RAIB

Rail Accident Investigation Branch

Rail Accident Report

Fatal accident at Trenos footpath crossing near Llanharan, Rhondda Cynon Taf, South Wales, 1 June 2017

Report 07/2018
May 2018

This investigation was carried out in accordance with:

- the Railway Safety Directive 2004/49/EC;
- the Railways and Transport Safety Act 2003; and
- the Railways (Accident Investigation and Reporting) Regulations 2005.

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Preface

The purpose of a Rail Accident Investigation Branch (RAIB) investigation is to improve railway safety by preventing future railway accidents or by mitigating their consequences. It is not the purpose of such an investigation to establish blame or liability. Accordingly, it is inappropriate that RAIB reports should be used to assign fault or blame, or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

The RAIB's findings are based on its own evaluation of the evidence that was available at the time of the investigation and are intended to explain what happened, and why, in a fair and unbiased manner.

Where the RAIB has described a factor as being linked to cause and the term is unqualified, this means that the RAIB has satisfied itself that the evidence supports both the presence of the factor and its direct relevance to the causation of the accident. However, where the RAIB is less confident about the existence of a factor, or its role in the causation of the accident, the RAIB will qualify its findings by use of the words 'probable' or 'possible', as appropriate. Where there is more than one potential explanation the RAIB may describe one factor as being 'more' or 'less' likely than the other.

In some cases factors are described as 'underlying'. Such factors are also relevant to the causation of the accident but are associated with the underlying management arrangements or organisational issues (such as working culture). Where necessary, the words 'probable' or 'possible' can also be used to qualify 'underlying factor'.

Use of the word 'probable' means that, although it is considered highly likely that the factor applied, some small element of uncertainty remains. Use of the word 'possible' means that, although there is some evidence that supports this factor, there remains a more significant degree of uncertainty.

An 'observation' is a safety issue discovered as part of the investigation that is not considered to be causal or underlying to the event being investigated, but does deserve scrutiny because of a perceived potential for safety learning.

The above terms are intended to assist readers' interpretation of the report, and to provide suitable explanations where uncertainty remains. The report should therefore be interpreted as the view of the RAIB, expressed with the sole purpose of improving railway safety.

The RAIB's investigation (including its scope, methods, conclusions and recommendations) is independent of any inquest or fatal accident inquiry, and all other investigations, including those carried out by the safety authority, police or railway industry.

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Fatal accident at Trenos footpath crossing near Llanharan, Rhondda Cynon Taf, South Wales, 1 June 2017

Contents

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Summary

At around 15:50 hrs on 1 June 2017, a pedestrian was struck and fatally injured by a train travelling from Cheltenham Spa to Maesteg, at Trenos footpath crossing near Llanharan, Rhondda Cynon Taf, South Wales. The pedestrian had walked onto the crossing, and did not move clear when the train driver repeatedly sounded the train horn and applied the emergency brake.

Approximately 20 minutes before the accident, another train had stopped at the crossing when its driver observed the pedestrian walking slowly over the crossing. The guard on this train had a short conversation with the pedestrian and, because he was concerned about her state of mind, asked his train driver to contact the signaller by radio. The driver's radio call was answered by a signaller located in Cardiff who relayed the message to a signaller at Port Talbot who was responsible for the Trenos area. As a result, the signaller was asked to stop trains at signals before the crossing and instruct drivers to proceed at caution when approaching the crossing. Based on out-of-date and misleading information shown on his display screen, the Port Talbot signaller put signals to red on either side of a closed crossing about 0.75 miles (1.2 km) from Trenos crossing. Shortly afterwards, he returned these signals to green, so the driver of the train involved in the accident was not cautioned and the train approached the crossing at normal speed.

The accident occurred because the pedestrian walked onto the crossing and into the path of an approaching train. However, it is possible that cautioning the train in accordance with railway rules would have avoided the accident. It is possible that the Port Talbot signaller's decision making was influenced by fatigue.

The RAIB has made one recommendation relating to the accuracy of signallers' displays. It has also identified three learning points. The first relates to the responsibility of staff to both report fatigue to their managers and to arrange their off-duty time so that they have sufficient sleep before the start of a shift. The second refers to the provision of, and familiarity with, up to date reference diagrams needed by signallers, and the third to the importance of signallers recording details about the cautioning of trains.

Introduction

Key definitions

1 Metric units are used in this report, except when it is normal railway practice to give speeds and locations in imperial units. Where appropriate the equivalent metric value is also given.

2 Sources of evidence used in the investigation are listed in Appendix A.

The accident

Summary of the accident

3 At about 15:50 hrs on 1 June 2017, a pedestrian was struck and fatally injured at Trenos footpath crossing near Llanharan, Rhondda Cynon Taf, South Wales. The crossing serves a footpath near Trenos Farm linking the villages of Bryncae and Brynna, about 1.3 km west of Llanharan. Two railway tracks cross the footpath at this location (figure 1).

4 The pedestrian, Beryl Morgan, aged 87, of Bryncae, walked onto the crossing from the south side of the railway. She was struck by train 2L59[1] operated by Arriva Trains Wales. The train was travelling west on the down line towards Bridgend at about 54 mph (87 km/h). The driver of the train had repeatedly sounded the train's horn and had applied the train's emergency brake before the collision.

