, and it was necessary to find a replacement. The inquest finally opened at the beginning of June 2010, more than eight years after the event which gave rise to it.

## 5 The Potters Bar inquest

5.1 The inquest lasted for the whole of June and July, and received oral (or, in a few cases, written) testimony from more than 180 witnesses. London TravelWatch and Passenger Focus were jointly recognised as a party to the proceedings, technically known under the Coroners' Rules as an "interested person". Similar recognition was extended to the bereaved families, Network Rail, ORR, WAGN, the trade union RMT, and Jarvis (although as this company is now in administration, it was unrepresented – but several of its former staff and directors appeared as individuals). RSSB, the Department for Transport (DfT) and the British Transport Police (BTP) were represented as observers and provided evidence, but did not play any direct part in the questioning of witnesses.

5.2 The principal topics addressed in the course of the inquest were :

- eyewitness evidence from passengers who were present on the station or the train and from people who were in nearby buildings;
- the actions of members of the public, railway staff and emergency services who gave comfort and assistance to the victims;
- the protection of the site and the identification and preservation of evidence, and the subsequent recovery operation;
- the identification of the fatalities, notification of relatives and conduct of post-mortem examinations
- the examination of the condition of the points, the train and other equipment (such as signalling systems) after the derailment;
- the conduct of laboratory tests on the performance of various components under stress conditions;
- the history of the rolling stock involved;
- WAGN's immediate response to the accident (i.e. in passenger handling, and the provision of assistance to survivors and the bereaved);
- accounts by passengers on previous trains of "rough riding" which they had experienced in the vicinity of Potters Bar, and by railway staff involved in the investigation of such a report which had been made on the day preceding the accident;
- the development and attributes of the type of points which were involved in the derailment;
- the manufacture and supply of some of the components of the points, and Railtrack's procedures for their procurement and quality assurance;
- the installation, maintenance and inspection of the points and track in the vicinity of Potters Bar;
- the condition in which other similar sets of points were found when examined immediately after the derailment, and subsequently;
- HSE's procedures for examining and approving Railtrack's "safety case";

- the requirements of the contractual regime under which the infrastructure maintenance company (Jarvis) operated;
- the findings of the technical investigations conducted by HSE and RSSB in the aftermath of the derailment;
- the rail industry's (and its safety regulator's) actions in response to the recommendations arising from these investigations;
- the extent to which similar deficiencies in point maintenance and integrity have been identified in other incidents before and after Potters Bar, particularly that at Grayrigg in 2007;
- the safety regulation and accident investigation arrangements currently in force in the rail industry, and particularly the changes which have occurred since 2002 (including the creation of RAIB, the transfer of regulatory powers under the Health & Safety at Work etc Act from HSE to ORR, and the application of the EU Rail Safety Directive by means of ROGS);
- Network Rail's safety management system;
- trends in the rail industry's overall safety performance, post-privatisation;
- the safety implications, if any, of the use of contract labour for certain infrastructure works;
- current developments in the design (and risk assessment) of points;
- current standards for points maintenance and inspection, and the training and certification arrangements for relevant staff;
- research into and/or action taken on certain specific issues highlighted by the event at Potters Bar, such as the design of bridge parapets, the use of laminated glass in train windows, means of securing (or replacing) balance weights for overhead line electrification, and arrangements for capturing and investigating reports by passengers of "rough riding" by trains;
- the respective advantages and disadvantages of Red or Green Zone working for track inspection and maintenance (i.e. at times when trains are running, or during track "possessions");
- the reasons which led some representatives of the maintenance contractor (Jarvis) to advance sabotage as a possible cause in the aftermath of the derailment;
- the specific – and hopefully unique – sequence of events which resulted in the eight year delay in the convening of the inquest.

5.3 Relatives of the fatally injured victims of the derailment were afforded an opportunity to make personal statements about their lives and accomplishments.

5.4 Representatives of "interested persons" accompanied the coroner and jury on visits to the site of the derailment and to a Network Rail training facility to observe the design and operation of points.

5.5 The inquest was conducted to a tightly drawn-up timetable and it was repeatedly made clear by the coroner to all parties that he expected them to exercise restraint in questioning witnesses on matters already addressed in the course of his own counsel's examination-in-chief. London TravelWatch/Passenger Focus therefore concentrated primarily on suggesting fruitful lines of questioning to counsel before witnesses appeared, and were sparing in their exercise of their right to put questions directly, though they did do so when it seemed useful as a means of clarifying ambiguous or incomplete answers given already or in relation to topics which were not explored by other parties (such as the trajectory of the derailed carriage in the seconds before it came to rest across the station platforms). A full transcript is available at http://pottersbarinquest.independent.gov.uk/.

