



Rail Accident Investigation Branch

# Rail Accident Report



## Collision at Swanage station 16 November 2006

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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# Collision at Swanage station

## 16 November 2006

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## Introduction

- 1 The sole purpose of an investigation by the Rail Accident Investigation Branch (RAIB) is to prevent future accidents and incidents and improve railway safety.
- 2 The RAIB does not establish blame or liability, or carry out prosecutions.
- 3 Access was freely given by Swanage Railway Company Ltd to their staff, data and records in connection with the investigation.
- 4 Appendices at the rear of the report contain the following glossaries:
  - acronyms and abbreviations are explained in appendix A; and
  - technical terms (shown in *italics* when they first appear in this report) are explained in appendix B.

## Summary

### Key facts about the accident

- 5 At 12:21 hrs on Thursday 16 November 2006 an *engineer's train* entered platform 2 at Swanage and collided with a rake of carriages that were stabled there.
- 6 Two members of Swanage Railway personnel were treated by ambulance staff, but neither required hospital treatment.
- 7 The locomotive and one carriage sustained damage to the buffers and surrounding bodywork.

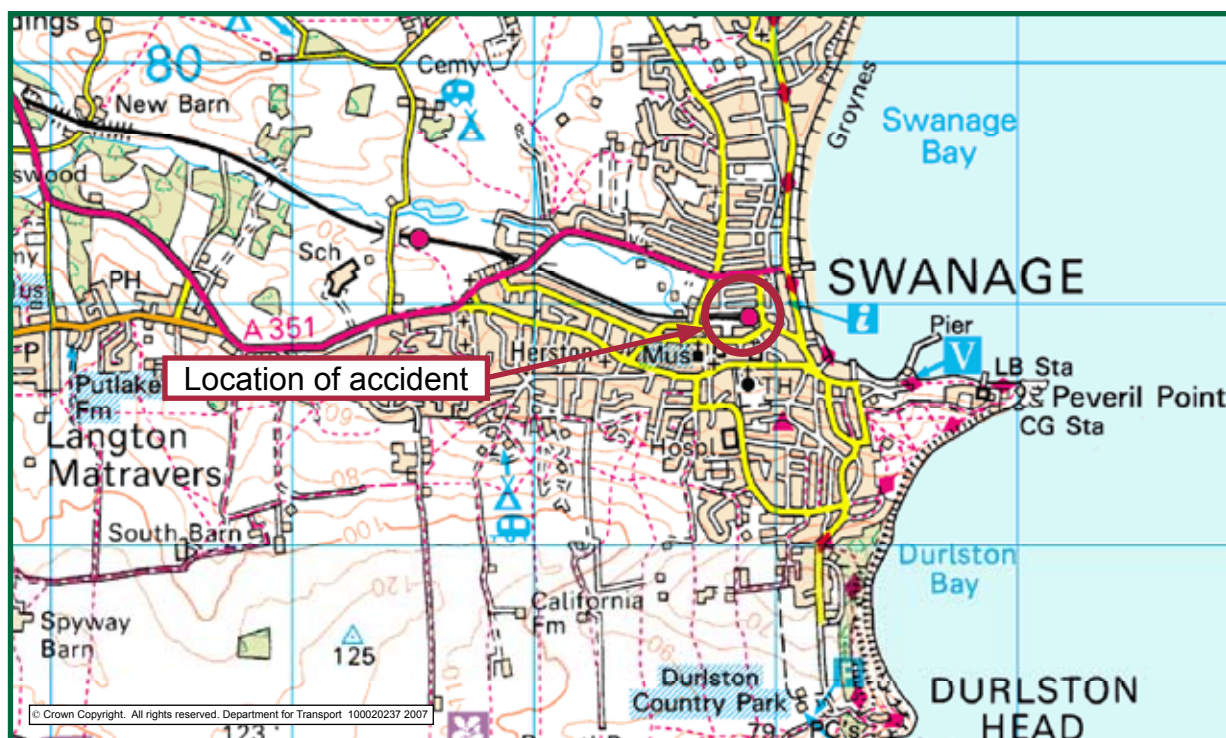


Figure 1: Extract from Ordnance Survey maps showing location of accident

### Immediate cause, causal and contributory factors, underlying causes

- 8 The immediate cause was the locomotive driver did not register the signalled route of the train when he checked the signal before starting the train move.
- 9 A causal factor was that the driver controlled the locomotive from the rear cab (paragraph 69);