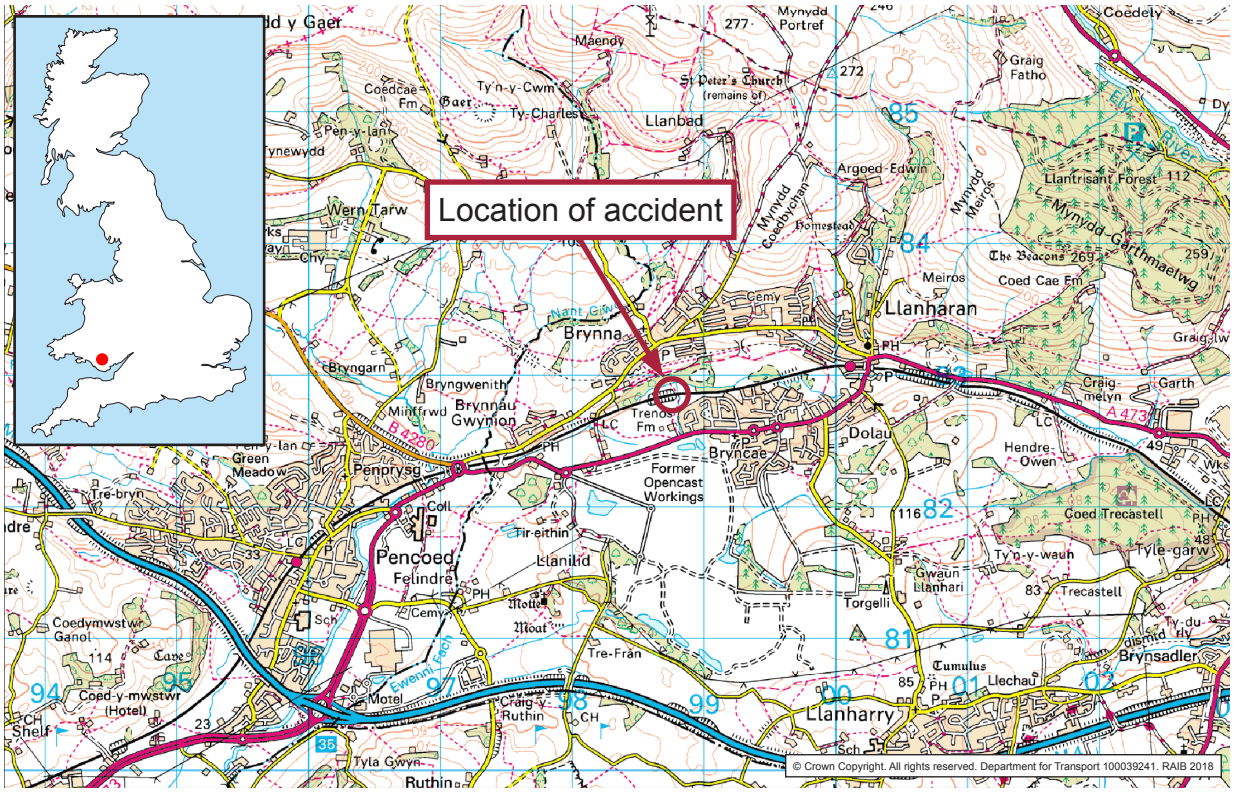

Figure 1: Extract from Ordnance Survey map showing location of accident

Context

Location

5 Trenos footpath crossing is located on the South Wales main line between Cardiff and Bridgend at a mileage of 184 miles 1276 yards[2]. It is situated on a two track section of railway between the stations of Llanharan and Pencoed (figure 2).

[1] Each train operating on Network Rail infrastructure is allocated an alphanumeric reporting code.

[2] Mileage is measured from London Paddington station via Gloucester.

6 Both lines were non-electrified with a maximum permitted line speed of 75 mph (121 km/h), and were equipped with three-aspect colour light signalling, controlled by a signaller located at panel 'A' in Port Talbot signal box (referred to as the Port Talbot signaller in this report). The workstation known as panel 'A' at Port Talbot uses a VDU screen as the signaller's interface.

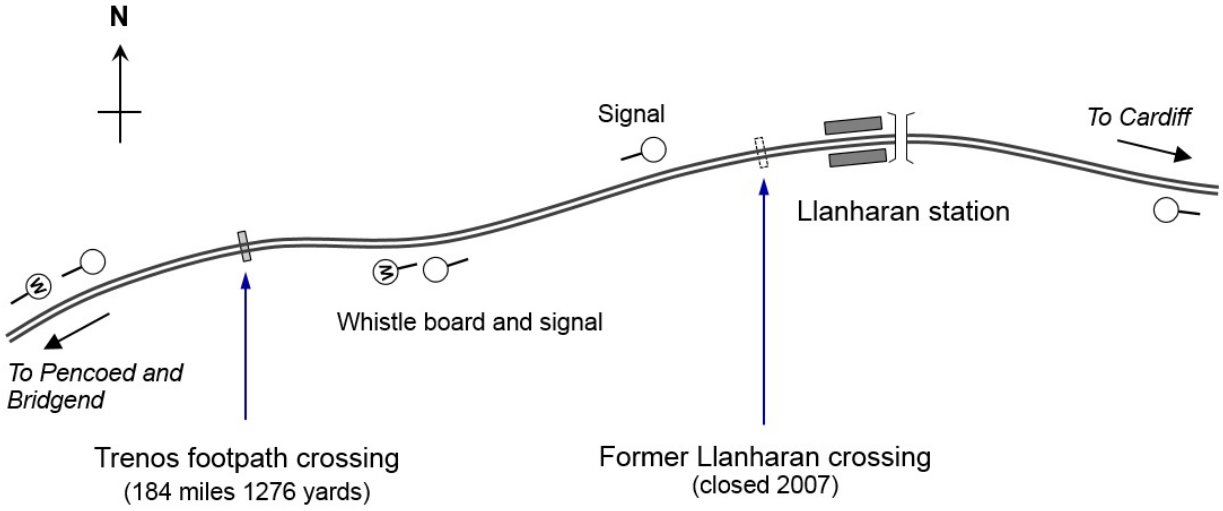

Figure 2: track layout diagram

Organisations involved

7 Network Rail's Wales Route[3] was the owner and maintainer of the railway infrastructure, including Trenos footpath crossing.

8 Arriva Trains Wales, a subsidiary of Arriva UK Trains, was the operator of the two trains involved. It was also the employer of the train crew on these trains.

9 Both parties freely co-operated with the investigation.

Trains involved

10 Train 1W66, the 13:10 hrs Milford Haven to Manchester Piccadilly service operated by Arriva Trains Wales, comprised a 2-carriage class 175 diesel multiple unit, number 175001. This train was on the up line used by trains travelling east towards Cardiff.

11 Train 2L59, the 13:45 hrs Cheltenham Spa to Maesteg service, comprised a class 158 diesel multiple unit, number 158824. This train was on the down line used by trains travelling west towards Bridgend.

Infrastructure involved

Trenos footpath crossing

12 Trenos footpath crossing (Trenos crossing) runs in a north-south direction with a pedestrian operated self-closing gate on each side of the railway. From the south side, the footpath crosses the down line and then the up line.

[3] In 2012, Network Rail devolved responsibility for day-to-day operation of Britain's main line railway to eight strategic geographical routes.

Figure 3: approach to Trenos crossing from the south

13 The approach from the south side is up a sloping path (figure 3 and figure 4). A pedestrian's view from this side of the railway looking towards trains approaching on the down line, the line used by the train which struck the pedestrian, is shown in figure 5.

Figure 4: Trenos crossing from the south with pedestrian gate open

Figure 5: View from south side of crossing looking east towards down trains on 1 June 2018 (photograph courtesy of Network Rail)

14 Users of Trenos crossing are responsible for checking that it is safe to cross (ie there are no warning lights, barriers or telephones provided). Whistle boards are provided requiring train drivers to sound a warning horn as they approach the crossing. This type of crossing is classified as a passive (or unprotected) crossing. This means there is no routine interaction between crossing users and the railway signaller. For this reason, crossings such as Trenos are not shown on the display screens used by signallers to control train movements.

15 Network Rail's risk assessment documentation for Trenos crossing was based on a routine assessment of the crossing undertaken on 11 January 2016. It recorded that the next assessment was due by 11 April 2018. The assessment found that the crossing did not have a history of misuse, and concluded that the risk controls in place at the crossing, with the inclusion of the temporary speed restriction over the up line (paragraph 21), were adequate for the current levels of pedestrian use.

16 Trenos crossing was inspected by Network Rail operations staff while responding to the accident on 1 June 2017. These staff found no evidence that the condition of the crossing was a factor in the accident and the RAIB concurs with this view.

