Rail Accident Investigation Branch

RAIB Bulletin 01/2013

Near miss at Four Lane Ends level crossing, near Burscough Bridge, Lancashire, 28 September 2012

Description of the incident

1 At approximately 18:20 hrs on Friday 28 September 2012, train 2F87, the 17:03 hrs passenger service from Manchester Airport to Southport, operated by Northern Rail, narrowly avoided a collision with a car that was crossing the railway at Four Lane Ends public level crossing, near Burscough Bridge (figures 1 and 2).

2 The crossing is provided with barriers, which are normally in the lowered position, operated by a Network Rail crossing keeper from inside a cabin by the crossing. Miniature stop lights facing road users are also provided, which are operated automatically by approaching trains. They show a red light when a train is detected as approaching the crossing and a green light when it is safe to cross the railway. The lights are not electrically interlocked with the barriers, which have to be raised by the crossing keeper to allow road traffic to pass over the crossing.

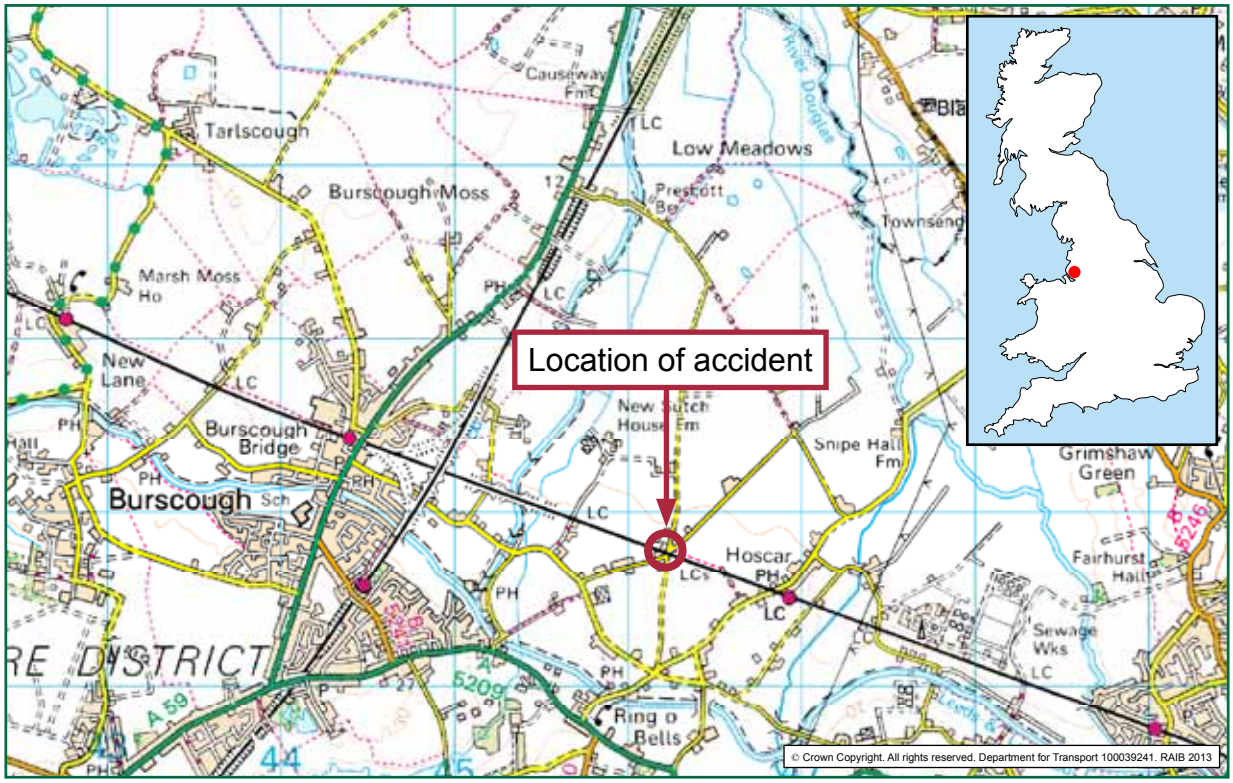

Figure 1: The location of Four Lane Ends level crossing

3 The crossing keeper made an error and raised the barriers when the lights were showing red in response to the car waiting at the crossing. He had been distracted by spilling a hot drink over a computer keyboard and did not check the indication of the lights before raising the barriers.

