RAIB

Rail Accident Investigation Branch

Rail Accident Report

Serious injury to a passenger alighting from a train at Loughborough Central station 14 January 2023

Report 13/2023
October 2023

This investigation was carried out in accordance with:

- the Railway Safety Directive 2004/49/EC
- the Railways and Transport Safety Act 2003
- 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.

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 RAIB has described a factor as being linked to cause and the term is unqualified, this means that RAIB has satisfied itself that the evidence supports both the presence of the factor and its direct relevance to the causation of the accident or incident that is being investigated. However, where RAIB is less confident about the existence of a factor, or its role in the causation of the accident or incident, RAIB will qualify its findings by use of words such as 'probable' or 'possible', as appropriate. Where there is more than one potential explanation 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 or incident but are associated with the underlying management arrangements or organisational issues (such as working culture). Where necessary, words such as '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 accident or incident 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 RAIB, expressed with the sole purpose of improving railway safety.

Any information about casualties is based on figures provided to RAIB from various sources. Considerations of personal privacy may mean that not all of the actual effects of the event are recorded in the report. RAIB recognises that sudden unexpected events can have both short- and long-term consequences for the physical and/or mental health of people who were involved, both directly and indirectly, in what happened.

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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Serious injury to a passenger alighting from a train at Loughborough Central station, 14 January 2023

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Summary

At 11:50 hrs on Saturday 14 January 2023, a passenger alighting from a train at Great Central Railway's Loughborough Central station lost his footing and sustained a serious injury. The train had made a planned stop at platform 1. The door used by the passenger opened onto the platform end ramp, approximately 1.6 metres beyond the end of the level part of the platform.

The passenger, who was visually impaired, lost his footing and fell while alighting from the train because he was unable to safely negotiate the step down onto the platform end ramp.

This was because the level platform was only around two metres longer than the distance needed to safely accommodate all of the train's doors, and the train's brakes were not performing in a consistent, predictable manner. Measures implemented by the railway had not effectively controlled the risk of passengers using doors which were not adjacent to usable platforms.

RAIB identified two underlying factors, that Great Central Railway did not have effective processes for learning lessons from operational experience, and had no effective process to support the identification, management and monitoring of risk.

The report makes three recommendations. The first is addressed to Great Central Railway and relates to the assessment and control of risk, learning from previous events, and ensuring that the needs of disabled passengers are considered. The second recommendation, also addressed to Great Central Railway, relates to auditing and assurance of its risk management activities. The third recommendation is made to the Heritage Railway Association and relates to the provision of guidance on managing the risks around the passenger / train interface at heritage railway stations.

RAIB has identified two learning points. The first is a reminder of the importance of having a robust system to manage staff training and competence records. The second reminds duty holders of the importance of prompt accident reporting.

Introduction

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 The report contains abbreviations and acronyms, which are explained in appendix A. Sources of evidence used in the investigation are listed in appendix B. Urgent Safety Advice issued by RAIB during the investigation is contained in appendix C.

The accident

Summary of the accident

3 At 11:50 hrs on Saturday 14 January 2023, a passenger alighting from a train onto platform 1 at Loughborough Central station sustained a serious injury, requiring admission to hospital.

4 The train involved had just arrived at Loughborough Central station on a return journey from Leicester North station, where the passenger involved had boarded.

5 The door from which the passenger alighted was the leading door on the train and was adjacent to the platform end ramp rather than the level part of the platform.

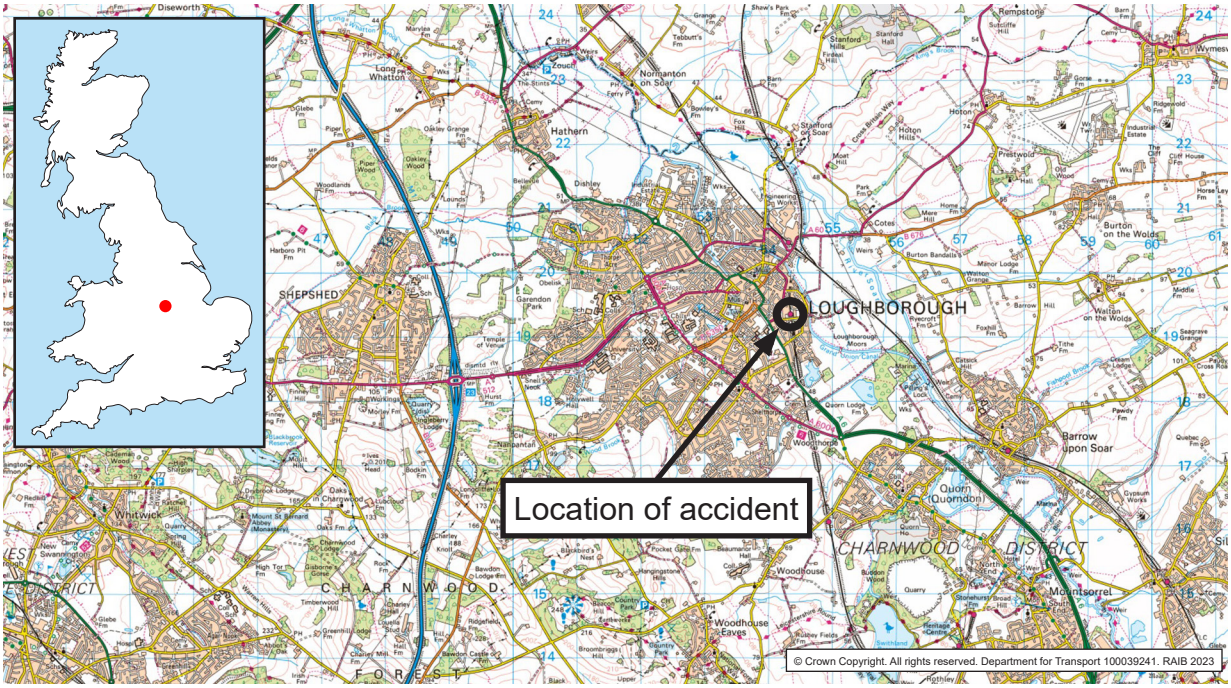

Figure 1: Extract from Ordnance Survey map showing location of the accident at Loughborough.

Context

Location

6 The railway through Loughborough Central station can be traced back to the 1890s when the then Manchester, Sheffield & Lincolnshire Railway was extended southwards from Sheffield to London. Loughborough Central station was opened in 1899 and closed as a mainline station in 1969. Efforts to preserve it began shortly afterwards. The operation of heritage trains by Great Central Railway (GCR) started in 1974. The general layout of the station, platforms and tracks has remained largely unchanged since Loughborough Central was closed in 1969 (figures 2 and 3).

7 GCR now operates public passenger trains on the railway which runs from Loughborough Central southwards to a station at Leicester North, a journey of 8 miles (12.87 km). Intermediate stations are located at Quorn & Woodhouse and Rothley (figure 4).

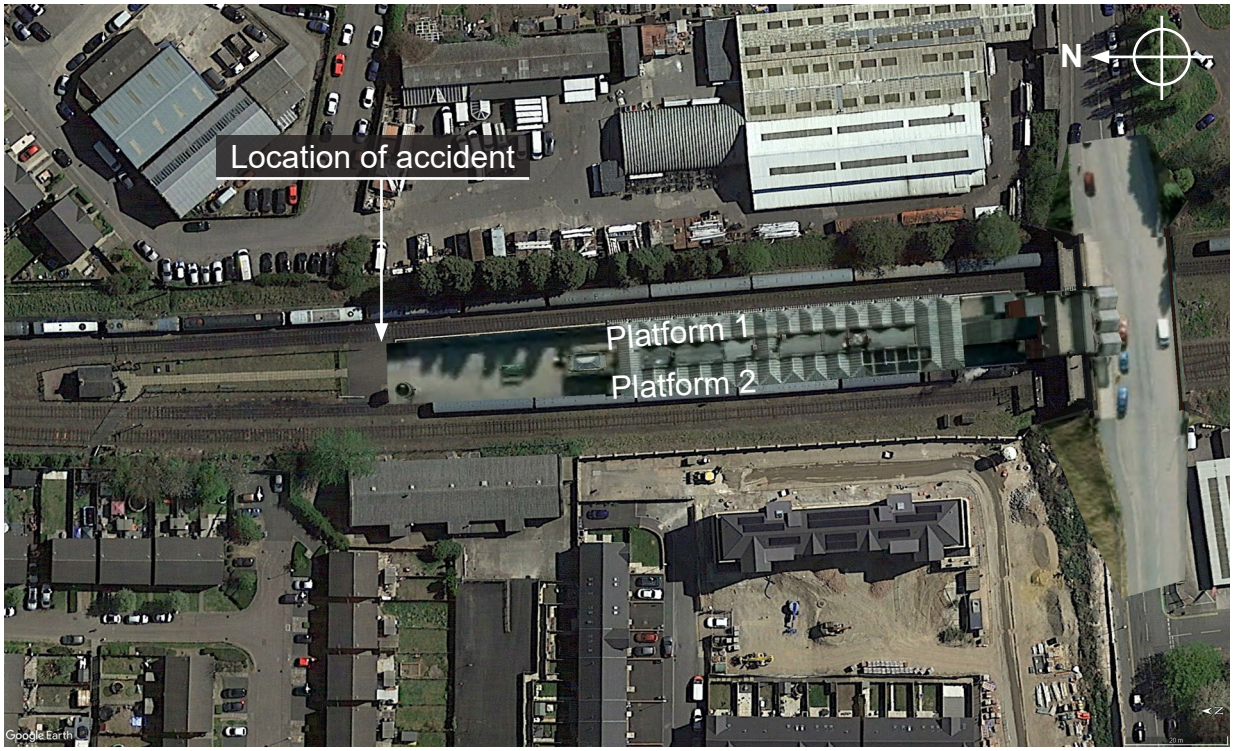

Figure 2: Google Earth image showing Loughborough Central station.