Llanharan crossing

17 A bridleway level crossing (Llanharan crossing) was 80 metres west of Llanharan station until 2007. Railway telephones were provided to allow crossing users to contact the Port Talbot signaller. For this reason, Llanharan crossing was shown on the signaller's display screen in common with three other telephone-equipped crossings in the signaller's area.

18 Llanharan crossing, located 1.2 km east of Trenos crossing, was closed and fenced off when Llanharan station was re-opened in December 2007. The remainder of its crossing equipment (ie telephones and crossing deck) was removed in 2009 (figure 6). However, the signalling system was not updated and Llanharan crossing continued to be shown on the signaller's display screen.

Figure 6: driver's cab view showing site of former Llanharan crossing, photographed in July 2017

Other railway infrastructure

19 Trains travelling on the down line heading west pass signal PT3005, Llanharan station, the site of the former Llanharan crossing, signal PT3007, a whistle board and then Trenos crossing (figure 7). Drivers are required to sound train horns at the whistle board as a warning to users of Trenos crossing. Both signals are controlled by the Port Talbot signaller.

20 Trains travelling on the up line heading east pass a whistle board for Trenos crossing and signal PT3008 before reaching Trenos crossing (figure 7). They then continue past signal PT3006, the former Llanharan crossing and Llanharan station. Both these signals are controlled by the Port Talbot signaller. Shortly after passing Llanharan station, trains travelling on the up line enter the area controlled by the Vale of Glamorgan signaller located in Cardiff.

21 The maximum permitted line speed on both lines is 75 mph (121 km/h). However, the up line has a long-standing temporary speed restriction which restricts trains to a maximum speed of 50 mph (80 km/h). This provides additional protection for crossing users as the sighting of trains approaching from the west is restricted because of a curve in the track.

Staff involved

22 Both trains were operated by a driver and a conductor employed by Arriva Trains Wales.

23 The signallers located at Cardiff route operations centre and Port Talbot signal box were both employed by Network Rail Wales Route.

External circumstances

24 Weather records for Cardiff (Rhoose) airport indicate that at 15:50 hrs on 1 June 2017, conditions were dry and partly cloudy with visibility of 10 km and a gentle breeze (13 km/h) from the south-east. At the time of the accident, the angle of the sun would not have affected the sighting of train 2L59 from the crossing.

The sequence of events

Events preceding the accident

25 At about 15:29 hrs on 1 June 2017, a train travelling west on the down line towards Bridgend passed over Trenos crossing without its driver reporting anything amiss.

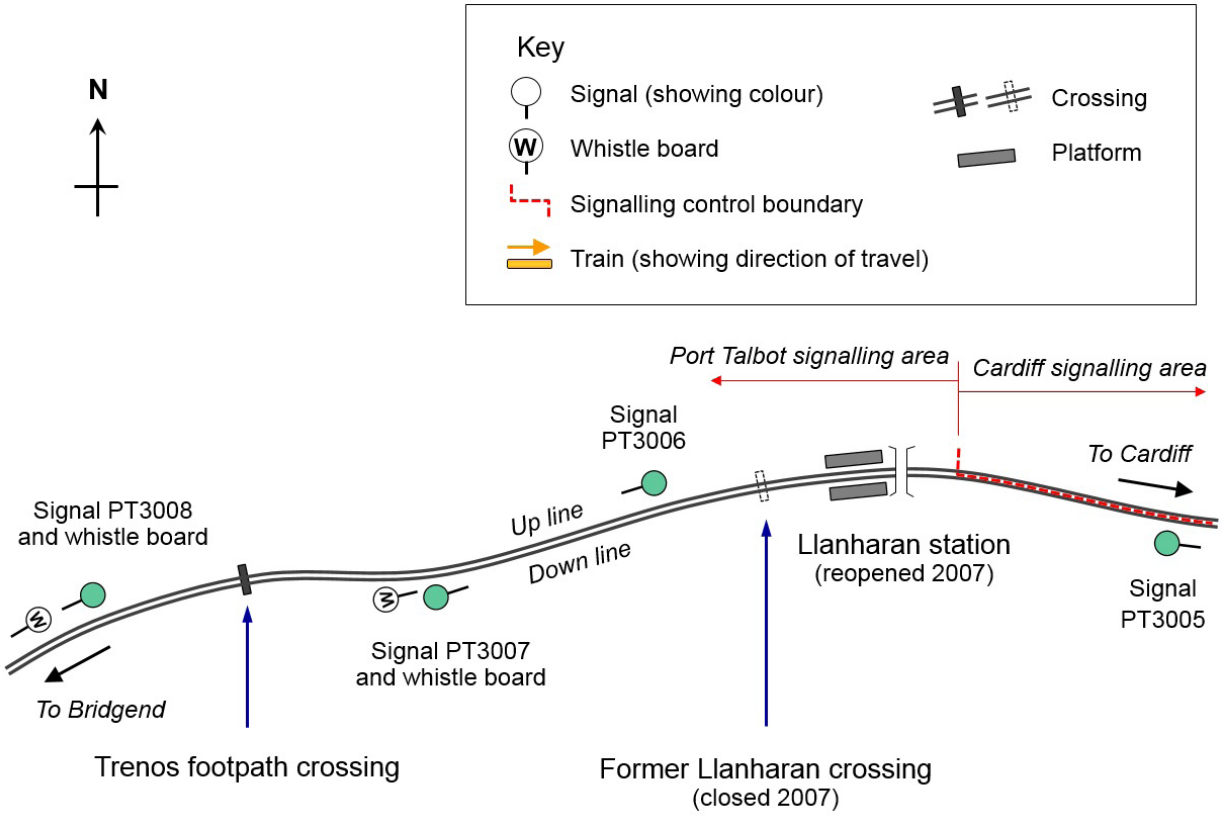

Figure 7: track and signalling layout diagram (not to scale). Note that the boundary between the Cardiff and Port Talbot signalling areas is staggered and signal PT3005 is within the Port Talbot signalling area.

26 At 15:31 hrs, the driver of train 1W66 approached Trenos crossing travelling east on the up line. The driver sounded the train's warning horn as he passed the whistle board. The train was travelling at about 50 mph (80 km/h). As the train approached the crossing, the driver observed a pedestrian crossing slowly from left to right ahead of his train.

27 The driver sounded the train's horn again, nine seconds before the crossing, and applied the brake. The on-train data recorder confirms that the driver did not use the train's emergency brake. At 15:32 hrs, the train stopped with its rear cab over the crossing (figure 8).

28 The driver looked out of the leading cab's right-hand window and saw the train's guard, who was travelling in the rear cab, speaking to the pedestrian. The guard believed the pedestrian was at immediate risk and shouted that she should get off the crossing. The driver then observed the pedestrian move off the crossing, and resumed the journey. He did not immediately report the incident despite the out of course stop. He attempted to contact the guard by the train's cab-to-cab telephone system, but this was not working.