4 The train consisted of a class 156 unit (leading) and a class 142 unit travelling at 65 mph (105 km/h). As the train approached the crossing, its driver noticed that the barriers were in the raised position and the car was at the down side[1] of the crossing (ie to the left of the train in its direction of travel). The train driver applied the emergency brake and sounded the horn as the car drove across the crossing. A collision was narrowly avoided.

Figure 2: Four Lane Ends level crossing in the direction that the car approached

Crossing operation

5 The barriers, which are normally in the lowered position, close off the whole width of the road. The crossing keeper should only raise the barriers when a road vehicle approaches, provided that the miniature stop lights (figure 3) are at green, indicating that no train is approaching the crossing. However, because there is no interlocking, there is nothing to prevent the crossing keeper raising the barriers at any time.

6 The crossing keeper operates the barriers from a control panel in the crossing keeper's cabin (figure 4). It has separate raise and lower buttons, which have to be pressed and held to cause the barriers to move. Lights on the panel repeat the indication of the miniature stop lights (figure 4). In addition, an audible alarm sounds for about five seconds in the cabin when the lights change from green to red to alert the crossing keeper. There is a minimum of 40 seconds between the red light illuminating and the arrival of a train travelling at the permitted speed for the line.

[1] The down direction of the railway is towards Southport.