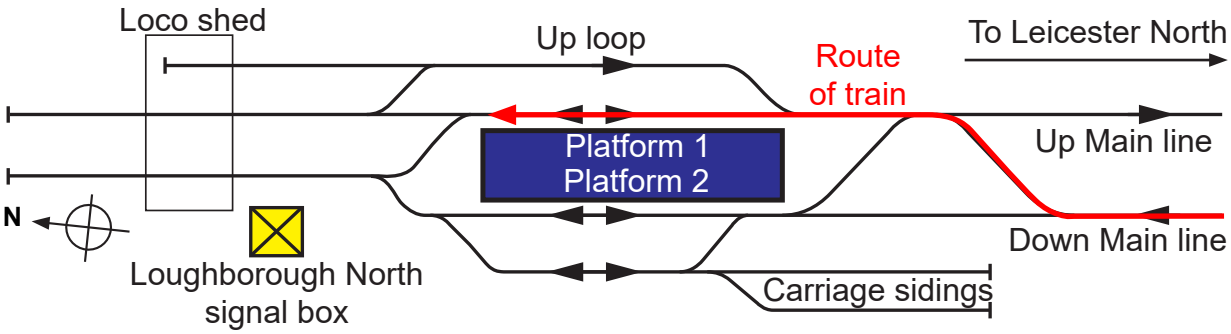

Figure 3: Layout of the track around Loughborough Central station.

8 The north end of platform 1 at Loughborough Central was in generally good condition with the coping stones at the platform edge made from a coarse dressed stone. The area intended for use by passengers was level with no identified trip hazards. The condition of the platform surface and the level of grip it offered are not considered to be factors in this accident.

Organisations involved

9 GCR is a heritage railway. GCR owns Loughborough Central station, the associated railway infrastructure and passenger coaches involved in the accident. The locomotive involved and its tender are owned by the Loughborough Standard Locomotives Group but are maintained by GCR.

10 GCR staff working on the train and at Loughborough Central station at the time of the accident were all volunteers, although the railway also has paid employees.

11 GCR freely co-operated with the investigation.

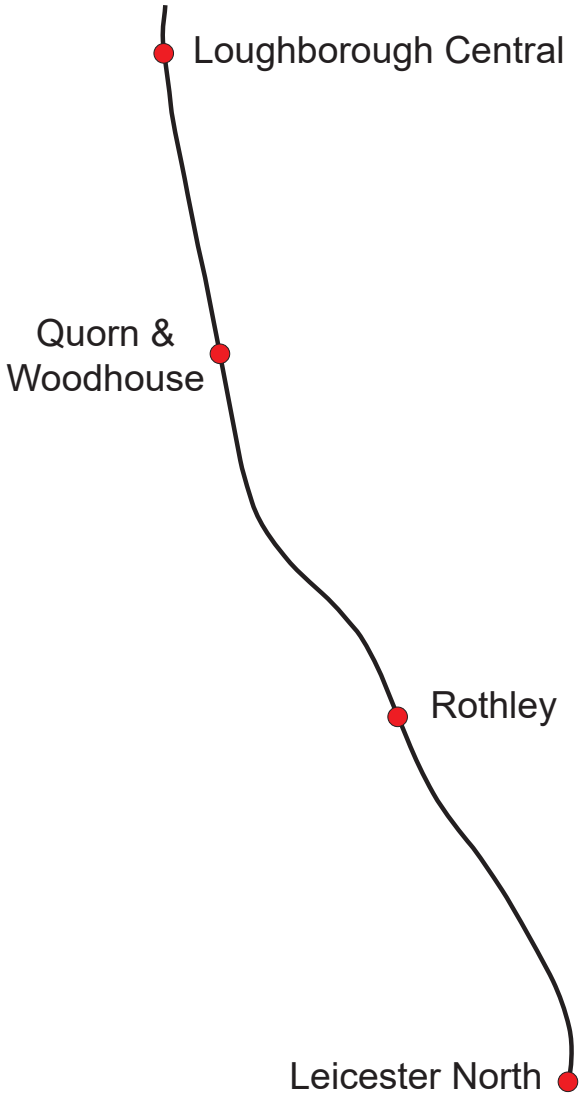

Figure 4: Route of the Great Central Railway.

Train involved

12 The train involved was the 11:05 hrs service from Leicester North station to Loughborough Central station. It comprised a steam locomotive, number 78019, built by British Railways in 1954 and 6 Mk1[1] coaches of different types (figure 7). The rear three coaches (on departure from Leicester North) were unavailable for general passenger use as they were being prepared for a dining service later in the day. A Brake Second Open (BSO (D)) coach was the third coach from the locomotive. This coach houses a parking brake which is operated by the guard when the train is stationary. The locomotive was being driven with the tender leading and was on the return leg of a journey which had started out from Loughborough at 10:20 hrs.

13 GCR recorded 63 passengers on the train during the journey from Leicester North to Loughborough Central.

[1] Mk1 coaches were constructed in the 1960s and 70s. They share certain construction characteristics and have slam type doors.

14 The passenger coach involved was a Mk1 Tourist Second Open (TSO), number 4857. It has a central aisle with eight groups of four seats around tables on either side of the aisle. A pair of toilets are located at one end of the coach. Access and egress is available by three pairs of external doors, with one pair of doors at each end of the coach and one pair in the middle (figure 5). The doors are hinged so they open outwards and incorporate a 'droplight' window. Droplight windows have a simple vertical sliding windowpane which is opened by pulling down a horizontal lip attached to the top edge of the pane. To open a door, passengers inside the train have to open the droplight and reach outside to operate the external door handle. There is no internal door handle. The doors are not locked centrally using a central door locking system and individual doors are not locked by train crew in normal service unless there is an out-of-course incident (such as a fault) or the coach is not in service. Passengers and staff can move between coaches using interconnecting gangways. In common with all other coaches on the train, coach 4857 was not fitted with a public address system.

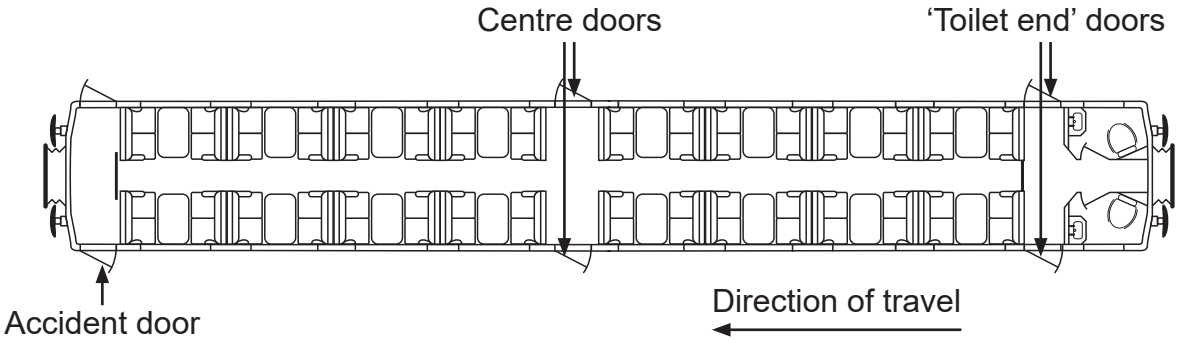

Figure 5: Layout of a Mk1 Tourist Second Open (TSO) coach.

15 The locomotive and tender are fitted with steam brakes while the rest of the train uses vacuum operated brakes with the coaches and locomotive being connected via the automatic vacuum train pipe. The brakes on the whole train are operated by the driver using a single valve in the locomotive cab (see paragraph 60).

16 Following an overhaul, the locomotive had recently (November 2022) returned to service. It was subject to GCR's maintenance and inspection regime, with its last examination, including the braking system, completed in December 2022. No defects relevant to the accident were found at that time.