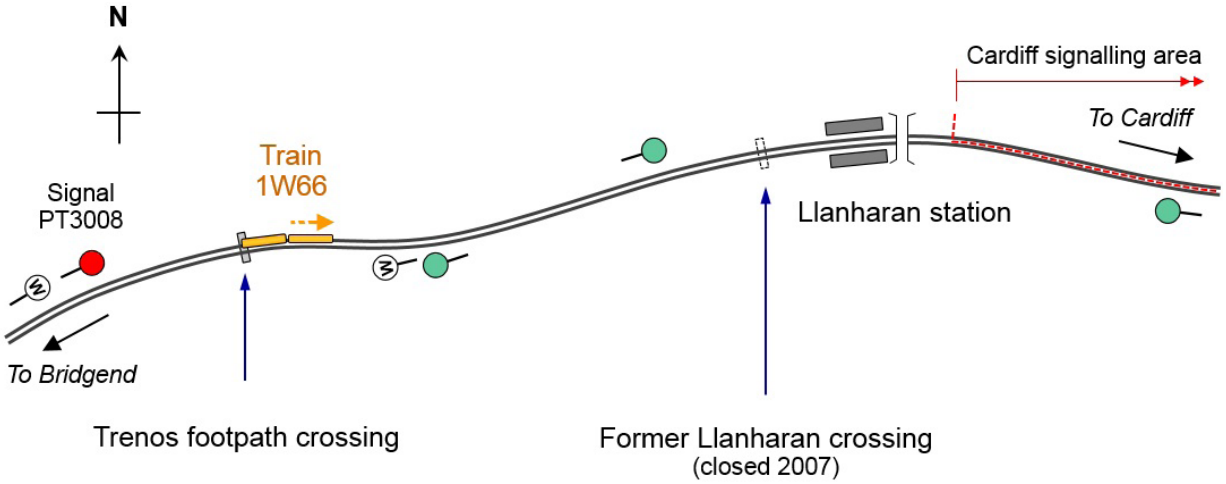

Figure 8: diagram at 15:32 hrs

29 The guard also used the train's cab-to-cab telephone but was unable to contact the driver. The guard ran through the 2-carriage train and entered the driver's cab. He informed the driver that he was concerned about the pedestrian's state of mind and advised the driver to report the incident to the signaller. The driver applied the brake and stopped the train for a second time east of Llanharan station at 15:35 hrs (figure 9).

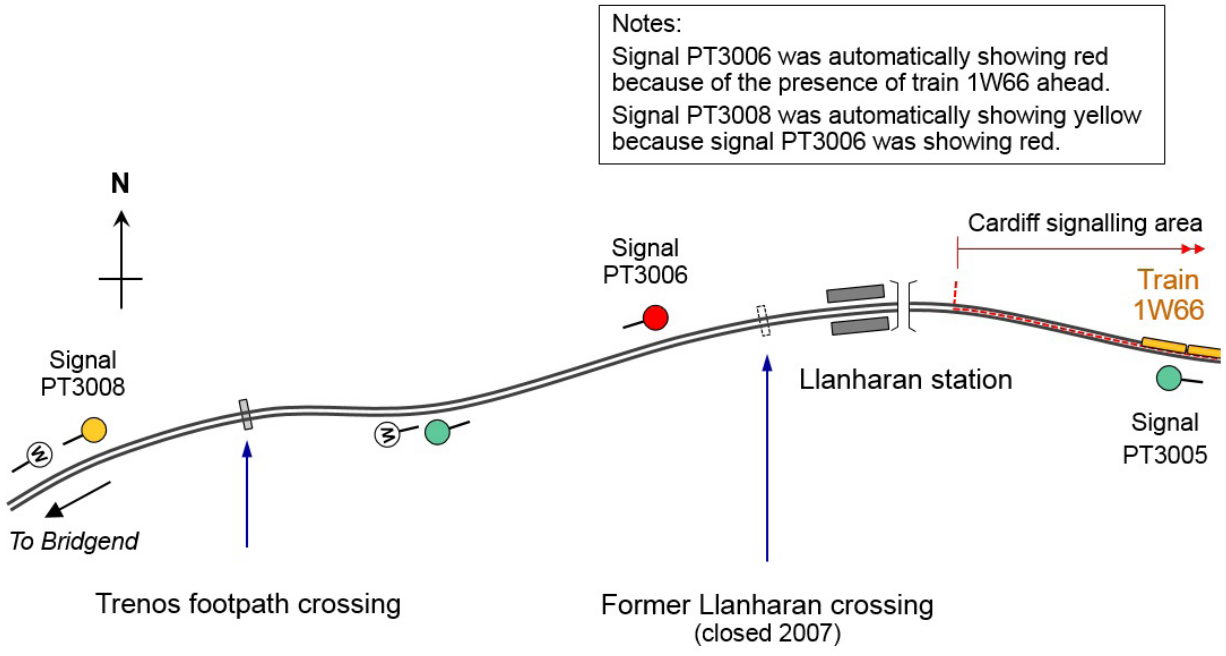

Figure 9: diagram at 15:35 hrs

30 The driver of 1W66 contacted the signaller using the train's in-cab GSM-R radio. This call was automatically routed to the Vale of Glamorgan signaller located in Cardiff (Cardiff signaller) because the train had crossed the boundary between the Port Talbot and Cardiff signalling areas. The driver of train 1W66 informed the Cardiff signaller that there was a person at "the first boarded crossing of Port Talbot's [signalling area]", who seemed confused. The Cardiff signaller asked the driver for a mileage for the crossing and was told that it was about two miles back.

31 The Cardiff signaller told the driver that he would inform the Port Talbot signaller as the crossing was in the Port Talbot signalling area. The Cardiff signaller requested, and was given, a description of the pedestrian. The driver stated that the pedestrian was at "the first boarded crossing of Port Talbot's [signalling area]." The driver did not have the geographical knowledge to describe the location more accurately, and his training[4] did not require him to know Trenos crossing's name or mileage.

32 At 15:37 hrs, the Cardiff signaller telephoned the Port Talbot signaller to pass on the message. The Cardiff signaller stated that the pedestrian was "on a crossing they've just gone over about two miles from where they are now." The Port Talbot signaller asked the Cardiff signaller "Llanharan station. Is it the foot crossing?" to which the Cardiff signaller replied "the foot crossing, yes". Llanharan crossing was the closest crossing to the signalling boundary shown on the Port Talbot signaller's display screen (paragraph 17).

33 The Cardiff signaller asked the Port Talbot signaller to caution trains approaching that crossing. The signallers agreed that because the incident was entirely within the area controlled by the Port Talbot signaller, the Cardiff signaller needed to take no further action.

34 At about 15:38 hrs (figure 10), the Port Talbot signaller put signals PT3006 (up line) and PT3005 (down line), either side of Llanharan station to red so that he could caution trains. When trains are to be cautioned, they are first stopped. The driver is then instructed by the signaller to proceed at caution until the specified hazard is passed. A driver may be instructed to report back to the signaller.

35 Signals PT3006 and PT3005 would have been the correct signals to caution trains for the former Llanharan crossing, but the signals needed to protect Trenos crossing were signal PT3007 (down line) and signal PT3008 (up line).