- 10 Contributory factors were:
  - (a) the signalman selected a route into an occupied platform; and
  - (b) the lack of a clear understanding of the shunting movements between the operations manager and the driver.
- 11 Three observations are made regarding improving the operational safety of the Swanage Railway. None of these refer to issues that caused or contributed to the accident.

## Recommendations

12 Recommendations can be found in paragraph 87. They relate to the following areas:

- amendment of the Swanage Railway rule book requirements for shunting;
- *safety critical communications* on the Swanage Railway;
- driver medical standards on the Swanage Railway; and
- protection of Swanage Railway staff working in the interior of trains.



## The Accident

### Summary of the accident

- 13 An engineer's train hauled by former British Railways (BR) class 33/1 diesel locomotive 33 108 ran into Swanage station and collided with a rake of carriages that were stabled in platform 2.
- 14 Two members of Swanage Railway personnel were treated by ambulance staff, but neither required hospital treatment.
- 15 The locomotive and one carriage became *buffer-locked* and both vehicles sustained damage to the buffers and surrounding bodywork.



Figure 2: Damage sustained to the locomotive and carriage

### Location

- 16 The Swanage Railway is a 6  $\frac{3}{4}$  mile (10.8 km) *standard gauge* un-electrified heritage railway located in Dorset. Before 1972 it was part of the British Railways network, and it has been operated as a heritage railway since 1979. The Swanage Railway currently operates a passenger service between Swanage and Norden, a distance of 5 $\frac{1}{2}$  miles (9.2 km). Figure 3 gives an overview of the line.
- 17 The accident occurred at Swanage, the eastern terminus of the line.