17 The passenger coaches involved were subject to GCR's maintenance and inspection regime which required inspections every three months. A dedicated coach door examination was completed on coach 4857 in December 2022. This included checks on the general condition of the doors as well as specific checks on the operation of the handles and locks. No issues requiring attention were recorded and, when the door involved was inspected by RAIB after the accident, no defects were identified. The coach floor and stepping board at the door involved were in good condition.

The passenger involved

18 The passenger, Mr Alan Smith, was 76-years old and was visiting GCR with his partner. The passenger was around 6 feet tall and witness evidence described him as being an agile and independent person, although he was visually impaired as a result of congenital cataracts.[2]

19 The passenger's left leg was reported to be around half an inch (13 mm) shorter than the right as a result of a previous operation to replace his left hip joint. This length difference was managed with an insert in his left shoe and had no known effect on his mobility. Witness evidence describes the passenger as having good balance and being able to walk quickly with long strides. The passenger was wearing lace-up shoes with a non-slip sole at the time of the accident.

20 The passenger was described as an active man who would confidently travel on public transport in all its forms. This included regularly using mainline trains alone and without assistance. He used a 'symbol' cane if travelling alone, to indicate to others that he was visually impaired and may require additional time and space when moving around. Like many visually impaired people, he did occasionally also use a cane to find and avoid obstacles (known as a 'guide cane' or 'long cane') when navigating complex transport hubs. He was not carrying a cane on the day of the accident.

21 RAIB has seen no evidence that the passenger was influenced by the presence or actions of other passengers, and he had not consumed alcohol that day. RAIB found no evidence of factors that might have influenced the passenger's cognitive function or decision-making.

Staff involved

22 A driver, a fireman and a cleaner[3] were on the footplate of the locomotive. The driver had been a volunteer at GCR since 1989 and began working on the footplate in 1993, qualifying as a fireman in 1999 and as a driver in 2007. They had driven locomotive 78019 many times as well as many other types of locomotive. Outside volunteering at GCR, the driver of the locomotive had a professional background as a railway rolling stock engineer.

23 GCR assesses driver competency annually, alternating between a practical assessment and Rule Book knowledge test. The driver was in date for both assessments. While drivers are responsible for identifying a suitable stopping point for the train and controlling the locomotive to achieve that, they have no specific responsibilities for monitoring passengers getting on or off trains.

24 The fireman had been a volunteer at GCR since 2012, initially as a cleaner before training as a fireman after 18 months. Firemen are also required to undertake a practical and Rule Book assessment on alternating years, and the fireman was in date for both. The role of a fireman is primarily related to the safe management of the locomotive's boiler. Staff working in the role of fireman have no responsibility for identifying the correct stopping position of the train or the management of passengers.

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[2] Cataracts occur when the lens inside an eye develops cloudy patches. These patches can expand causing blurry, misty vision and eventually blindness.

[3] Cleaners are responsible for assisting in general duties around trains and in depots. Cleaner is usually the first role undertaken by someone working on locomotives, often as the first step in the progression to the roles of fireman and then driver.

25 The cleaner was an inexperienced volunteer who had been volunteering at GCR for about nine months at the time of the accident. The role of cleaner is not considered a safety-critical role, so GCR do not require formal assessment of competence.

26 A guard and a trainee guard were in the BSO (D) coach. The guard was experienced in the role, having volunteered at GCR for 20 years. They were accredited to work at GCR in the role of guard, guards' inspector and duty traffic manager. As a guards' inspector, they were responsible for assessing the competence of other guards. Their annual rules assessment was out of date (see paragraph 110). Despite being beyond the 12-month period in which they should have been assessed, there is no evidence to indicate the guard was not aware of, nor complying with, the requirements of their role. The conduct of the guard is not causal to this accident because they were not in a position to intervene in the accident, nor were they required to be. The trainee guard was working under the direction of the guard.

27 Also working on the train was a travelling ticket inspector (TTI) who had no specific safety-related responsibilities on this train. Six catering staff were also on the train, either working in the buffet coach (number 1962, figure 7) or preparing the train for the later dining service. These catering staff had no safety responsibilities and played no part in the accident.

28 On platform 1 at Loughborough Central station when the train arrived were three other staff, a platform inspector, the station master and the duty traffic manager. These staff were all located on the southern half of the platform, with the platform inspector walking north alongside the train as it slowed to a halt. The GCR Rule Book requires staff on the platform to provide a warning to any passengers that they identify as trying to leave trains via doors that are not in the platform. It also requires platform staff to be in a position to help passengers who seek assistance.

External circumstances

29 At the time of the accident, it was daylight with good visibility in the area around the platform. The weather at Loughborough was dull and wet with continuous rain before and during the accident. There was no significant wind, and a minimum temperature of 6°C was recorded during the day at East Midlands Airport (7 miles (11.3 km) away), meaning there was no ice or frost present. There was no significant ambient noise at the station although there would have been some background noise from the locomotive as the train was in the platform. RAIB has concluded that external influences did not affect the accident.

The sequence of events

Events preceding the accident

30 The train was prepared for service by GCR volunteers, including the driver, fireman, cleaner and a fitter from around 06:00 hrs on the day of the accident. Train preparation included 'fitness to run' inspections.

31 The fitness to run inspections included a check of the integrity of the locomotive steam brake system, which was successfully undertaken. The driver then conducted a vacuum brake system leak test. While creating the vacuum in the system, the driver observed that the needle on the vacuum gauge did not move as smoothly as they expected when increasing the level of vacuum. Despite this, the locomotive passed the checks and was deemed fit to enter service. As the locomotive was being moved from the engine shed to platform 1 at Loughborough Central station, the driver performed a running brake test during which the locomotive's brakes performed in line with expectations.

32 The locomotive was then coupled to the coaches at Loughborough Central station and final checks on the integrity of the train's brake systems were conducted. At 10:21 hrs, the train left the station, one minute later than its planned departure. It arrived at Leicester North station at 10:53 hrs, three minutes later than planned. The delay was attributed to temporary speed restrictions (TSRs) along the route connected to engineering works at two bridges.

33 As the train arrived at Leicester North, the driver observed that the brake was slow to release, and they had to apply power to overcome it. On arrival, the driver satisfied themselves that the braking system was making and maintaining sufficient vacuum and then ran the locomotive around the train for the return journey.

34 During the stop at Leicester North, the passenger involved in the accident boarded the train with his partner. They entered coach 4857. This coach was at the northern end of the train. It was therefore directly behind the locomotive during the return journey to Loughborough. They entered the trailing end of the coach and walked the length of the coach taking seats at the leading end (nearest to the locomotive, figure 7).

35 Once the locomotive had been coupled up for the return journey, the driver examined the locomotive for any signs of overheated brake blocks which would indicate a dragging brake.[4] The brake blocks showed no signs of overheating. At 11:15 hrs the train set off on the return journey, 10 minutes later than timetabled.

36 Another individual, who also boarded the train at Leicester, joined the passenger and his partner at their table and travelled to Loughborough. This individual is referred to in the remainder of the report as the 'second passenger'.

[4] A dragging brake is the term used to describe a brake that remains applied (perhaps partially) after the command for braking is removed.

37 On two occasions during the return journey, the driver experienced the brakes being slow to release. On the first of these, while slowing for a TSR between Quorn and Loughborough (figure 4), they had to apply power to overcome the additional unwanted braking effort. The second occasion was on the approach to Loughborough Central station. This time no additional power was needed to overcome unwanted braking.

Events during the accident

38 Closed-circuit television (CCTV) at Loughborough Central station shows that the train entered platform 1 at 11:48 hrs, 14 minutes later than timetabled.[5] The driver of the locomotive was anticipating that the train's brakes would be slow to release as they had been earlier, so adjusted their driving accordingly. However, on this occasion the issue with the brakes did not manifest itself, so the train travelled further along the platform than the driver had intended. When the train came to a stop, the leading edge of the leading door of the first coach (4857) was adjacent to the platform end ramp and beyond the end of the platform by approximately 1.6 metres (figure 10). The driver was aware that the train had gone beyond the intended stopping position and that the leading door of coach 4857 was likely to be beyond the platform. However, they could not safely reposition the train because passengers would have started to alight from the passenger coaches.

39 The guard and trainee guard were in the BSO (D) coach in accordance with paragraph 4.4 of section H of the Rule Book, as their duties required them to apply the hand brake once the train had stopped. The TTI, who was not required to be in any specific location at stations, was in another coach. Although the platform inspector, station master and duty traffic manager were on platform 1 when the train arrived (paragraph 28) there was no GCR Rule Book requirement or briefing tasking them with being at the platform ends to manage the risk of a train unintentionally stopping with a passenger door situated off the platform.