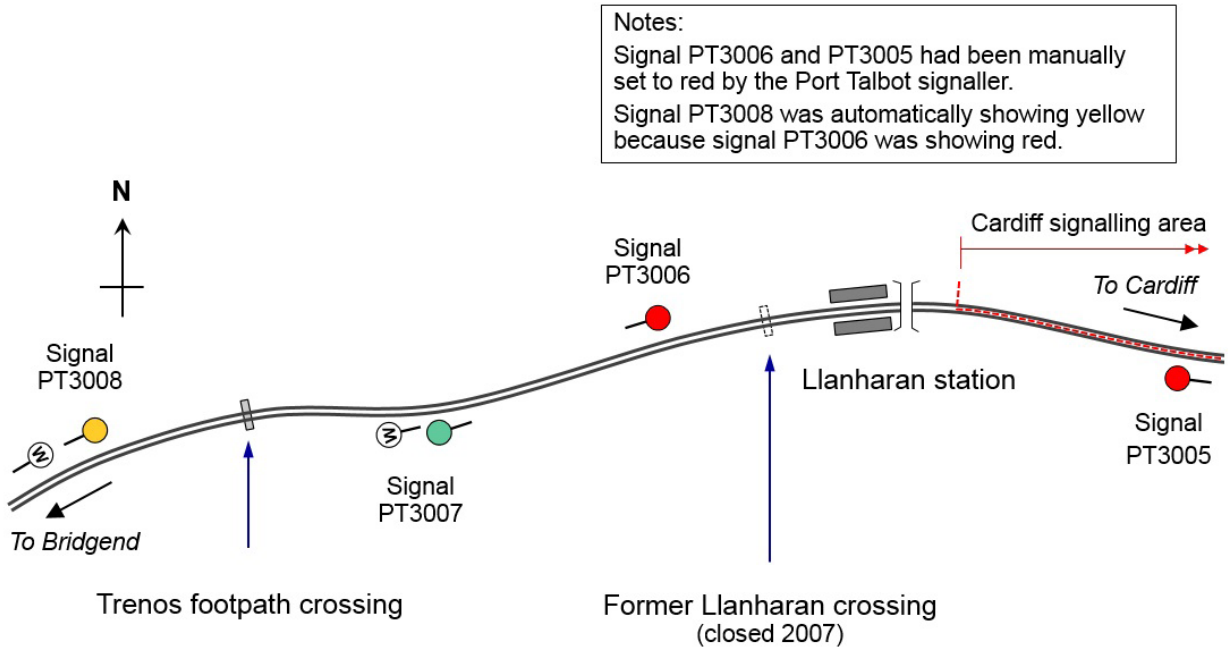

Figure 10: diagram at about 15:38 hrs

[4] Arriva Trains Wales 'route knowledge' requirements for its drivers did not include the passive crossings between Cardiff and Bridgend.

36 At about 15:40 hrs, two minutes and five seconds after the Port Talbot signaller had put signals PT3005 and PT3006 to red, he cleared the signals to green (refer to paragraph 56). This action restored normal running and removed the opportunity for the signaller to stop trains to caution drivers about the person reported by the driver of train 1W66.

37 Shortly before the accident, a local dog walker had seen train 1W66 stationary on the crossing from a distance across a field. As she got nearer, she observed that the train had departed, but that there was a person standing on the crossing. She was concerned and left her dog in the field while she walked onto the crossing and moved the person off the railway, leading them back behind the pedestrian gate. She had a short conversation with the person, whose family she knew, then retrieved her dog and continued her walk. Shortly afterwards, she became concerned and telephoned a member of the person's family to inform them of the situation.

38 At 15:48 hrs (figure 11), train 2L59 departed from its booked stop at Llanharan station and accelerated towards its next stop at Pencoed station. This service was due to depart Llanharan at 15:36 hrs, but had been delayed at Cardiff and was running about 12 minutes late.

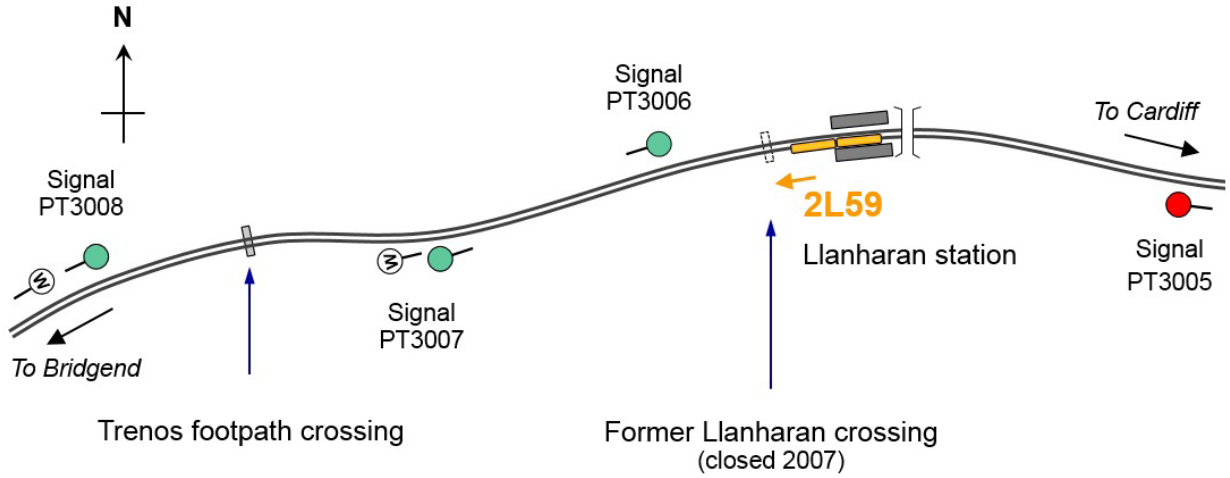

Figure 11: diagram at 15:48 hrs

39 Train 2L59's on-train data recorder[5] indicates that signal PT3007 was displaying a green aspect as the train approached (figure 12). It also indicates that the driver then sounded the train's warning horn about 380 metres (16 seconds) from the crossing as it passed the whistle board located just beyond the signal.

[5] Similar to the 'black box' carried by commercial aircraft.