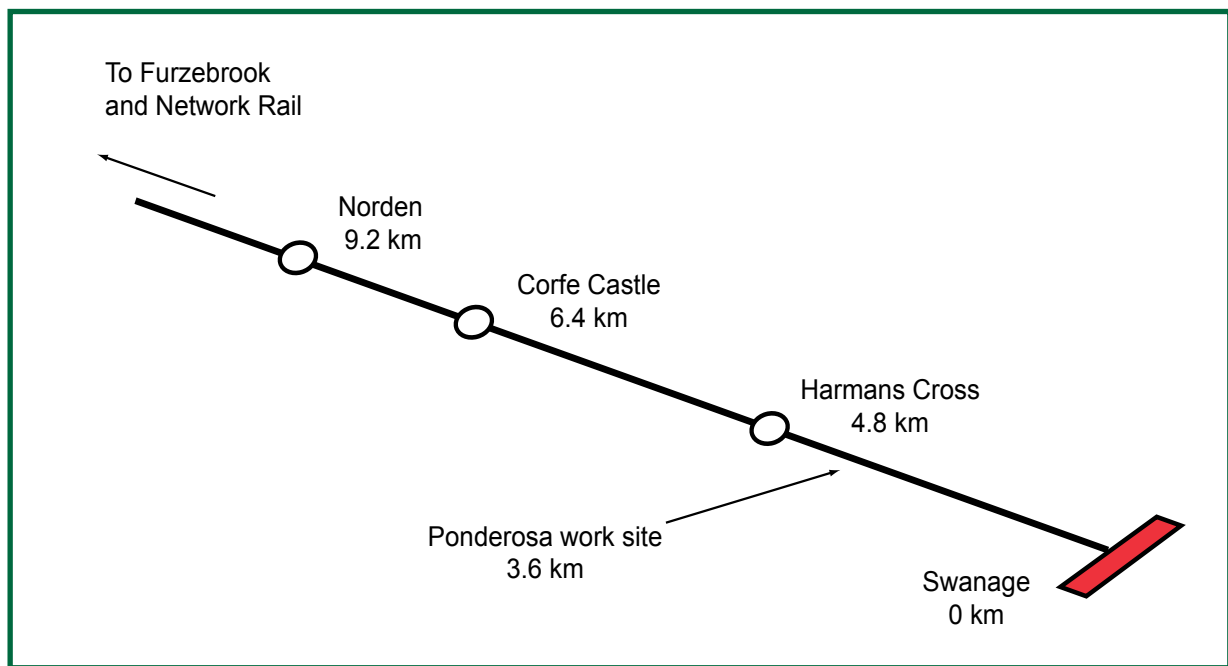


Figure 3: Overview of the Swanage Railway, showing distances from Swanage station

## The parties involved

- 18 Four members of Swanage Railway staff were involved in the movement of the train:
  - the driver, a full time employee;
  - the signalman, a part time employee;
  - the operations manager, a full time employee; and
  - the train guard, a volunteer member of staff.
- 19 Each person was qualified and medically competent in accordance with Swanage Railway requirements for the duties that they were carrying out.

## External circumstances

- 20 On 16 November the weather was overcast with frequent rain showers.
- 21 Although it was raining at the time of the accident, this had no significant effect on the visibility of signals, points positions or the line ahead.

## The infrastructure

- 22 Swanage station has an island platform. Platform 1 is no longer directly accessible from the running line, and carriages providing storage and a catering outlet are permanently stabled in it. Platform 2 is the sole operational platform; a loop exists to the north of it. There is a single siding to the south of platform 1 and a locomotive depot outside the station. Access to platform 1 and the south siding is by a *headshunt*, which can only be accessed from platform 2 or the loop line (Figure 4).
- 23 *Semaphore signalling* is in use; Figure 4 shows a simplified signal configuration for trains arriving from Harmans Cross.