Figure 3: The miniature stop lights at Four Lane Ends crossing

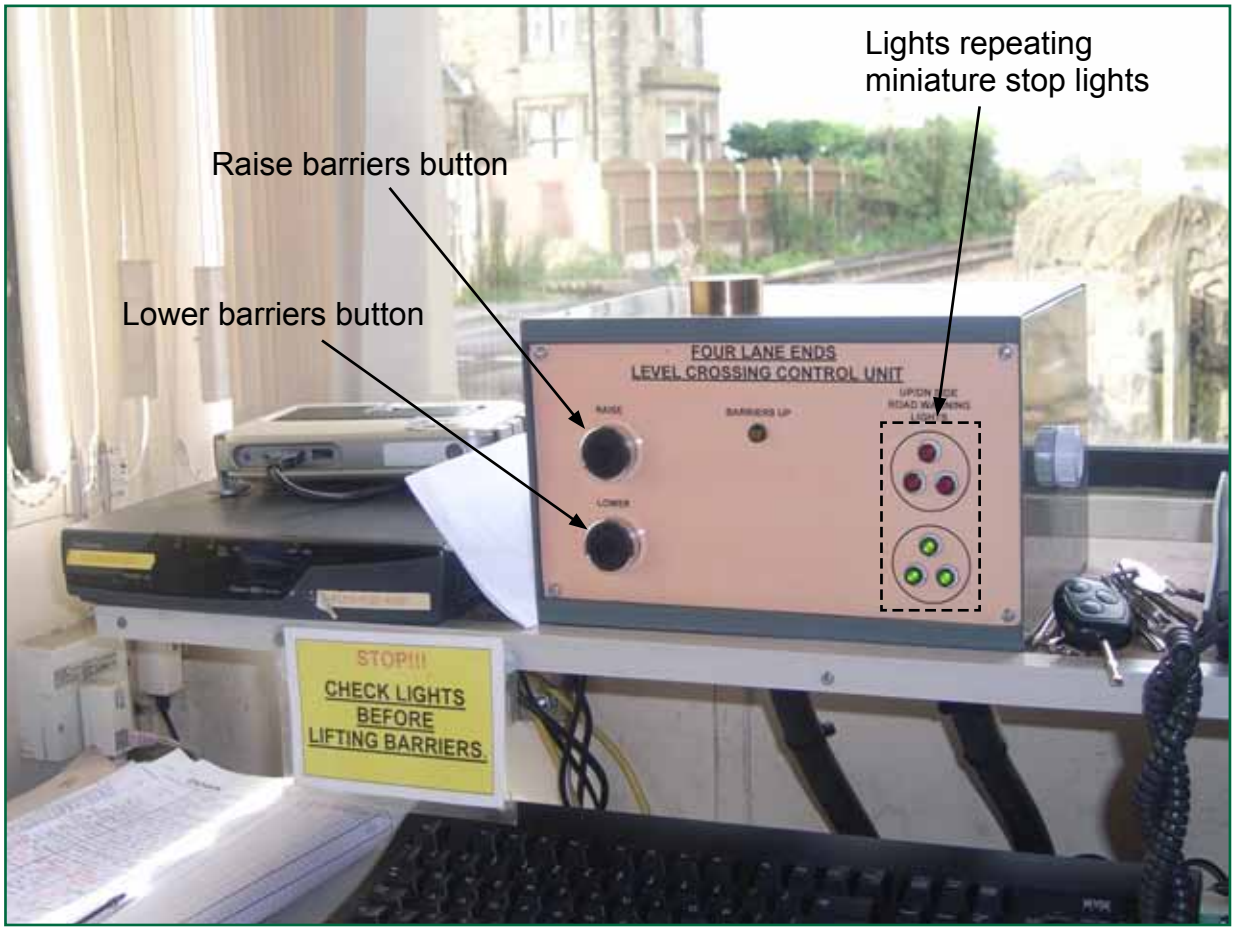

Figure 4: Control panel in the crossing keeper's cabin

7 Miniature stop lights are normally only provided at private road and public footpath/bridleway crossings where there is limited warning of approaching trains and significant usage. They are no longer permitted to be fitted to public road crossings. Where a railway crosses a private road, they are authorised for use by the Private Crossings (Signs and Barriers) Regulations 1996. Section 55 of the Transport and Works Act 1992 prohibits road vehicles from crossing the railway when the lights are at red. The status of this prohibition where miniature stop lights have been provided at a public road crossing, such as Four Lane Ends, is unclear.

8 The RAIB has no evidence that the unclear legal status of miniature stop lights on public roads had any influence on the occurrence of the incident. Miniature stop lights are provided at only a small number of public road crossings, which are likely to reduce further in number as crossings are modernised.

The history of the crossing

9 Four Lane Ends level crossing was equipped with gates operated by the road user until 1971 when hydraulic 'pump up' barriers and miniature stop lights were provided. These required a road user to pump up the barriers by using a lever, provided the lights were green, and then lower them having passed over the crossing. The arrangements were authorised in a level crossing order, made under the British Transport Commission Act 1957, and issued by the Railway Inspectorate[2] on behalf of the Secretary of State for Transport.

10 In 1989, in response to increasing road traffic, British Rail provided a crossing keeper to operate the barriers so that road users did not need to do so themselves.

11 By 2006 the hydraulic pump up barriers had become life-expired so they were replaced by the current electrically operated barriers. These were operated by one of two switches, one located in the crossing keeper's cabin and the other, outside, close to the north side barrier machine. The crossing keeper had the option of using either switch to operate the barriers. A mirror was provided so that the crossing keeper could see the indication of the miniature stop lights from inside the cabin.

12 The new crossing equipment was authorised by a new level crossing order that was issued by HM Railway Inspectorate and made under the Level Crossings Act 1983[3]. The order came into force on 8 January 2006.

13 According to information received from Network Rail, there are no other crossings of the same type on their network where barriers at a public road crossing, which are operated by a railway employee, are not interlocked with the protecting railway signals[4] and can be worked independently of the indication shown by the miniature stop lights.

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[2] The Railway Inspectorate later became HM Railway Inspectorate and was incorporated into the Office of Rail Regulation in 2006. It is the safety regulator for railways in Great Britain.

[3] See www.legislation.gov.uk.

[4] Railway signals which display a stop indication to trains on each railway approach to a level crossing.

14 Following an incident at Four Lane Ends crossing on 21 March 2011, and as an interim measure pending planned upgrading of the crossing (paragraph 16 below), Network Rail introduced the present control panel, with the push buttons and lights repeating the miniature stop light indications, and the audible alarm (figure 4). The original switches were removed, as they were no longer required, but the mirror has been retained. These changes did not require any change to the level crossing order.

15 As a result of the incident on 28 September 2012, Network Rail instructed crossing keepers to place a reminder appliance, consisting of a metal cap, over the button that raises the barriers each time the miniature stop lights change to red. This was to remind them to check that the lights were green before pressing the raise button.