5.6 The coroner directed the jury that, on the evidence, no verdict other than accidental death could properly be reached. The jury was therefore invited to give a narrative verdict by answering yes/no/don't know to a series of specific questions which had been drawn up in consultation with all parties (and had been amended in the light of comments from Passenger Focus/London TravelWatch and others). In summary, the jury determined that the derailment was caused by the failure of the points as the train passed over them, and that the factors which contributed substantially to the cause of this included :

- defects in their design and specification;
- the difficulty of tightening the nuts on the stretcher bars which held the movable switch blades of the points apart;
- the ability of these nuts to become loosened by vibration;
- excessive dependence on the maintenance of very precise settings for certain points components;
- failures of inspection and maintenance of the points in the period prior to the derailment;
- failures in the provision of standards for points maintenance, in the training of the personnel who carried it out, and in the provision of appropriate tools;
- errors in the handling of a "rough ride" report received before the derailment, and the inadequacy of the system for capturing and actioning such reports.

Additionally, a causal factor in the death of the passer-by was :

- the design of the parapet of the bridge with which the train collided (causing material to fall onto the pavement below).

5.7 At the end of the inquest, the coroner announced his intention to submit a report, under Coroners' Rule 43, to one or more appropriate persons regarding measures which he believes should be taken to mitigate the risk of further deaths being caused in similar circumstances. He did not specify these measures at the time, as before making his report it was necessary for him to take due account of the jury's decision. But to assist him in this, he sought submissions (during the retirement of the jury) from the recognised parties on the topics which they believed could usefully be included. London TravelWatch/Passenger Focus argued that action under Rule 43 was most likely to be effective if used sparingly, and that any report should focus on the limited range of matters to which further impetus could still be added, rather than all those which had already been identified and addressed by the industry and its regulator in the eight years since the derailment occurred. We felt that such a report should therefore be restricted to arrangements for capturing and acting upon rough ride reports, and for ensuring that ease of maintenance is taken fully into account in the development of new designs of points. We did not oppose the suggestion, made by others, that a risk assessment should be made of the continuing use of conventional lock nuts on points of the type found at Potters Bar.

5.8 Following further written consultation with the parties involved, the coroner's Rule 43 reports have now been published. They are addressed to Network Rail and to the Association of Train Operating Companies, as appropriate, and do include the matters proposed by London TravelWatch/Passenger Focus. In addition, recommendations are made regarding research into the clamping forces required to maintain the integrity of stretcher bar nuts, an audit of the current state of points with adjustable stretcher bars, a more general risk assessment of such equipment, the design of the insulating bushes

used in stretcher bars of this type, arrangements for the procurement and auditing of components, improving the relevant written instructions to permanent way staff, the reporting of – and analysis of trends in - recurrent defects, and an associated review of this aspect of Network Rail's safety management system. The bodies to which recommendations are made are required to provide a written response within 56 days.

5.9 In considering this paper, it is important to bear in mind that, because of their rarity, multi-fatality events such as the Potters Bar derailment attract extensive media coverage. If and when they occur, it is important that they should be properly investigated so that any necessary lessons can be learned. But caution should be exercised in projecting general conclusions from individual – and often atypical – lapses in the industry's safety performance. RSSB's most recent annual safety performance report on the main line rail industry shows that, per mile travelled, the fatality risk rail to rail travellers is three times less than that by bus or coach, 32 times less than by car, 401 times less than by cycle, 513 times less than for pedestrians, and 1473 times less than by motorcycle. Since Potters Bar, there have been only two occasions on which passengers have been killed in train accidents in Britain, one of which (Ufton Nervet) resulted from the deliberate act of a motorist. Based on a ten-year moving average, the risk of a train accident involving fatalities is less than one per year. And in the four-year period 2005-08, the fatality rate for passengers and members of the workforce in incidents involving moving trains was less than one third of the average for the 25 EU member states which have rail systems.

## 6 Equalities and inclusion implications

6.1 No equalities and inclusion implications for London TravelWatch arise from this report.

## 7 Legal powers

7.1 Section 252A of the Greater London Authority Act 1999 places a duty upon London TravelWatch (as the London Transport Users Committee) to keep under review matters affecting the interests of the public in relation to railway passenger and station services provided wholly or partly within the London railway area, and to make representations about them to such persons as it thinks appropriate.

## 8 Financial implications

8.1 This report raises no specific financial implications for London TravelWatch.

## 9 Glossary

WAGN West Anglia Great Northern (former franchise which operated from 1994 to 2006)