40 The platform inspector recognised that the train had stopped further along the platform than it would have normally. Their assessment was that the leading door of coach 4857 was just beyond the level part of the platform. However, they saw passengers at the middle door of coach 4857, which was much closer to the platform inspector's position, and went to that door to assist them. At that time, the platform inspector had not seen any passengers waiting to board or alight at the leading door of coach 4857.

41 The passenger and his partner planned to get off the train at Loughborough Central. Witness evidence indicates that on arrival, the passenger went to the leading end of coach 4857 and opened the door. The passenger then stepped down onto the platform ramp, placing one foot after the other.

[5] Although there is CCTV at Loughborough Central station, the camera covering the accident location had droplets of rain on the lens which obscured the view of the platform end ramp where the accident occurred.

42 On stepping down from the coach, the passenger lost his footing and crumpled to the ground. This left him lying on the platform ramp adjacent to the door (figure 6). His partner stepped down from the coach around him and went to help him. Shortly after this, the second passenger also lost their footing exiting from this door. Witness evidence about where the second passenger landed differs, with one account suggesting that they landed on the first passenger. The second passenger was not injured and was able to get up unaided.

Events following the accident

43 GCR staff and visitors, including an off-duty doctor, went to the passenger's assistance and an ambulance was called, which took him to hospital. In hospital it was identified that the passenger had sustained a spiral fracture to the left femur and he underwent surgery which included replacement of a prosthetic hip joint.

44 The locomotive remained in service. The issue with the brakes was formally reported by the driver and shared with a second driver who was rostered to take over the train later that day. This second driver also reported the braking issue and a subsequent examination of the locomotive identified the likely defect that had caused the variation in brake performance (see paragraph 59).

45 Three days later, having been made aware of the severity of the injury to the passenger, GCR appointed two staff to undertake an internal investigation. On 22 January, GCR undertook a reconstruction of the position of the train to allow some measurements of the platform-train interface (PTI) to be taken. Subsequently, GCR reported the accident to the safety authority for railways in Great Britain, the Office of Rail and Road (ORR). Although this accident should have been notified to RAIB,[6] GCR did not notify RAIB that it had occurred. RAIB was subsequently informed of the accident by ORR as part of the normal liaison arrangements between the two organisations.[7]

46 A further reconstruction was undertaken on 30 January at which both ORR and RAIB were present.

[6] Regulation 4 and Schedule 2(2) of The Railways (Accident Investigation and Reporting) Regulations 2005 (as amended) require accidents connected to the operation of trains which result in serious injuries to one person to be notified to RAIB within three working days.

[7] https://www.gov.uk/government/publications/mou-between-raib-btp-and-orr.

Analysis

Identification of the immediate cause

47 The passenger lost his footing and fell while alighting from the train because he was unable to safely negotiate the step down onto the platform end ramp.

48 Witness evidence indicates that the passenger, having opened the leading end door of coach 4857, commented to his partner that there was a larger-than-normal vertical distance between the stepping board and the platform. For this reason, he decided to alight first to help his partner from the train. The passenger then stepped down deliberately, one foot after the other, but lost his footing and crumpled to the ground. Shortly after this, the second passenger also stepped down from leading door of coach 4857 and lost their footing (paragraph 41).

Identification of causal factors

49 The accident occurred due to a combination of the following causal factors:

a. The train stopped with the leading door of coach 4857 adjacent to the platform end ramp (paragraph 50).

b. The passenger was unable to safely alight from the train due to the nature of the stepping distance between the door and platform end ramp (paragraph 67).

c. Control measures put in place by GCR had not effectively controlled the risk of a person alighting from a door which was not adjacent to a usable platform (paragraph 86).

Each of these factors is now considered in turn.

The stopping position of the train

50 The train stopped with the leading door of coach 4857 adjacent to the platform end ramp.

51 Witness accounts, corroborated by photographs taken after the accident, show that the train stopped with the front edge of the leading door on coach 4857 approximately 1.6 metres beyond the end of the level part of the platform.

52 To help drivers stop the train in the correct place, GCR had placed a marker between the platform line and a siding adjacent to the north end of the platform which runs parallel to it. This marker was intended to help drivers judge the position of the leading coach so they could stop with all passenger doors correctly platformed. The marker was positioned to align with the leading end of the coaches rather than the locomotive cab because a variety of different locomotives are used on the railway, each with different cab positions relative to the coaches. The driver of the train at the time of the accident reported that they found no difficulty with identifying the marker and judging the train's position relative to it.

53 This causal factor arose due to a combination of the following:

a. The usable length of the platform was only around 2 metres longer than the distance between the end doors of the train formation, leaving a small tolerance for the stopping position of trains (paragraph 54).

b. An intermittent variation of brake performance made accurately stopping the train difficult (paragraph 59).

Each of these sub-factors is now considered in turn.

Useable platform length

54 The usable length of the platform was only around 2 metres longer than the distance between the end doors of the train formation, leaving a small tolerance for the stopping position of trains.

55 Loughborough Central station has two platforms, numbers 1 and 2, located between the Up and Down Main lines (a configuration referred to as an 'island platform' (figure 3)). Platform 1 runs along the east side of the station. The horizontal length of each platform, between the ramps at each end, is 122 metres.

56 At the north end of the island, a ramp is provided which slopes from platform height to ground level. This ramp runs across the whole width of the platform island. Visitors can use a path down the middle of the ramp to access a walkway that leads to the Locomotive Shed and a picnic area. The level part of the platform is marked out by white lines painted on the platform edge. At each end, where the platform end ramp starts, there is a short white line perpendicular to the platform edge (figures 6 and 11).

Figure 6: The north end platform ramp.

57 The train involved was formed of a locomotive, tender and six coaches (paragraph 12 and figure 7). The distance between the rear edge of the trailing end door of the trailing coach and the front edge of the leading door of the leading coach was 119.9 metres. This means that platform 1 was just over 2 metres longer than the distance between the extreme end doors of the train involved. If the train had stopped centrally along the available level platform length, then there would have been just over 1 metre of level platform beyond each door at both ends (figure 8).

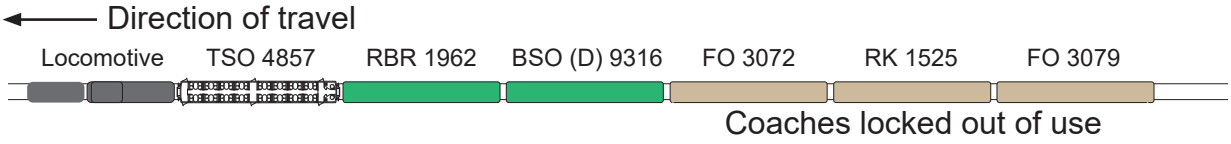

Figure 7: Formation of the train involved in the accident. Refer to Appendix A for vehicle type definitions.

58 Coach 4857 had a pair of toilets at one end with the vestibule inboard of them (paragraph 14, figure 5). Consequently, the passenger doors at that end are around 1.36 metres further inboard than the leading end doors. When the train travelled north from Leicester North station, the toilets were at the trailing end of coach 4857. If the coach had been orientated with the 'toilet end' leading, the external door at that end would have been adjacent to the start of the platform end ramp.

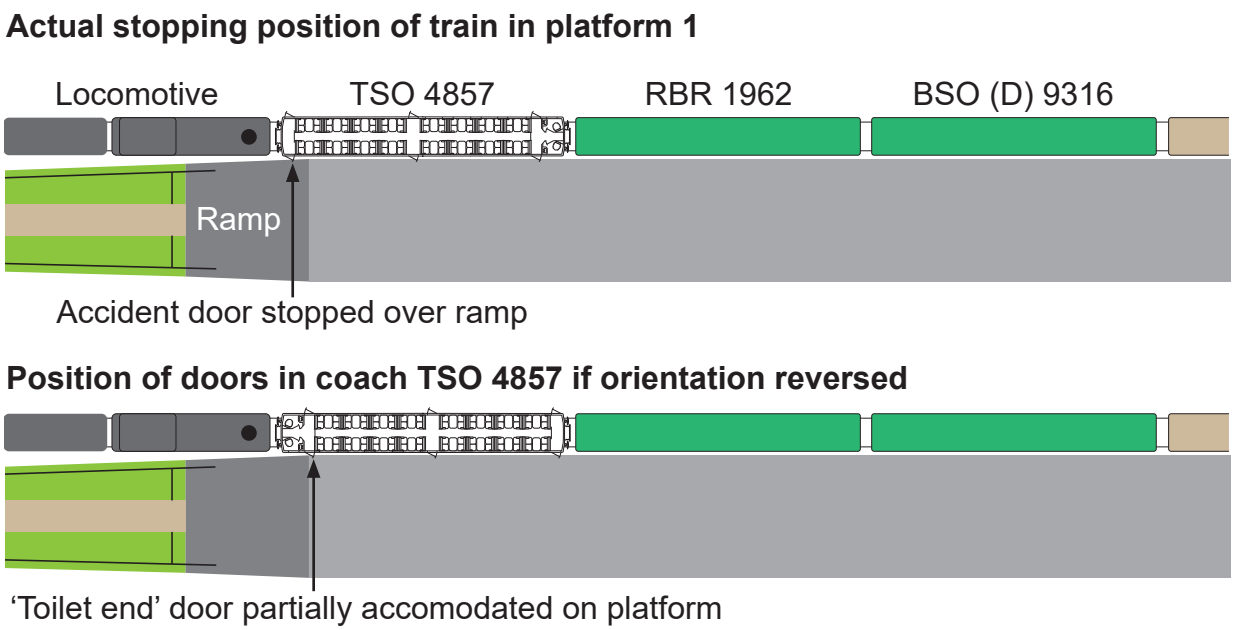

Figure 8: Stopping positions of the train involved in the accident.