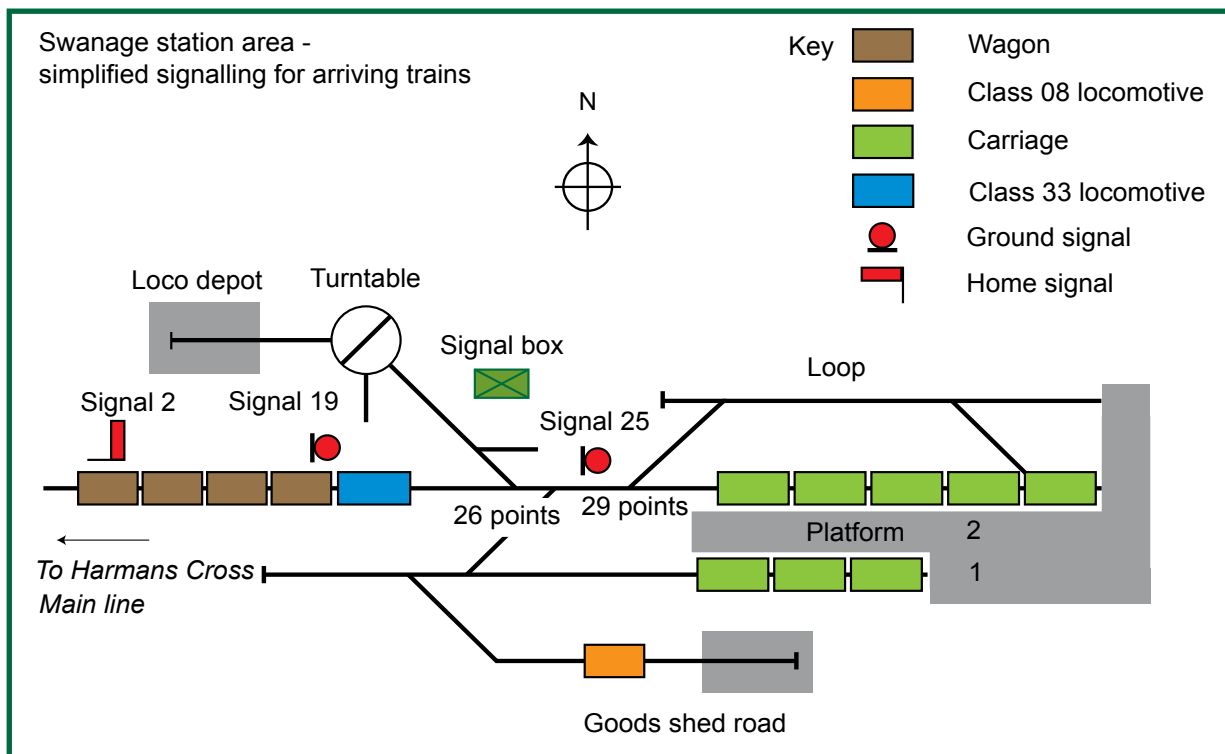


Figure 4: Layout of track at Swanage station, showing signals applicable to an arriving train

- 24 Ground signal no.25 controls the final approach to the station platform or loop. When the signal is in the proceed (or 'off') position a *route indicator* displays either the letter 'M' when the route is set for the Main (platform 2), or 'L' when the route is set for the Loop. The 'M' and 'L' are illuminated whenever in use (Figure 5).



Figure 5: Signal 25 as seen looking towards Swanage station. The 'M' indication is displayed



## The train

- 25 The train involved in the collision consisted of a locomotive, number 33 108, and 6 wagons.
- 26 The locomotive was built in the early 1960's by the Birmingham Railway Carriage & Wagon Co for service on BR, and was purchased for preservation on withdrawal from BR service. It is now owned by the Class 33/1 Preservation Group, and operates on the Swanage Railway. The locomotive is an eight wheeled bogie diesel locomotive, and has driving cabs at both ends, and is colloquially referred to as the 'Crompton' on the Swanage Railway, a reference to the manufacturer of its electrical equipment (Figure 6).



Figure 6: Class 33/1 locomotive

- 27 Two *brake vans* were provided, one coupled at each end of the wagons in the train, because the wagons in the train were not *continuously braked*.
- 28 There were 5 carriages stabled in platform 2. All were of the ex BR *mark 1* type. The handbrake in the guard's van in these carriages had been applied as a parking brake, in accordance with the Swanage Railway rule book.
- 29 The westernmost carriage in platform 2 carried a *tail lamp* capable of giving a red light that was visible to arriving trains. This lamp was not lit at the time of the accident. Not illuminating a tail lamp on stabled stock is common practice during daylight hours, and at times when the railway is not operating a service, as it is considered that the lamp body is sufficiently visible. Swanage Railway rule book, Section F, rule 22.2, requires that;  
  
'When vehicles have to be left on a dead end line where a red or white light is provided on the buffer stops, the Shunter must ensure that a red or white light (as appropriate) is placed on the end of vehicles facing approaching movements.'