16 Network Rail had already developed a scheme to replace the current equipment at the crossing with a full barrier crossing incorporating the normal road traffic light signals provided at public level crossings and obstacle detection. Under this arrangement, the barriers will be caused to lower automatically by an approaching train. The obstacle detection system will check whether anything is trapped and if not, it will permit the applicable railway signal on the approach to the crossing to clear to a proceed aspect. Once the train has cleared the crossing, the level crossing equipment will detect this and the barriers will lift to the raised position to reopen the road.

17 Following the incident on 28 September 2012, the completion date of the new crossing was brought forward from March 2014 to May 2013. In the interim, Network Rail has obtained a temporary closure order, agreed by Lancashire County Council, to close the crossing until the new full barrier crossing is commissioned

RAIB investigation findings

18 The cause of the incident was that the crossing keeper became distracted and erroneously raised the barriers before the approaching train had passed over the crossing. There is no engineered safeguard to prevent the crossing keeper raising the barriers when it is unsafe to do so as a result of such an error.

19 Irrespective of the indication shown by the miniature stop lights, vehicle drivers could interpret the barriers being raised by the crossing keeper as an indication that it is safe to cross the railway.

20 The crossing keeper was trained and passed as competent to undertake that role at Four Lane Ends crossing on 23 November 2006. He has subsequently been tested annually using a computer based e-learning course and was last tested before the incident on 25 January 2012. He was successful in passing the course and was issued with an authority to work, valid for 12 months.

21 The RAIB has made a recommendation relating to the lack of engineered safeguards at level crossings in its report on the fatal accident at Moreton-on-Lugg level crossing, near Hereford on 16 January 2010 (report 04/2011):

> *Network Rail should identify level crossings operated by railway staff where a single human error could result in the road being opened to the railway when a train is approaching. At each such crossing, Network Rail should consider and, where appropriate, implement engineered safeguards. Safeguards for consideration should include additional reminder appliances, alarms to warn of the approach of trains, approach locking, locking of the route, run-by controls, and local interlocking of train detection and signalling systems with level crossing controls.*

22 Network Rail responded to the above recommendation by identifying 97 crossings that are fitted with protecting signals but without approach locking[5]. In a programme that is to be completed in February 2014, additional safety mitigation is being fitted to prevent signallers at these crossings erroneously opening the crossing to road traffic while a train is still approaching.

23 Having given priority to those crossings fitted with protecting signals but without approach locking, at the time of publication of this bulletin, Network Rail was also reviewing the options available for level crossings that do not have protecting signals and where a single error made by the railway employee operating the crossing could result in the road being opened to the railway in error. The RAIB understands that apart from the crossing at Four Lane Ends, there are 48 such crossings; all of which have gates that are operated by crossing keepers. Network Rail was evaluating what action to take in respect of these crossings.

24 The RAIB also made a recommendation in its report on the fatal accident at Moreton-on-Lugg level crossing to enhance the risk management process applied to level crossings. The current process, which includes the use of the All Level Crossing Risk Model[6] (ALCRM), does not specifically identify the risk of staff error or the extent of engineered safeguards at crossings. Network Rail has responded to this recommendation by working with RSSB[7] to enhance the ALCRM and associated risk management process with the aim of taking account of these factors. A major research project associated with this work is due to be completed by June 2015.

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[5] An engineered safeguard which would prevent an operator of a crossing (eg signaller or crossing keeper) from raising barriers, or opening a gate, at a level crossing before a train has passed clear, or stopped on the approach.

[6] A computer model used by Network Rail to calculate the risk at level crossings and to evaluate reasonably practicable improvements to reduce the risk.

[7] A not-for-profit company owned and funded by major stakeholders in the railway industry, and which provides support and facilitation for a wide range of cross-industry activities. The company is registered as 'Rail Safety and Standards Board', but trades as 'RSSB'.

Learning points

25 The RAIB has decided not to conduct a full investigation as it does not believe that an investigation would lead to the identification of any further recommendations. However, this incident reinforces the lesson highlighted by the RAIB's Moreton-on-Lugg investigation that engineered safeguards are desirable at level crossings operated by railway staff to prevent situations where a single human error could result in the opening of a level crossing to road users before an approaching train has passed over the crossing.

26 A further learning point is that the use of simple reminder appliances (paragraph 15) can be a useful mitigation measure to reduce the probability of incorrect actions being made in error.

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