Locomotive brake defect

59 An intermittent variation of brake performance made accurately stopping the train difficult.

60 The locomotive and tender use pressurised steam generated by the steam boiler to provide the braking force. Braking effort is transmitted to the wheels via a steam brake cylinder connected to brake blocks through a series of linkages. A manual parking brake is also provided, used only when the locomotive is stationary.

61 A partial vacuum created by the locomotive is used in a vacuum brake system fitted to the passenger coaches. The difference in pressure between the vacuum brake pipe and atmospheric pressure determines the level of braking force demanded along the train. The brake force on each coach is generated by the pressure differential between the vacuum brake pipe and the stored vacuum within each brake cylinder, which acts on a piston. A further manual parking brake is provided on the BSO (D) coach, used by the guard when the train is stationary (paragraph 12).

62 When coupled to passenger coaches, drivers use the vacuum brake control to apply the brakes. A 'combining valve' provides simultaneous operation of the steam brake (on the locomotive and tender) and the vacuum brakes (on the coaches). This arrangement simplifies the controls used by the driver.

63 The locomotive was declared fit to run in passenger service after checks and a functional brake test (paragraphs 30 and 31). During the journey to Leicester, the driver noticed that the brakes were 'dragging' and despite inspecting the train at Leicester, was unable to determine the cause (paragraph 35). The GCR Rule Book does not require that the train be taken out of service in such circumstances, and the driver was free to use their professional judgement as to whether to continue using the train. The driver viewed the issue as one of irregular performance rather than as a safety risk.

64 On the return journey to Loughborough the braking issue became apparent twice more (paragraph 37). On arriving at Loughborough, the driver anticipated that the fault would again affect the train, so adapted their driving to suit. However, witness evidence is that at this point the brakes performed normally meaning that the train came to a halt a little beyond the point that the driver intended (paragraph 38).

65 The driver reported the braking issue to a second driver, who was taking over the train for the remainder of the day, and a locomotive defect card was submitted, detailing the brake issue along with three minor unrelated issues. Subsequently, the train was examined and a spindle in the locomotive brake combining valve was found to be sticking. This caused the locomotive steam brakes to remain applied after the driver had stopped demanding braking. RAIB considers this to be the likely cause of the variation in brake performance experienced on the day of the accident.

66 The spindle was later machined to reduce its diameter and GCR reported that this resolved the sticking issue.

The platform-train interface

67 The passenger was unable to safely alight from the train due to the nature of the stepping distance between the door and platform end ramp.

68 Witness evidence indicates that the passenger stepped out of the leading door of coach 4857 in a deliberate and considered way but that he lost his footing and fell while doing so (paragraph 48). The available evidence indicates that, although the passenger appreciated that there was a significant vertical stepping height present, he had probably not realised that the door was adjacent to the platform end ramp instead of the platform itself. The increased stepping height and the slope presented by the ramp would have created a challenging surface on which to step and RAIB considers that it is almost certainly the reason why the passenger lost his footing. This is supported by the second passenger also losing their footing on exiting the leading door and falling onto the ramp.

69 This causal factor arose due to a combination of the following:

a. There was a larger-than-normal vertical stepping height present when stepping from the coach's foot step to the platform, which increased the likelihood of a loss of footing by the passenger (paragraph 70).

b. The passenger was stepping onto a sloping surface that he was probably unaware of, further increasing the likelihood of him losing his footing (paragraph 78).

Each of these sub-factors is now considered in turn.

Vertical stepping height

70 There was a larger-than-normal vertical stepping height present when stepping from the coach's foot step to the platform, which increased the likelihood of a loss of footing by the passenger.

71 The platform at Loughborough Central was built in the 1890s (paragraph 6). An engineering drawing from 1895 shows a designed platform height of 3 feet (914.4 mm) above rail level (ARL). RAIB has not been able to determine if it was originally constructed to that design, but records held by GCR show that in 1956 (while still a part of the national network) the track bed at the north end of platform 1 was found to be 6 inches (152 mm) '*too high*'. In July 2015 GCR measured the track bed as 7.75 inches (197 mm) '*too high*' at the north end.

72 RAIB has not been able to determine how or when the track bed became higher than the design, but it may have been a result of periodic re-laying of the track and the addition of ballast over many years.

73 A consequence of the elevated track bed was an increased vertical stepping height for passengers. For example, on the coach involved in the accident, correctly platformed doors at the north end of platform 1 were approximately 430 mm (17 inches) vertically above the platform. GCR was managing this stepping height by providing wooden stepping boxes (figure 9). Such stepping boxes are carried on passenger coaches and provided at platforms for use by on-train or platform staff if required.

Figure 9: A stepping box and standard stepping height.

74 Stepping distances (which consist of a vertical stepping height, a horizontal stepping gap and a resultant diagonal stepping dimension) have been managed on railways by various standards over time. Providing a consistent stepping distance for passengers across a network requires a standardised platform height. At modern mainline stations, this is 915 mm ARL[8] which is consistent with the original design height at Loughborough of 3 feet (914.4 mm). Current guidance within Railway Group Standards[9] for mainline trains is that, when at a compliant platform, operators should aim to have a vertical stepping height that is no more than 230 mm. It should be noted that not all historic mainline platforms and rolling stock comply with this standard nor are they required to.

75 Heritage operators may use guidance which is published and distributed by the Heritage Railway Association (HRA). HRA is a trade body and produces guidance on various topics to its members. The guidance (HGR-A0000-RSP5)[10] describes how '*the floor or footboards of passenger rolling stock should be as close as practicable to the platform. The vertical and horizontal distances between the platform edge and the floor or footboards of the passenger rolling stock should not exceed 250 mm and 275 mm respectively, or 350 mm on the diagonal*'. While the horizontal gap at Loughborough Central was within the range advised in HGR-A0000-RSP5, the vertical stepping heights and diagonal stepping distances were not.

[8] Railway Group Standard GIRT7020, issue 2: June 2022, 'GB Requirements for Platform Height, Platform Offset and Platform Width'.

[9] Railway Group Standard GMRT2173, issue 4, June 2022, 'Size of Vehicles and Position of Equipment'.

[10] HRA document HGR-A0000-RSP5, issue 1, February 2020, which is derived from a previous document written by ORR.

76 The stopping position of the train with the leading door of coach 4857 adjacent to the ramp meant that this normal stepping height of around 430 mm was further increased across the width of the door to between 560 mm and 590 mm (figure 10). While witness evidence indicates that the passenger had identified the larger-than-normal vertical drop at Loughborough Central, and that he had attempted to descend carefully, the increased distance nevertheless would increase the chance of an accident exiting the train.

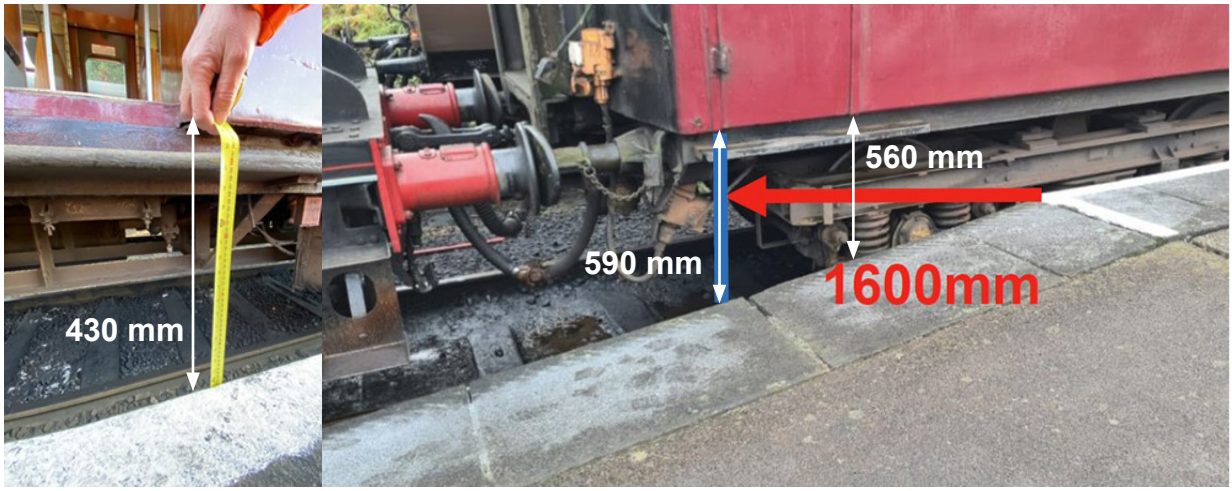

Figure 10: Reconstruction photos showing standard platform stepping height (left) and the increased stepping heights from the train at its stopped position (right).