## Events preceding the accident

- 30 The Swanage Railway had planned engineering work at an embankment slip site at Ponderosa Crossing, 3.6 km from Swanage, (Figure 3) for the Monday to Friday (13-17) November 2006. This work finished ahead of schedule on Wednesday 15 November 2006, and the engineer's train was returned to Swanage that evening. As there was no signalman on duty the train stopped on the main line opposite the locomotive shed just before ground signal 19 and the crew *shut down* the locomotive and secured the train by applying brakes in the two brake vans and the locomotive. Figure 4 shows the position of the engineer's train and other vehicles in the Swanage station area after the train was shut down and secured.
- 31 The operations manager planned for the engineer's train to travel to Harmans Cross on 16 November 2006, and arranged staff to enable this to happen that day.
- 32 The driver for the train and the operations manager both arrived at approximately 08:00 hrs on the morning of the 16 November 2006; they discussed the arrangements for taking the train to Harmans Cross shortly after their arrival, although the move could not take place at that time as the signalman was not expected to take up duty until 12:00 hrs.
- 33 Because of the carriages in platform 2 (paragraph 28), the locomotive could not run round the train in the conventional manner. The operations manager decided that he would accomplish the manoeuvre using two locomotives, 33 108 and a class 08 shunting locomotive that was stabled in the south siding. He intended to drive the class 08 himself, with the train driver driving locomotive 33 108.
- 34 The operations manager planned the manoeuvre in 9 distinct steps:
1. uncouple locomotive 33 108 from the east end of the wagons;
  2. run locomotive 33 108 forward into the station area, beyond no.26 points;
  3. reverse locomotive 33 108 back into the headshunt;
  4. bring the class 08 locomotive out of the south siding into the headshunt, reversing and move to the wagons, coupling to their east end;
  5. use the class 08 locomotive to haul the wagons into the loop line adjacent to platform 2;
  6. detach the class 08 locomotive from the east end of the wagons;
  7. run locomotive 33 108 from the headshunt to the loop line and attach to the west end of the wagons;
  8. locomotive 33 108 to haul the train to Harmans Cross for disposal there; and
  9. the class 08 locomotive to return to the south siding.
- The plan was not written down, but followed the pattern of similar manoeuvres previously undertaken. Figure 7 shows the intended second and third steps of the plan.
- 35 The operations manager then discussed the plan with the driver of locomotive 33 108 and believed that the driver understood what he was required to do to make the moves. The operations manager did not require the driver to repeat the instructions back to confirm understanding, although the Swanage Railway rule book has such a requirement (paragraph 61).
- 36 The driver *prepared locomotive* 33 108 for service during the morning.
- 37 At some point during the morning four members of staff started working inside the carriages stabled in platform 2 in preparation for traffic.

