



**TRAIN DERAILMENT AT UFTON LEVEL CROSSING,
NEAR UFTON NERVET, BERKSHIRE**

SATURDAY 6 NOVEMBER 2004

HSE INTERIM REPORT

10 November 2004

SUMMARY

The HSE investigation into the incident at Ufton Automatic Half Barrier (AHB) Level Crossing in Berkshire on Saturday 6 November 2004 is continuing.

All vehicles of a 10 vehicle High Speed Train derailed after the train struck a stationary car on the level crossing at approximately 18:11 hours and passed over 979 points at the entry to a Goods Loop. The derailed train came to rest no more than $\frac{1}{4}$ mile from the crossing, the power cars and coaches at various angles and orientations with severe damage to the train and infrastructure.

Latest casualty figures are that 7 were killed, and 37 people taken to hospital.

HSE investigators have not found any evidence at this stage to suggest that there were any errors by railway staff or faults with the level crossing, the signalling system or the train involved in the incident. Early indications are that a car driver stopped his vehicle on the crossing before the barrier sequence commenced and made no attempt to leave the vehicle once the crossing traffic signals began to flash and the barriers descended. The train struck the car. Damage to the crossing surface and sleepers between the crossing and 979 points indicates that the leading wheelset of the train derailed at the crossing and the train travelled in that condition until reaching the points. The derailment was then exacerbated as the train passed over the points.

HSE's investigation is focussing on the operation of the level crossing. All relevant evidence has been secured and is undergoing expert examination.

HSE has now completed its on-site investigation, and has withdrawn from the site. HSE will continue to support BTP's investigation as it continues.

The Rail Safety and Standards Board (RSSB) are managing and organising a rail industry Formal Inquiry by a three-person panel independent of any of the organisations involved. HSE will support this and monitor its progress and the implementation of any findings it makes.

INTRODUCTION

1. The Health and Safety Executive (HSE) is conducting an investigation, in close cooperation with British Transport Police (BTP) and Thames Valley Police (TVP), into the railway aspects of an incident at Ufton Automatic Half Barrier (AHB) Level Crossing, Ufton Nervet, near Aldermaston in Berkshire on 6 November 2004. The 17.35 First Great Western service from London Paddington to Plymouth struck a car at the crossing at 18:11 causing the leading power car of the train to derail. Catastrophic derailment of all vehicles then occurred as the train passed over the facing point at the London end of the Down Goods Loop.
2. There were approximately 180 passengers and four train crew (the Driver, two Train Managers and a Customer Host) on the train. Latest information regarding casualties is that 7 people were killed and 37 people were taken to hospital.
3. This report only records a factual account of progress to date and details of current lines of inquiry.

HSE INVESTIGATION

4. HSE is carrying out a joint investigation with British Transport Police (BTP), with whom it is working closely. Immediately on being informed of the incident three Inspectors from HSE's HM Railway Inspectorate (HMRI) went to the site, arriving from approximately 20:00 on Saturday 6 November. They were subsequently backed up by a further 4 Inspectors, including a Specialist Principal Inspector from HMRI's Level Crossings Section, who attended the site on Sunday, 7 November. The HSE site investigation was completed 16.00 on Monday 8 November.
5. The data logger from the level crossing and the On Train Monitoring Recording (OTMR) and the Automatic Train Protection (ATP) recording equipment from the HST have been obtained and downloaded. Records of risk assessment, maintenance and inspection of the level crossing have been obtained, as have signalling records from Reading Signalling Centre.
6. HSE inquiries have focused on the operation of the signalling system and the level crossing equipment. The Police investigation is centred on the reasons for the car being on the level crossing and the actions of the car driver. It has been widely reported that an off duty TVP officer witnessed the incident, with insufficient time for the officer to raise the alarm before the impact.

DETAILS OF THE INCIDENT

The level crossing

7. The track at Ufton is straightforward – one Up (i.e. towards London) Westbury and one Down (i.e. away from London) Westbury line. Approx 91 metres west of Ufton AHB Level Crossing there is a Down Goods Loop off the Down Line, accessed via 979 points.

8. The crossing is 43 miles 39 chains from Paddington in a rural area of Berkshire. The line is signalled by Track Circuit Block with Automatic Signalling from Network Rail's Reading Signalling Centre. The line in the area of the crossing is generally level. Down trains approach the crossing on a slight right hand curve before the line straightens and passes over the crossing and reaches a facing point for the Down Goods Loop at 43 miles 44 chains. At 43 miles 60 chains the line curves to the left and runs towards Aldermaston station. Line speed through the crossing is 100 mph.