77 Both the passenger and the second passenger boarded the train at Leicester (paragraph 34) where the vertical stepping distance is much smaller (between 170 mm and 220 mm). GCR told RAIB that the platform at Leicester North was constructed around 1990 and was compliant to mainline railway standards at the time. RAIB has considered whether both passengers may have developed an expectation of the platform height at Loughborough Central, based on their experience at Leicester North. While this cannot be entirely discounted, witness evidence is that the passenger had identified the presence of an increased vertical stepping height (paragraph 41). Witness evidence also shows that the second passenger knew about the platform height at Loughborough Central having travelled widely on GCR for many years.

The passenger's perception of the platform end ramp

78 The passenger was stepping onto a sloping surface, that he was probably unaware of, further increasing the likelihood of him losing his footing.

79 In addition to the larger-than-normal vertical stepping height, the sloped surface would make stepping out from the coach more challenging for passengers. In particular, a passenger who steps out and who is unaware of the slope is more likely to lose their footing. Although the details of witness accounts vary, it is clear that the passenger in this case lost his footing as his feet made contact with the sloped surface of the platform end ramp.

80 On 30 January 2023, GCR reconstructed the position of the train to assist the understanding of the nature of the stepping distance between the train and the platform. Photographs of the train taken post-accident showed that the reconstructed position of the train was consistent with that on the day of the accident.

81 RAIB inspectors took a series of photographs to document the reconstruction. It was observed during the reconstruction that the slope along the platform end ramp was not easy to distinguish. As such, it is likely that a visually impaired person would not be able to distinguish the slope. Figure 11 shows the view of the platform end ramp taken from the position of a person preparing to alight from the leading door of coach 4857.

Figure 11: Photo of ramp viewed from coach doorway.

82 The passenger was registered as severely sight impaired or 'blind',[11] as a result of developing cataracts as an infant. He is described as having some central vision in his left eye and some peripheral vision in his right eye. Every year he had an annual check at a specialist eye hospital. Witness evidence, corroborated by medical records, confirmed that his sight had not deteriorated significantly throughout his adult life and there was no recent change in his vision before the accident. Despite the challenges presented by his eyesight, the passenger would use mainline railways alone and did not feel the need to seek assistance when doing so. Although GCR has arrangements in place for passengers requiring assistance, the passenger did not feel the need to arrange such assistance on the day of the accident and was helped by his partner.

83 Witness evidence regarding the loss of footing by the second passenger suggests that visually impaired passengers may also not perceive the potential hazard created by the slope along the platform end ramp and consequently not successfully negotiate it.

[11] RNIB (the Royal National Institute of Blind People) is the UK's leading sight loss charity. It advocates using the term 'blind' for persons who are severely sight impaired.

84 The white painted lines around the platform at Loughborough Central were in good condition (figures 6, 9, 10 and 11). Before the train left Leicester North station, the passenger enquired of his partner whether the platform end ramp had white painted markings on it. His partner was not able to see the ramp from their seat but was able to see white lines marking the extent of the level platform which they reported back to the passenger.

85 This suggests that the passenger may have understood the significance of the white painted lines around platforms. However, it cannot be determined conclusively if the passenger saw these white lines further along the platform before leaving the train at Loughborough Central and, if so, if he appreciated that their absence signified the end of the platform and the start of the ramp.

The management of passenger / train interface risk at Loughborough Central station

86 Control measures put in place by GCR had not effectively controlled the risk of a person alighting from a door which was not adjacent to a usable platform.

87 GCR had documented risk assessments for all of its station platforms. The risk assessment for platform 1 at Loughborough Central station was completed in August 2019. It considered issues associated with train dispatch, the nature of the platform surface and risks arising from overcrowding and poor weather. It recognised the larger-than-normal vertical stepping distance and how stepping boxes would be available to mitigate the associated risks (paragraph 73).

88 GCR had recognised that when it ran seven or eight-coach trains they could not be safely accommodated in platform 1 at Loughborough Central station (that is to say with all the doors adjacent to the platform). GCR explained that on these occasions staff would be briefed to ensure that passengers in affected coaches were told not to use certain doors which might not be adjacent to the platform. Guards would either speak[12] to passengers themselves to convey this message or would ask the TTI to assist in this task. Platform staff would also be positioned to prevent passengers from trying to alight from these doors. This practice was supported by a requirement in GCR's Rule Book[13] which required guards to warn passengers on trains where not all the doors would be safely accommodated. Although the risk assessment identified some additional control measures, there was no defined means of ensuring they were followed up (see paragraph 103). However, the train involved in the accident was formed of six coaches, so none of these additional control measures were applied.

[12] As the vehicles are not fitted with a public address system (paragraph 14) this would need to be conveyed face-to-face.

[13] Paragraph 5.5.1 of section H of GCR's Rule Book GCR87109 December 2012.

89 Steam locomotive drivers at GCR are judged against various criteria when being assessed. One of these criteria is the ability to accurately stop trains. GCR uses a standard of stopping '*within ten feet (3 metres) of an ideal position*'. Drivers who can achieve this consistently are considered to meet the required competence. In terms of this criterion alone, the fact that the train involved had passed approximately 1.6 metres (5 feet, 3 inches) beyond a safe position (with all doors platformed) was within this standard. Even if the driver had intended to stop so that the passenger coaches were positioned centrally along the platform (with approximately 1 metre of level platform at each end) the final position was still within 10 feet (3 metres) of that point. GCR reported that the 'ten feet' requirement was a historic British Railways standard for vacuum braked trains. GCR and other operators of vacuum braked trains hauled by steam locomotives consider it reasonable and achievable by a competent driver.

90 Although the risk assessment for platform 1 at Loughborough Central recognised that trains with more than six passenger coaches could not be safely accommodated, it did not recognise that the allowable margin for error when stopping a six-coach train was small (paragraph 57). This meant that the risk assessment did not specifically recognise there was also a risk of a door on a six-coach train not being safely accommodated or arrange for any control measures to be put in place for such occurrences.

91 The risk assessment did refer to a control measure of '*additional staff where available provided to warn passengers at the north end of the platform'.* This control measure was described in the context of trains that are longer than six coaches. Implementing this control measure required staff to be present to recognise that the train had stopped in a position where doors were not adjacent to the platform, and that people were about to use them. This control measure was not intended to apply to the train involved in this accident. The nearest member of staff to the leading door (the platform inspector) nevertheless realised that the train had stopped further along the platform than it would normally do. They were, however, engaged in attending to passengers at another door and were also unaware that the leading door was about to be used (paragraph 39).

92 Although GCR had a policy of offering assistance to passengers who either requested or appeared to need help, the risk assessment for platform 1 at Loughborough Central also did not consider passengers (such as mobility or visually impaired people) whose use of the railway exposed them to greater levels of individual risk. As GCR has acknowledged, the nature of the railway (as a heritage attraction) means that they have a greater proportion of families with young children, and older people. GCR has also recognised that an increasing number of visitors and passengers may have no prior experience of using slam door stock (such as Mk1 coaches) and/or trains without centrally controlled doors and/or stations without modern platforms.

93 The door concerned had a notice above it warning passengers of the danger of leaning out of an open droplight window. This notice also required passengers to ensure that the train was *'in the platform and has come to a complete stand before opening the door*'. This notice was fitted in response to a passenger fatality on the mainline in 2018 which involved a passenger who was fatally injured as a result of having their head out of a window on a moving train.[14]

[14] https://www.gov.uk/raib-reports/report-14-2019-fatal-accident-at-twerton.

Identification of underlying factors

Reaction to previous incidents

94 GCR did not have effective processes for learning lessons from operational experience.

95 Schedule 1 of The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) requires duty holders to have *'procedures to ensure that accidents, incidents, near misses and other dangerous occurrences are reported, investigated and analysed and that necessary measures are taken'.* At the time of the accident, GCR had a policy on reporting accidents and incidents[15] which had been approved (by the managing director) in February 2022. Its stated intent was to '*provide guidance to senior members of staff* (*"Investigating Managers") involved with the investigation of accidents and incidents and any required regulatory reporting'.*

96 The policy described the importance of reporting and investigating safety issues to meet legal obligations and as part of the risk management process. RAIB was supplied with recent examples of GCR reports where incidents had been investigated and recommendations made to improve safety as a result. Although the policy acknowledged the value of investigating 'near misses', it contained no direction or guidance on how operational staff could, through their day-to-day experience of working on the railway, contribute to the railway's understanding of risk by reporting minor incidents or 'near misses'.