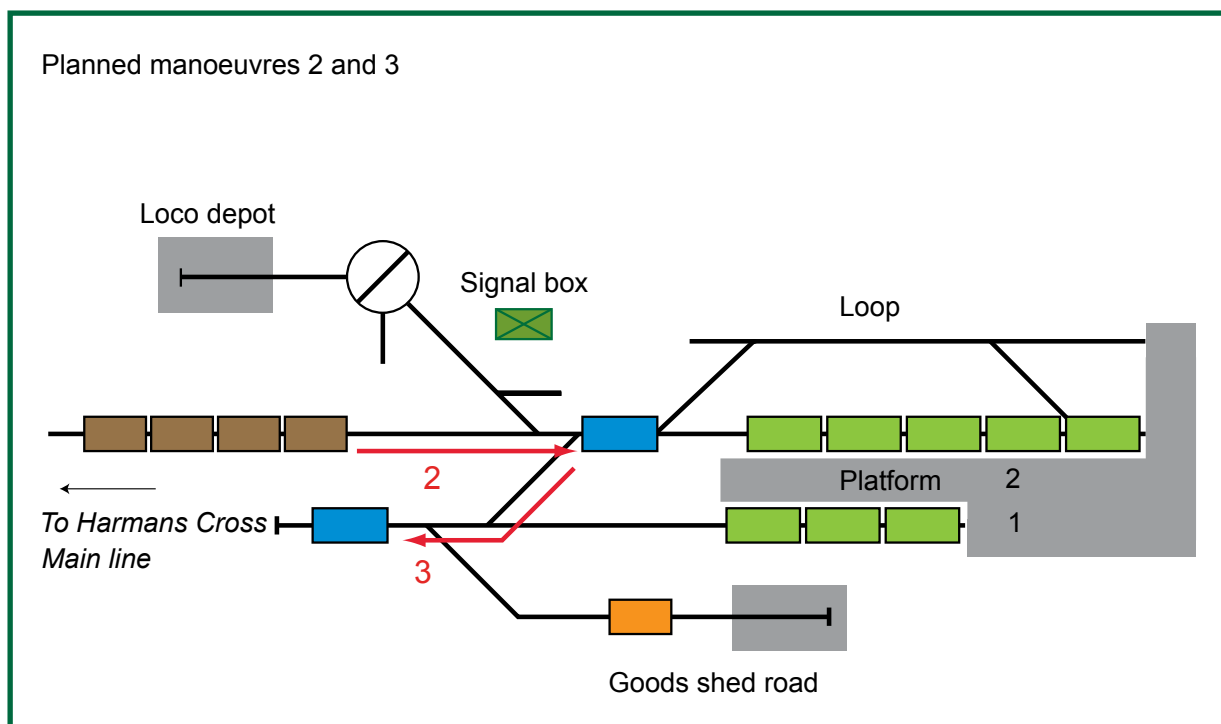


Figure 7: Sketch showing the intentions of steps 2 and 3 of the manoeuvre described in paragraph 34

- 38 At approximately 12:00 hrs the signaller booked on duty and reported to the operations manager at the latter's office. Rather than brief the signaller and driver separately the operations manager telephoned the driver who was in the mess room at the locomotive depot and stated the planned movements whilst the signaller listened to the conversation. The operations manager used the phrase 'move the Crompton' for the second of the moves described in paragraph 34.
- 39 At 12:10 hrs the signaller proceeded to Swanage signal box, the driver to locomotive 33 108 and the operations manager to the class 08 shunting locomotive. The driver instructed a volunteer member of the operations team to release the brakes on the brake vans. Having done that the volunteer took up a position on the front balcony of the leading brake van, having been asked by the driver to act as guard / shunter.

## Events during the accident

- 40 At 12:15 hrs the signaller opened the signal box and *cleared* no.19 and no.25 ground signals so that the locomotive could proceed towards the station area. No.29 points were in the *normal* position, routing traffic towards platform 2, and no.25 signal was displaying an M aspect for that line (paragraph 24).
- 41 At 12:21 hrs the driver, having started up 33 108 and controlling it from the western end, checked that signals no.19 and no.25 were showing proceed, released the brakes and took power.
- 42 The whole train moved forward towards Swanage station.
- 43 The driver, who was on the north side of the cab to observe the signals, crossed to the south side as the train moved off. This was so that he would have better visibility as the train rounded the right hand curve in the loop, towards which he thought the route was set.

- 44 The operations manager, who was in the cab of the class 08 locomotive, realised that the whole train was moving, contrary to his instructions, and tried to phone the driver by using a speed dial function on his mobile phone. The phone had not rung by the time the collision occurred. The operations manager could not see from his position whether the train was heading for platform 2 or the loop.
- 45 When the driver realised that he was moving into platform 2 he applied emergency braking but this was too late to prevent the train colliding with the stationary carriages (Figure 8).