9. Ufton Level Crossing is a standard AHB crossing. This type of crossing is protected by road traffic light signals and a lifting half-barrier on both sides of the railway. The crossing equipment is initiated automatically by an approaching train at the "strike in point" (1743 metres before the crossing), and the lowering of the barriers is preceded by the display of road traffic light signals. When lowered, the barriers only extend across the entrances to the crossing, leaving the exits clear. The strike in point for Down trains approaching Ufton crossing is correctly positioned to give a minimum warning time for road users of 27 seconds for trains running at line speed.

10. The Level Crossings Act 1983 as amended by the Level Crossings Regulations 1997 enables the Secretary of State for Transport to make Level Crossing Orders to specify the protective equipment provided. The function of making Orders is delegated to HSE's HMRI in most circumstances. Orders are required for all changes to protective arrangements at crossings where any roads or other highways to which the public has access cross a railway. The equipment and operation of this level crossing is authorised by the British Railways Board (Berks and Hants Railway) (Ufton Level Crossing) Order 1977 which came into force date on 19 September 1977. Two subsequent amendments to the Order exist - the British Railways Board (Berks and Hants Railway) (Upton Level Crossing) (Amendment No 1) Order 1983 and the British Railways Board (Berks and Hants Railway) (Upton Level Crossing) (Amendment No 2) Order 1983 which came into force on 16 May 1983 and 14 August 1983 respectively.

11. Network Rail reviews its risk assessments at crossings on an annual basis. HSE understands that the last review for Ufton was 8 July 2004. Details of this last review are still to be examined as part of the HSE investigation.

The train

12. The 17:35 First Great Western service (Train 1C92) from London Paddington to Plymouth was a 10 vehicle High Speed Train (HST) running in

reverse formation with the first class vehicles at the Country end. The formation was as follows:

London	⇨ Direction of Travel ⇨								Country
43029	44006	42020	42017	42022	42018	40206	41014	41013	43019
PC	TGS	TS	TS	TS	TSD	TRB	TF	TF	PC
Power Car	Coach A	Coach B*	Coach B*	Coach D	Coach E	Coach F	Coach G	Coach H	Power Car

*Two coaches were labelled as Coach B, there was no Coach C.

Sequence of events

13. The 17:35 London Paddington to Plymouth service departed from Paddington on time. It made a booked stop at Reading station, departed one minute late at 18:03, and the OTMR download from the HST identifies that the driver then took power and accelerated to linespeed of 100mph. The train initiated the crossing sequence for the Ufton AHB level crossing at 18:11 as it passed the “striking in point”, 1743 metres before the crossing. It took 39 seconds to then reach the crossing, giving the required 27 seconds of warning at the crossing.

14. At around this time an off-duty police officer, driving towards Ufton crossing had noticed that a car driver had stopped his vehicle on the crossing before the barrier sequence commenced and made no attempt to leave the vehicle once the crossing traffic signals began to flash and the barriers descended. The train struck the car at 18:11. The OTMR data indicates that the train brakes were applied some 2 to 3 seconds before the collision.

15. Subject to further detailed analysis, the crossing datalogger shows that the train “struck in” correctly, the red lights were proved alight and the barriers proved down. Two seconds after the barriers were proved down this indication was lost and “reappeared” at approximately the moment of impact. This is the subject of further consideration by HSE.

16. Level crossing equipment on the approach from the East was intact. Treadles associated with the “strike out” and the Up line have been damaged in the collision. The East wall of the equipment room has suffered minor damage, but this is believed to be irrelevant.

17. The HSE investigation has not found any evidence in any of the level crossing or train data downloads to suggest any fault in the signalling, level crossing or on train equipment, or with the actions of those personnel on duty.

18. Damage to the crossing surface and to sleepers between the crossing and the pointwork associated with the Down Goods loop indicate that the leading wheelset of the train derailed on the crossing on impact with the stationary car and the train travelled in that condition until reaching the facing points (979) at the London end of the Down Goods Loop some 91 metres further on. The derailment was then exacerbated as the train passed over the pointwork, followed by the catastrophic derailment of all vehicles.