97 RAIB identified that the accident on 14 January 2023 was not an isolated occasion where a coach door had not been safely accommodated at Loughborough Central station. A very similar accident happened in 2014 when an elderly, visually impaired passenger fell when they tried to alight from a coach at a door that was adjacent to the platform end ramp at Loughborough Central. This passenger was taken to hospital but was discharged after being examined. This accident was notified to GCR staff at the time and an accident report was completed, although RAIB found no evidence that it triggered a review of the associated risk assessment or that any changes were made as a result of it.

98 Witness evidence indicates that, two weeks after the January 2023 accident, a train again stopped so that the leading door of the leading coach was beyond the level part of the platform and that passengers had alighted on to the platform ramp. RAIB has seen social media reports suggesting that other visitors had experienced similar incidents at Loughborough Central.

99 Evidence suggests there had been a considerable number of incidents of passengers alighting from doors not adjacent to platforms on GCR. Had GCR provided an effective means of ensuring that staff understood the importance of vigilance towards identifying and reporting such 'near misses', then the opportunity would have existed for GCR to identify these previous incidents, revise risk assessments, and implement effective mitigation measures.

[15] Policy document 62 – Accident / Incident Reporting and Investigation Procedures, issue 3 February 2022.

Risk assessment and safety leadership

100 GCR had no effective process to support the identification, management and monitoring of risk.

101 Regulation 19 of ROGS requires that transport operators '*make a suitable and sufficient assessment of the risks to the safety of any persons for the purpose of identifying the measures he needs to take to ensure safe operation of the transport system'*. Although an overarching policy within GCR's safety management system (SMS) described how risks should be assessed, GCR did not have a documented process that described how this would be done. The SMS referred to two policies, a risk assessment 'Philosophy' policy and a risk management and risk assessment 'Process' policy. Although both documents had reference numbers and were directly cited, RAIB found that the 'Philosophy' document did not actually exist and that the 'Process' document, although almost complete, had not been approved or issued since it was written in 2014.

102 This meant that when risk assessments were prepared by GCR staff, the staff doing this did not have access to any internal guidance that would support them. There was no process or guidance on where to seek advice, or guidance on areas such as what skills an assessor should have or how the assessment should be approached. Some staff at GCR understood that HRA offered such guidance, but GCR did not have formal arrangements for accessing this.

103 The risk assessment for platform 1 at Loughborough Central contained some proposed mitigation actions for issues that had been identified. However, there was no formal process to revise this risk assessment or to track the effectiveness of control measures (paragraph 88). GCR explained that it relied on the individual making the assessment to follow up, so was vulnerable to actions being overlooked or forgotten.

104 GCR explained that at the time of the accident overall safety leadership was undertaken at board level and there was no 'Head of Safety' post overseeing safety. This meant that no one with an operational management role was overseeing and co-ordinating the activities undertaken by the various departments and ensuring that there was a co-ordinated approach to safety management.

105 The unissued policy on risk management and risk assessment contained requirements for GCR to develop and maintain a risk register. GCR explained it did have a record of organisational risks but there was no formal register of safety risks for railway operations.

106 RAIB found that there was also no defined means of sharing or co-ordinating risk assessment information between different departments within GCR. For example, although the process for producing the risk assessment for the platforms at Loughborough Central station had involved someone with driving competence, there was no requirement for such assessments to involve staff from different departments or for control measures to be briefed out more widely.

107 Although a high-level requirement existed in the GCR SMS for the railway to audit and review its safety policies every two years, it had no effective policy or process for doing so. This is likely to have been a consequence of the risk management and assessment 'Process' policy not being adopted. This absence of a defined risk assessment periodic review process meant the possible opportunities for incorporating lessons from operational incidents (paragraph 94) may have been lost.

108 The platform risk assessments at GCR did not consider the risk posed to passengers with disabilities, such as mobility or sensory impairment (paragraph 92). If it had done so, it may have recognised that the transition between the level platform and the platform end ramp, while perhaps apparent to most passengers would not be so for all.

Observations

Competence management

109 There was an error in correctly recording the competence of the train's guard.

110 GCR has a policy of requiring staff who undertake safety-critical roles to undergo periodic assessments. Guards are required to undertake an annual assessment, alternating between their knowledge of the Rule Book and a practical assessment. The guard on the train involved had not completed their annual Rule Book assessment within the preceding year. However, the records held by GCR incorrectly recorded the status of the individual's assessment and showed that they were in date. Consequently, GCR was unaware that the guard's assessment was overdue.

Notification of the accident to RAIB

111 RAIB was not directly notified of the accident by GCR.

112 Accidents involving serious injury to persons in circumstances such as this accident are notifiable to RAIB within three days (paragraph 45). Although notified to ORR, this accident was not reported directly to RAIB.

The role of the regulator

113 ROGS came into force in 2006, providing the current regulatory regime for rail safety, including heritage railways. Under ROGS, mainline operators are not permitted to operate vehicles unless they have obtained safety certification from the national safety authority, which is ORR for most railways in the United Kingdom. Applicants need to show how their safety management system allows them to run their transport system safely.

114 Lower risk sectors such as heritage railways that do not run at speeds above 25 mph (40 km/h) do not need a safety certificate but must still have a written safety management system in place, which sets out the method by which they manage risks. During August 2023, ORR published guidance[16] for heritage railways to help them interpret and apply the specific requirements of ROGS in a proportionate way.

115 There is no requirement for ORR to review a heritage railway's SMS. ORR undertakes a programme of proactive inspections of heritage railway duty holders and will also undertake inspections in response to accidents or serious complaints against the railway. ORR also held a series of workshops between 2021 and 2023 for heritage railways on assessing the maturity of dutyholder's SMS.

[16] https://www.orr.gov.uk/sites/default/files/2023-08/sms-guidance-guidance-for-minor-and-heritage-railways-v1.pdf.

Summary of conclusions

Immediate cause

116 The passenger lost his footing and fell while alighting from the train because he was unable to safely negotiate the step down onto the platform end ramp (paragraph 47).

Causal factors

117 The causal factors were:

a. The train stopped with the leading door of coach 4857 adjacent to the platform end ramp (paragraph 50, **Recommendations 1 and 2**). This causal factor arose due to a combination of the following:

   i. The usable length of the platform was only around two metres longer than the distance between the end doors of the train formation, leaving a small tolerance on the stopping position of trains (paragraph 54, **Recommendation 1**).

   ii. An intermittent variation of brake performance made accurately stopping the train difficult (paragraph 59, **Recommendation 1**).

b. The passenger was unable to safely alight from the train due to the nature of the stepping distance between the door and platform end ramp (paragraph 67, **Recommendations 1 and 3**). This causal factor arose due to a combination of the following:

   i. There was a larger-than-normal vertical stepping height present when stepping from the coach's footstep to the platform, which increased the likelihood of a loss of footing by the passenger (paragraph 70, **Recommendations 1 and 3**).

   ii. The passenger was stepping onto a sloping surface, that he was probably unaware of, further increasing the likelihood of him losing his footing (paragraph 78, **Recommendations 1 and 3**).

c. Control measures put in place by GCR had not effectively controlled the risk of a person alighting from a door which was not adjacent to a useable platform (paragraph 86, **Recommendations 1, 2 and 3**).

Underlying factors

118 The underlying factors were:

a. GCR did not have effective processes for learning lessons from operational experience (paragraph 94, **Recommendation 1**).

b. GCR had no effective process to support the identification, management and monitoring of risk (paragraph 100, **Recommendation 2**).

Actions reported as already taken or in progress relevant to this report

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

119 Widespread sharing of safety learning helps duty holders to understand and mitigate risks that are within their control. This is especially important in the heritage sector with railways that are geographically separate and use a variety of rolling stock in different operating environments. HRA has a dedicated section, titled 'Urgent Safety Information', within its website which can be accessed by members. This has subsequently been developed by HRA through its Operating and Safety Committee with the intent of ensuring that its members are brought up to date with the latest safety learning, including learning outcomes from near misses across the sector. HRA explained that 'Urgent Safety Information' is proactively shared with members and so is not reliant on members checking the website.[17]

120 This resource improves the coverage and speed at which safety learning is shared within the heritage sector.

Other reported actions

121 A week after the accident, GCR committed to arrange an independent review of its SMS, which is in progress, and transferred safety responsibility to a new general manager. A new GCR Board Health, Safety and Environment Committee was established to scrutinise safety performance and to hold the meneral manager and the company's executive to account for the discharge of their safety responsibilities.

122 GCR has created a new role, head of safety & compliance, and an individual has been appointed to that role. A Board Health and Safety sub-committee has been established, chaired by a senior manager from the mainline railway industry.