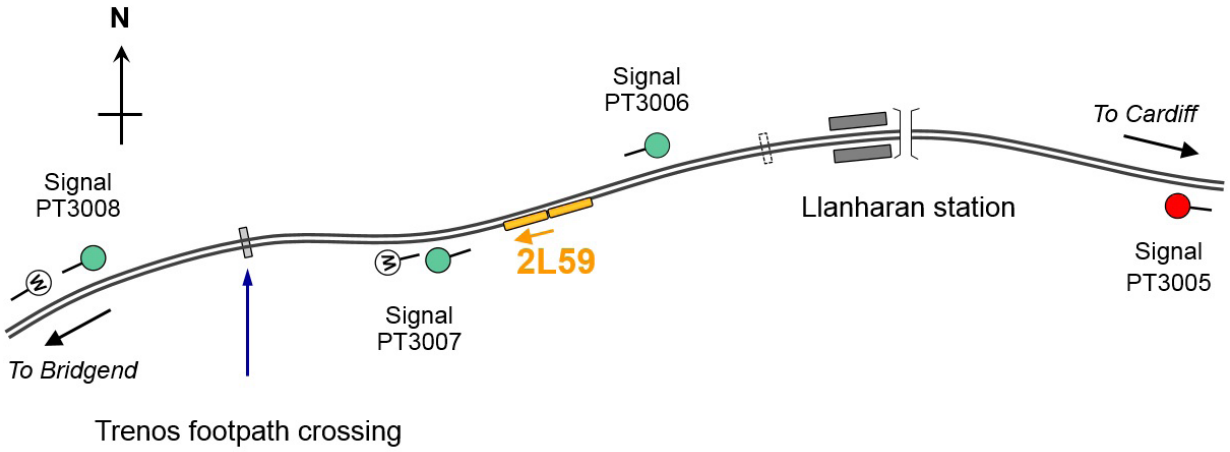

Figure 12: diagram at 15:49:30 hrs

40 At 15:49:45 hrs (figure 13), train 2L59's data recorder indicates that the train was 250 metres (10.5 seconds) from the crossing when its driver started to repeatedly sound the train's warning horn. The driver took this action after seeing a pedestrian walking onto the crossing from the left side of the track.

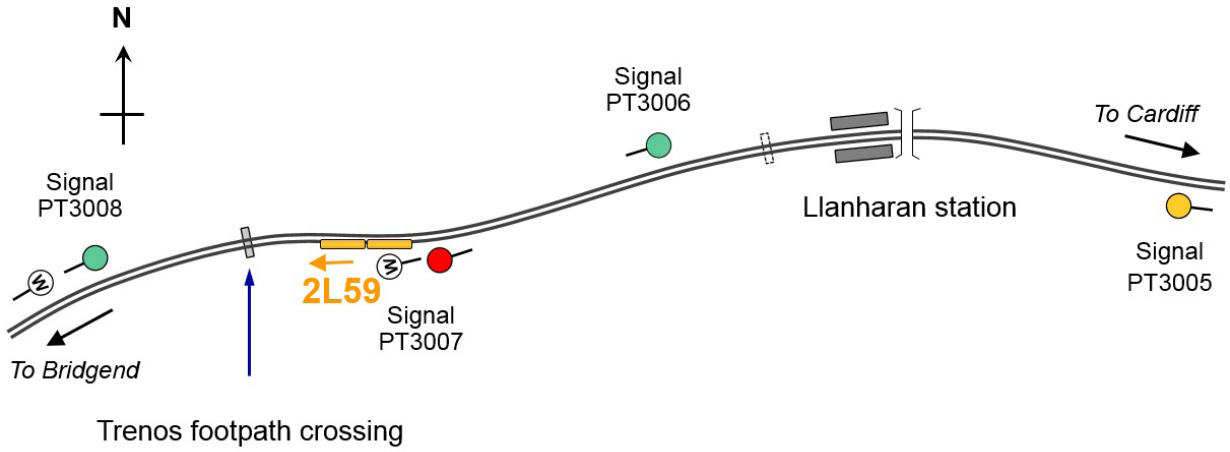

Figure 13: diagram at 15:49:45 hrs

41 The train was 130 metres (5.5 seconds) from the crossing (figure 14) when the driver applied the train's emergency brake. The train was travelling at 54 mph (87 km/h) on a section of line where the maximum permissible speed was 75 mph (121 km/h).

Events during the accident

42 The train struck the pedestrian who had walked onto the crossing and did not move clear in response to repeated warnings from the train horn. The train continued to slow down, and stopped approximately 310 metres beyond the crossing at 15:50:20 hrs.

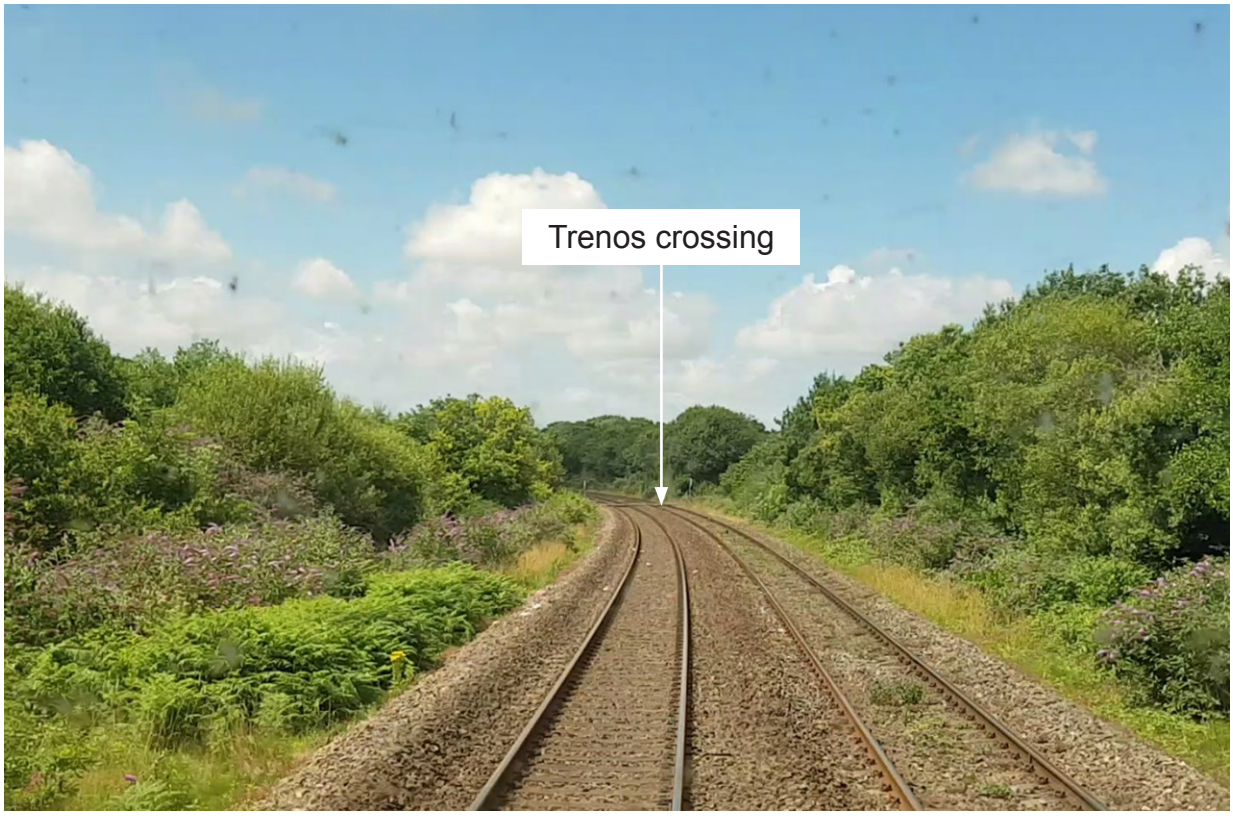

Figure 14: Driver's cab view from a similar train travelling on the down line used by the incident train. Trenos crossing is about 130 metres ahead (5.5 seconds for a train travelling at the speed of the incident train).