19. The rear power car (43029) came to rest some 157 metres from the level crossing, leaning at approximately 60° to the horizontal and still attached to its bogies. Coach A (44006) and the first Coach B (42020) stopped at angles of between 50° and 80° to the horizontal, aligned roughly parallel to the direction of travel. The body of the second Coach B (42017) stopped across the Down Goods Loop line and the ballast shoulder, cress side of the Down Westbury line at approximately 30° to the direction of travel. All four vehicles had ploughed into the ballast shoulder to varying degrees and there had been detachment of bogies from bodyshell together with substantial damage to the substructures and loss of equipment from beneath floor level. Windows on the three passenger coaches were largely intact except at the rear right hand side of second Coach B where there was impact damage and bodyside ripping in the area of the last seating bay and the toilet. The rear power and three coaches A, first B and second B remained joined, but with varying degrees of rotation and damage to the buckeye couplers.

20. Coach D (42022) was detached from second Coach B and came to rest across the Down Westbury, the Down Loop line and also the lineside fence, leaning at around 70° and orientated at 45° to the direction of travel. The roof was severely damaged and pushed down into the body of the coach, probably by impact with the track formation as the coach rolled over. The side of the coach also showed evidence of contact with the track. At the country end there was soil on the roof, further suggesting the carriage had rolled. Most windows on this coach were broken and the bodyshell was detached from the bogies.

21. There was then a 15-20 metre gap in the train between Coach D and Coach F (40206), the buffet car. The buffet car had been bent double and was severely damaged. It was wrapped around an embedded bogie which was thrust upwards from the ballast into the centre of the vehicle. In the area between these two coaches there were 5 bogies pushed together perpendicular to the line of the track, approximately in the position of the Down Westbury line. One bogie was inverted. The post carrying Up direction signal R885 located on the Up side ballast shoulder in this area showed impact damage.

22. The country end of Coach F remained coupled to Coach G (41014) and both had been pushed/dragged through the cress bank with soil blocking the adjacent cress side doorways, although egress was available through the separated corridor connection.

23. Coach G had come to rest at an angle of 70 degrees and lay across the Down Goods Loop and the ballast shoulder to the Down Westbury orientated at approximately 15 degrees to the direction of travel. Windows on this vehicle were largely intact.

24. Coach H (41013) was still coupled to both Coach G and the leading power car. It rested on its left side on the Down Westbury ballast. Windows on the left side were broken.

25. The leading power car (43019) lay on its side on the ballast shoulder, cress side of the Down Westbury. It had ploughed into the shoulder with ballast and debris penetrating and partly filling the cab. The front faring

showed substantial impact damage and a large gash had been ripped in the base of the fuel tanks. The bogies remained in place. The rear of the power car showed some crumple damage as Coach H had been driven into it.

26. The body of Coach E (42018) came to rest on its side on the Up Westbury line, the rails of which shows that the bodyshell slid along it for some considerable distance. The coach lay out of position alongside coach G. Windows on this vehicle had been broken during the rescue operation.

27. There was severe damage and destruction of the track and formation from the vicinity of 979 points to beyond the final resting place of the leading power car, at around $\frac{1}{4}$ mile from the point of impact with the car. The scale of the incident and damage is consistent with the dissipation of the amount of energy associated with a train of this size - total weight approx 350 tonnes - travelling at 100 mph coming to rest only $\frac{1}{4}$ mile from the point of impact.

28. The likely sequence of events is that immediately after the impact between the train and the car on the level crossing, the leading wheelset of the front bogie of the leading power car derailed. As 979 points were reached the derailment progressed, momentum in the rear power car continued to propel the train forward and the train jack-knifed, probably assisted by some of the bogies taking the points and running down the Loop.

29. Working from the London end, the train divided between the second Coach B and Coach D, and between D and E and then between E and F, the buffet car. Coaches variously toppled and in part rolled. Coach bodysells became separated from bogies and elements became significantly embedded in the ballast. The body of Coach E was forced out of the formation and slid along the rails of the Up line, coming to rest alongside coaches G and H. Coach F, the buffet car was bent double around an embedded bogie. The leading power car and Coaches G and H came to rest on their sides. That other coaches remained generally upright appears largely due to them coming to lie against, and partially embedded in, the ballast shoulder.

FURTHER ACTION

30. HSE has now completed its on-site investigation, and has withdrawn from site. Now that lifting of the carriages has begun HSE do not see any reason why Network Rail should not start track repairs once the site has been cleared. It will be for Network Rail to judge the time needed for infrastructure repairs once the train has been removed.

31. HSE will continue to support BTP's investigation as it continues. In addition, the Rail Safety and Standards Board (RSSB) are managing and organising a rail industry Formal Inquiry by a three-person panel independent of any of the organisations involved. The purpose of the Formal Inquiry is to identify and learn any safety lessons for the industry. HSE will support this and monitor its progress and the implementation of any findings it makes.