123 GCR reviewed all its PTI risk assessments and now routinely operates five-coach trains, unless there is a specific need for six and seven coaches when they will staff trains and platforms accordingly. The effect of the new mitigations was observed and reviewed in February 2023 and all footplate crew had attended a mandatory training and briefing session on the new arrangements by the end of March 2023.

124 GCR undertook a full review of train dispatch and stopping point risk assessments for all platforms, and revised stop markers were implemented after consultation with footplate crews. A new incident reporting policy and supporting documentation has been published and a review of all staff competency records took place to ensure all competencies are up to date. GCR intends to buy a proprietary software package to manage competence records.

[17] HRA included the RAIB urgent safety advice that related to the accident at Loughborough Central station in the 'Urgent Safety Information' section of its website.

Background to RAIB's recommendations

125 On the UK's mainline railway, the Railway Safety and Standards Board (RSSB)[18] safety risk model (SRM) v9.00.00, dated March 2022, expresses safety risk in terms of predicted fatalities and weighted injuries[19] (FWI). SRM risk data is used by the railway industry to support safety-related decision making. The SRM estimates the fatality risk to passengers and other members of the public (excluding trespass, suicide and level crossings) on the mainline railway network to be 12.8 FWI per year. The fatality risk to passengers at the PTI represents around half of that risk. The mainline railway manages this risk through implementing a number of standards and best practice guidance aimed at closely monitoring and controlling the hazards at the PTI.

126 While heritage railways are much less intensively used than the mainline railway, the nature of heritage railway stations, the rolling stock and their operation means that some risks (for example, manually operated doors) which are not normally present at mainline stations may be found at heritage railway stations. Heritage railways may also see a different demographic of visitors and passengers than is found on the mainline. RAIB, therefore, considers that risks at the PTI at heritage railways, while different to the mainline railway, remain significant. Despite this, RAIB has not found any dedicated guidance on assessing and mitigating the risks associated with the PTI at heritage railways.

127 On 29 March 2023, RAIB issued urgent safety advice (USA) to heritage railways and other operators of trains who use passenger coaching stock without doors which are centrally controlled and/or locked by train crew (principally slam door rolling stock). This USA advised a review of the risks associated with the use of train formations which may not be fully platformed or which are of a length close to that of the platforms being called at. The content of the USA is at appendix C.

[18] 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.

[19] Defined by RSSB as the aggregate amount of safety harm. One FWI is equivalent to one fatality, 10 major injuries or 200 minor injuries or shock/trauma events requiring hospital admission, or 1000 minor injuries or shock/trauma events not requiring hospital admission.

Recommendations and learning points

Recommendations

128 The following recommendations are made:[20]

1 *The intent of this recommendation is to ensure that the safety management system at Great Central Railway adequately controls the risks arising from its activities, so that it incorporates industry best practice, complies with legal requirements and is updated at appropriate intervals.*

Great Central Railway should continue with the review of its safety management system with a focus on:

- developing a robust process for assessing and controlling the risks arising from its activities, and ensuring this process is well understood by the staff responsible for creating and reviewing risk assessments
- ensuring that it has a well-defined process for investigating and reporting accidents and near misses that enhances its understanding of the risks arising from its activities
- ensuring that the needs of disabled[21] passengers and staff are reflected in their assessment of risk (paragraphs 117a, 117a.i, 117a.ii, 117b.i, 117b.ii, 117c and 118a).

Once complete, Great Central Railway should develop a timebound plan to implement any changes identified in a sustainable and consistent manner.

[20] Those identified in the recommendations have a general and ongoing obligation to comply with health and safety legislation, and need to take these recommendations 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, these recommendations are 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.

[21] As defined in section 6 of the Equality Act 2010.

2 *The intent of this recommendation is to ensure that Great Central Railway has an organisational structure and process that provides effective oversight of how the various departments manage risk and ensures they operate in a co-ordinated, mutually beneficial manner.*

Great Central Railway should continue to review its organisational structure and processes to give senior managers and the board a comprehensive understanding of what activities are being undertaken to manage risks, and that learning from accidents, incidents and near misses is shared. It should implement a programme of thorough regular audits, which are capable of identifying corrective actions needed to improve the management of risk (paragraphs 117a, 117c, 118b).

This recommendation may apply to other heritage railways.

3 *The intent of this recommendation is to ensure that Heritage Railway Association members have access to guidance on managing the risks around the platform-train interface, in particular how those risks can be influenced by the demographic of heritage railway visitors*.

The Heritage Railway Association, in consultation with its members, should produce guidance on identifying and assessing the risks associated with the platform-train interface. This guidance should reflect where relevant any applicable law, guidance and good practice, including from other railways (including mainline). It should also consider how heritage railways should control the risks which arise from the use of heritage rolling stock and infrastructure, the use of heritage railways by persons with disabilities and the demographic of visitors and passengers to such railways (paragraphs 117b, 117b.i, 117b.ii. 117c and 118b).

Learning points

129 RAIB has identified the following learning points:[22]

1 It is important to have a robust system to manage records of staff training and competence so that the status of staff competence can be readily ascertained ensuring appropriate deployment of staff and timely planning of refresher training (paragraph 109).

2 It is important to report promptly notifiable accidents to RAIB in accordance with Railways (Accident Investigation and Reporting) Regulations 2005 (paragraph 111).

[22] 'Learning points' are intended to disseminate safety learning that is not covered by a recommendation. They are included in a report when RAIB wishes to reinforce the importance of compliance with existing safety arrangements (where 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.

Appendices

Appendix A - Glossary of abbreviations and acronyms

ARL	Above rail level
BSO (D)	Brake Second Open with spaces for disabled passengers.
CCTV	Closed-circuit television
FO	First Open
FWI	Fatalities and weighted injuries
GCR	Great Central Railway
HRA	Heritage Railway Association
ORR	Office of Rail and Road
PTI	Platform-train interface
RBR	Restaurant Buffet Refurbished
RK	Restaurant, Corridor
RNIB	Royal National Institute of Blind People
ROGS	Railways and Other Guided Transport Systems (Safety) Regulations 2006
RSSB	Rail Safety and Standards Board
SMS	Safety management system
SRM	Safety risk model
TSO	Tourist Second Open
TSR	Temporary speed restriction
TTI	Travelling ticket inspector
USA	Urgent safety advice

Appendix B - Investigation details

RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- CCTV recordings taken from Loughborough Central station
- site photographs and measurements
- weather reports and observations at the site
- a review of previous reported accidents
- a review of medical records supplied to RAIB
- a review of risk assessments and safety management system documentation provided by GCR
- a review of previous RAIB investigations that had relevance to this accident.

Appendix C – Urgent safety advice

Urgent Safety Advice 01/2023: Passenger doors not centrally controlled and/or locked by train crew

Published 29 March 2023

1. Safety issue

Suitable arrangements may not be in place to mitigate the risks arising from the operation of passenger trains formed of rolling stock with doors that are not centrally controlled and/or locked by train crew (principally slam door rolling stock) where these trains are close to, or longer than, the length of station platforms.

2. Safety advice

Heritage railways and other operators of trains who use passenger coaching stock without doors which are centrally controlled and/or locked by train crew (principally slam door rolling stock) should review the risks associated with the use of train formations which may not be fully platformed or which are of a length close to that of the platforms being called at.

Duty holders should ensure that a suitable and sufficient assessment of the risks is carried out and that any appropriate control measures identified are implemented. These assessments should consider:

- the type and location of passenger doors on the relevant rolling stock
- the length of passenger trains compared to the platforms at which they may call
- the capabilities of the braking systems of the trains involved and the level of precision which is reasonably achievable by them when stopping
- the level of accuracy in stopping position required of train crew and if this is supported by relevant competency and assessment processes
- if the level of stopping position accuracy required of train crew aligns with the capability of the trains involved and the accuracy required at the relevant platforms
- the effectiveness of existing measures intended to manage the risk of passengers exiting a train that is not fully platformed or which may stop in line with areas not intended for public use, such as platform ramps

- the effectiveness of existing measures intended to manage the risk of passengers exiting a train that is not fully platformed or which may stop in line with areas not intended for public use, such as platform ramps
- the visibility from the cab of different traction units and the effectiveness of any stopping markers in place.

3. Issued to:

Heritage railways and other operators of trains who use passenger coaching stock which has passenger doors which are not centrally controlled and/or locked by train crew (principally slam door rolling stock).

4. Background

At around 11:49 hrs on 14 January 2023, a passenger lost their footing and sustained a serious injury while alighting from a train at Loughborough Central station on the Great Central Railway.

The Great Central Railway is a heritage railway and the passenger train involved was formed of historic slam door rolling stock. The accident occurred just after the train had stopped and as the passenger was alighting from the leading door of the train's leading coach. The train stopped in a position which meant that this door was adjacent to the ramped part of the platform, which is not intended for public use. The passenger lost their footing and sustained their injuries while they were stepping down from the coach and onto the platform ramp.

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