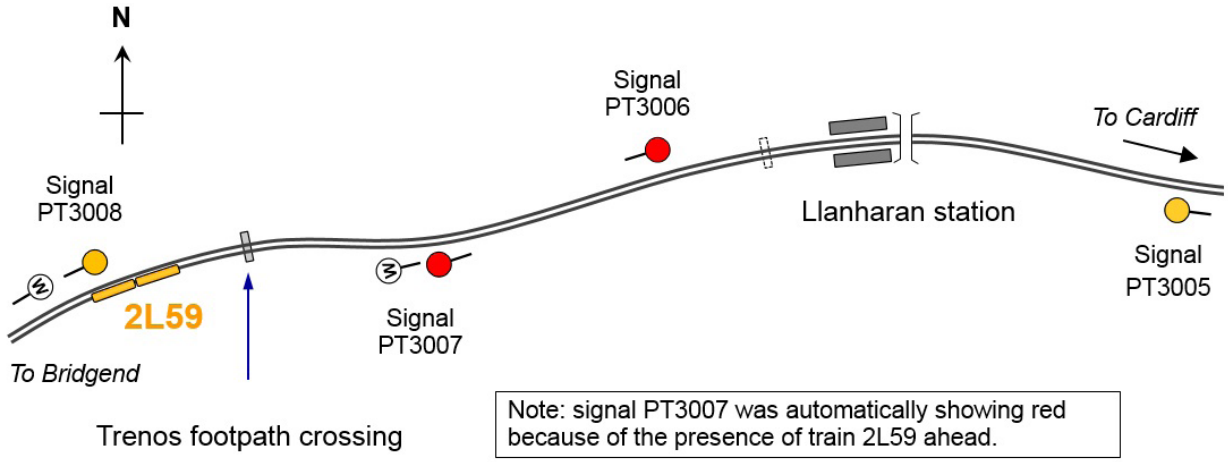

Figure 15: diagram at 15:51 hrs

43 The driver of train 2L59 contacted the Port Talbot signaller using the in-cab radio's emergency button. He informed the signaller that his train had struck a pedestrian on the level crossing just after Llanharan station. In response, the Port Talbot signaller put signal PT3006 to red (figure 15). This would have prevented a train approaching Llanharan crossing on the up line but would not have prevented a train approaching Trenos crossing. At 15:58 hrs, the signaller put signals PT3005 and PT3008 to red. Although the signaller still believed the accident had occurred at Llanharran crossing, this action also prevented trains approaching Trenos crossing.

44 The driver of a train approaching Trenos crossing on the up line heard the emergency broadcast from the driver of train 2L59 and brought their train to a halt before passing signal PT3008. This driver did not witness the accident.

Events following the accident

45 A British Transport Police (BTP) officer was travelling on train 2L59 and reported the accident to the BTP control room. The BTP officer took control of the scene and assisted the driver.

46 BTP, Ambulance services and Network Rail Mobile Operations Managers were notified by the Port Talbot signaller, who directed them to Llanharan station, due to his incorrect understanding of the crossing involved (paragraph 32). After further enquiries, the emergency services and staff were re-directed to Trenos crossing.

Inquest

47 An Inquest was held at Aberdare Coroner's court on 26-27 February 2018 under the direction of the Coroner for Powys, Bridgend and the Glamorgan Valleys. The Inquest heard evidence that Mrs Morgan had been found on the crossing by the crew of train 1W66 (paragraph 28), and physically removed from the crossing by a local resident after the train had left (paragraph 37). She was struck after returning to the crossing again a few minutes later. After hearing the evidence (including evidence from the RAIB), the jury returned a verdict of Accident, meaning that the cause of death was unnatural but not unlawful. The jury considered, but rejected, a verdict of suicide.

Key facts and analysis

Identification of the immediate cause

48 **The pedestrian walked onto Trenos crossing as train 2L59 was approaching.**

49 As train 2L59 approached Trenos crossing, its driver saw the pedestrian standing at the side of the railway before she moved onto the crossing. The driver started sounding the train's warning horn repeatedly when the train was 10.5 seconds from the crossing (paragraph 40) but the pedestrian did not move clear. The driver applied the emergency brake 5.5 seconds from the crossing and then could take no further avoiding action.

Identification of causal factors

50 The accident occurred because the pedestrian walked onto the crossing and into the path of an approaching train and did not move clear (paragraph 52).

51 The following possible causal factors lead to the safety learning for the railway which is presented at paragraph 76:

a. Train 2L59 was not cautioned, and it is possible that cautioning would have avoided the accident (paragraph 54).

b. Graphical information provided on the signaller's display was out-of-date and misleading (paragraph 57).

c. It is possible that the signaller's decision making was influenced by fatigue (paragraph 60).

52 **The accident occurred because the pedestrian walked onto the crossing and into the path of an approaching train and did not move clear.**

53 The Inquest heard evidence that Mrs Morgan had twice returned to the crossing (paragraph 47). There is no evidence suggesting that these actions were influenced by the design and/or management of the crossing.

54 **Train 2L59 was not cautioned, and it is possible that cautioning would have avoided the accident.**

55 The Port Talbot signaller had been a signaller for over 15 years. He was regarded as reliable and competent by his managers, and was experienced in cautioning trains. He had no known history of contravening procedures.

56 The signaller took action to protect Llanharan crossing (refer to paragraph 58), but then removed the protection just over two minutes later and before any trains had approached. There is no conclusive evidence to explain why the signaller removed the protection at this time, as he did not record this action as required by railway signalling regulations[6]. Signalling regulations[7] also required him to continue to tell each driver to proceed at caution until he was sure the line was clear. The signaller subsequently informed his employer that he cleared the signals because he was aware that the next train in each direction was scheduled to stop at Llanharan station. This meant that both trains would be travelling slowly as they passed Llanharan crossing. This approach was not compliant with signalling regulations.

57 **Graphical information provided on the signaller's display was out-of-date and misleading.**

58 The Port Talbot signaller understood, from the telephone message he received from the Cardiff signaller, that he needed to protect a crossing close to the signalling control boundary (paragraph 32 and figure 7). His display screen indicated that this was Llanharan crossing located just west of Llanharan station. He took action to protect this crossing, unaware that it was the wrong location and that the crossing no longer existed. He later dispatched emergency services to the same place.

59 The display screen used by signallers operating Port Talbot signal box panel 'A' continued to show Llanharan crossing despite it having been closed in 2007 and removed in 2009 (paragraph 18). The signaller's display was not updated to reflect the removal of the crossing when this happened. Network Rail's Signalling Design Handbook, standard NR/L2/SIG/11201[8], stipulates that design, such as the removal of level crossings, should be complete and fit for purpose. To be considered complete, the design for the removal of Llanharan crossing should have specified the removal of Llanharan crossing references from the complete signalling system, including the signaller's display.

60 **It is possible that the signaller's decision making was influenced by fatigue.**

61 On 1 June 2017, the Port Talbot signaller started his shift at 06:00 hrs. He had a break between 12:00 hrs and 13:00 hrs and was due to finish at 18:00 hrs (ie a 12 hour turn of duty). This was preceded by two days during which he was rostered to work six hour daytime support shifts, and prior to that he had two rest days. Although he had worked five 12 hour night shifts during the previous week, the RAIB considers it unlikely that his working hours would have caused him to be unusually fatigued.

62 However, the RAIB considers that it is likely that the signaller was fatigued due to insufficient sleep, and that it is possible that this influenced his decision making when he removed the protection without being sure that the line was clear. Although he had not informed his manager about fatigue issues prior to the events at Trenos crossing, he has since stated to his employer that he had had about four hours sleep during the night before the accident, due to personal circumstances.

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[6] Rule Book GE/RT8000/TS1 'General signalling regulations' issue 11, clause 1.1.

[7] Rule Book GE/RT8000/TS1 'General signalling regulations' issue 11, clause 18.1.

[8] Network Rail standard NR/L2/SIG/11201 'Signalling design handbook' issue 10, clause 8.1.

Observation

63 **Up to date reference diagrams were not available to the signaller.**

64 Standard NR/L2/SIG/11201[9] requires signallers to be provided with a list of information not shown permanently on the signalling display. This includes the location of all level crossings, including those which are not equipped with telephones (paragraph 14). At Port Talbot signal box, this information was provided in a booklet[10] containing reference diagrams, sometimes known as 'line diagrams', showing the location of tracks, signals and level crossings.

65 The booklet was marked as being a 'Controlled Document', but although it was last amended in January 2017, the relevant line diagram was not up to date as it continued to show the former Llanharan bridleway crossing as well as Trenos footpath crossing. The signaller knew the booklet existed, but it was kept in a different part of the signal box and was not readily available. The signaller did not consult the booklet but, because both crossings were shown, consulting it when responding to the message given by the driver of train 1W66 could still have led the Port Talbot signaller to conclude that the pedestrian was at Llanharan crossing (paragraph 32).

[9] Network Rail standard NR/L2/SIG/11201- Mod A2 'Signalling design module A2: Minimum requirements for design details' issue 5, clause 5.1.1.

[10] ACE/MOM/CDF/02-2017 'South Wales main line Port Talbot Panel Area 2017'.

Summary of conclusions

Immediate cause

66 The pedestrian walked onto Trenos crossing as train 2L59 was approaching (paragraph 48).

Causal factors

67 The accident occurred because the pedestrian walked onto the crossing and into the path of an approaching train and did not move clear (paragraph 52).

68 The following possible causal factors lead to safety learning for the railway:

a. Train 2L59 was not cautioned, and it is possible that cautioning would have avoided the accident (paragraph 54, **Learning point 3**).

b. Graphical information provided on the signaller's display was out-of-date and misleading (paragraph 57, **Recommendation 1**).

c. It is possible that the signaller's decision making was influenced by fatigue (paragraph 60, **Learning point 1**).

Observation

69 Up to date reference diagrams were not available to the signaller (paragraph 63, **Learning point 2**).

Actions reported that address factors which otherwise would have resulted in a RAIB recommendation

70 The Network Rail operations manager responsible for Port Talbot signal box has taken steps to update the booklet containing line diagrams used by signallers at Port Talbot signal box to remove references to Llanharan crossing (paragraph 64).

71 Network Rail Wales Route has re-briefed its signallers to help them identify possible risks and/or consequences of fatigue. The re-briefing also included suggested techniques for managing their own fatigue and what actions they should take if they become aware of tiredness, one of which is to inform their line manager.

72 Network Rail Wales Route has commenced a programme to brief and train its signallers on the process for forwarding incoming GSM-R radio calls to the correct person (eg a signaller at an adjacent signal box) when necessary.

73 The RAIB has written to Network Rail to express its concern at the out-of-date information shown on the signaller's display panel, and the lack of up-to-date and readily available information on the location of all level crossings provided to signallers at Port Talbot signal box.

74 Network Rail has installed a new type of audible warning device at Trenos crossing. The device is activated automatically as a train approaches and reproduces the sound of a train horn. This provides a secondary warning in the event that a crossing user does not hear the approaching train's horn.

Recommendation and learning points

Recommendation

75 The following recommendation is made[11]:

1 *The intent of this recommendation is to ensure that accurate information is displayed to signallers.*

Network Rail Wales Route should check that signallers' displays for level crossings accurately reflect changes to level crossing arrangements made since the displays were designed. It should take suitable risk mitigation measures where this is not the case, and inform other Routes of the extent of inconsistencies found (paragraph 68b).

Learning points

76 The RAIB has identified the following key learning points[12]:

1 It is essential for staff undertaking safety critical roles to arrange their off-duty time so that they are able to get sufficient sleep before the start of a planned shift, and to inform their managers if fatigue has the potential to prevent them from undertaking their duties safely (paragraph 68c).

2 Signallers should have ready access to, and be familiar with, up to date infrastructure information to assist them in making decisions in response to reported incidents (paragraph 69).

[11] Those identified in the recommendation have a general and ongoing obligation to comply with health and safety legislation, and need to take this recommendation into account in ensuring the safety of their employees and others.

Additionally, for the purposes of regulation 12(1) of the Railways (Accident Investigation and Reporting) Regulations 2005, this recommendation is addressed to the Office of Rail and Road to enable it to carry out its duties under regulation 12(2) to:

(a) ensure that recommendations are duly considered and where appropriate acted upon; and

(b) report back to RAIB details of any implementation measures, or the reasons why no implementation measures are being taken.

Copies of both the regulations and the accompanying guidance notes (paragraphs 200 to 203) can be found on RAIB's website www.gov.uk/raib.

[12] 'Learning points' are intended to disseminate safety learning that is not covered by a recommendation. They are included in a report when the RAIB wishes to reinforce the importance of compliance with existing safety arrangements (where the RAIB has not identified management issues that justify a recommendation) and the consequences of failing to do so. They also record good practice and actions already taken by industry bodies that may have a wider application.

3 It is important that signallers record the reason and location when a caution is applied (eg in the Train Register or Occurrence Book), together with another entry for when and why it is removed. This will assist them to check that their actions are correct, and enable them to accurately explain their actions if necessary at a later date (paragraph 68a).

Appendices

Appendix A - Investigation details

The objectives of the RAIB's investigation were to investigate the actions of railway staff and equipment associated with this accident. The RAIB did not consider why the pedestrian was on the crossing, as this was outside the scope of the investigation and was deemed to be a matter for the Inquest to determine.

The RAIB used the following sources of evidence in this investigation:

- information provided by witnesses;
- information taken from the on-train data recorder on both trains (OTDR);
- signalling data;
- recordings of radio and telephone messages;
- site photographs and measurements;
- weather reports and observations at the site; and
- Network Rail's level crossing assessment and inspection records.

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