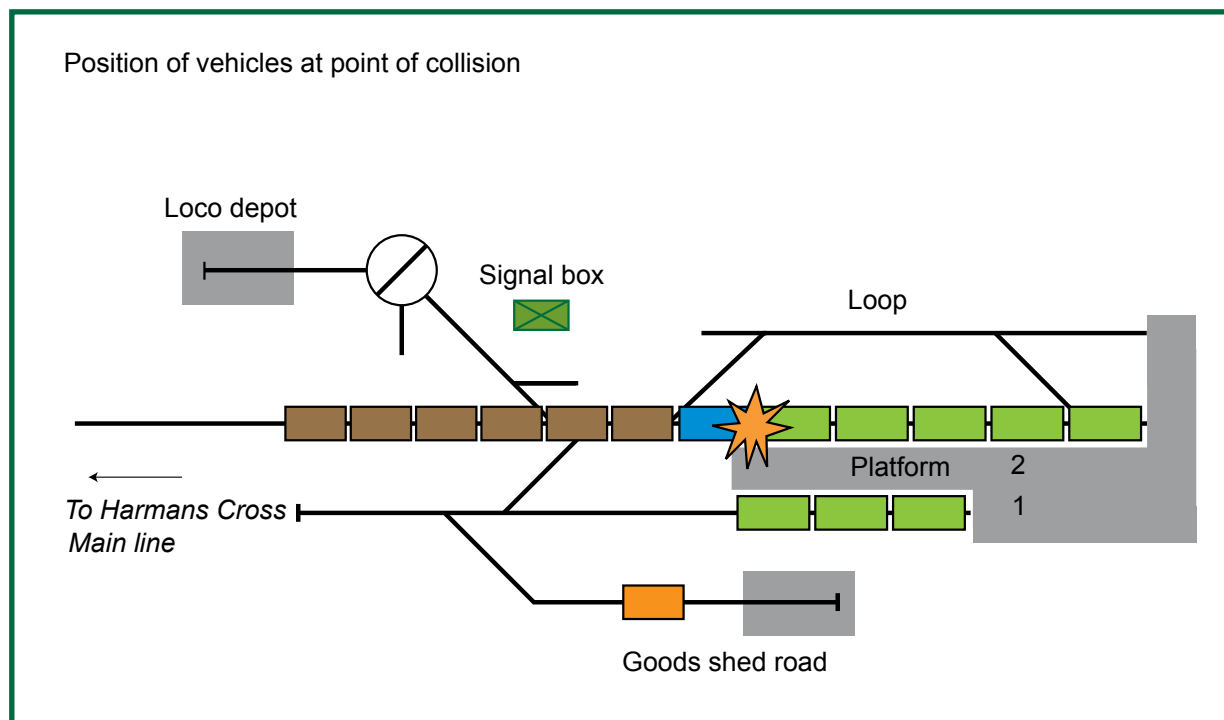


Figure 8: Sketch showing the actual move of the train up to the point of collision

## Consequences of the accident

- 46 The driver and one of the staff members working in the carriages were slightly injured.
- 47 The carriages were moved 0.6 m towards the buffer stops as a result of the collision. Locomotive 33 108 and the westernmost carriage became buffer-locked (Figure 2).
- 48 Locomotive 33 108 suffered damage to its buffers, buffer beam and body panels at the eastern end.
- 49 The westernmost carriage suffered damage to its buffers and a bogie centre casting.

## Events following the accident

- 50 Swanage Railway staff not involved in the collision went to check on the condition of their colleagues and an ambulance was called.
- 51 Locomotive 33 108 was shut down by the operations manager.

## The Investigation

### Sources of evidence

- 52 Evidence was gained through:
- examining the position and state of rail vehicles;
  - examining the position and state of the signalling equipment;
  - examination of rail head conditions between no.29 points and the point of collision;
  - *sighting tests* of the positions of the ground signals and the associated route indicator;
  - *static brake tests* of locomotive 33 108 and the wagons;
  - witness statements;
  - review of relevant personnel documents relating to training; and
  - a review of the Swanage Railway's rule book and relevant work instructions.
- 53 The Swanage Railway do not have, and are not legally obliged to provide, data recorders on traction equipment, signalling systems or telephony; therefore no evidence was available from such sources.

### Key facts

- 54 No.29 points had been set towards platform 2 on the evening of 15 November 2006. The signaller had not attempted to change them towards the loop as he had expected that only the locomotive would be moving into the station area.
- 55 No.25 signal had indicated that no.29 points were set for the main line, ie into platform 2. Figure 5 was taken shortly after the collision, and clearly shows the M aspect of the route indicator.
- 56 The operations manager had instructed the driver to undertake the movements as laid out in paragraph 34. However the driver had not repeated the messages back at either the initial briefing or the later telephone call at 12:00 hrs, and the operations manager had not obtained confirmation of the driver's understanding of the move.
- 57 The driver's understanding of the shunting movement was different from that laid out in paragraph 34. He anticipated that:
- locomotive 33 108 would draw the whole train into the loop line, and then propel it into the headshunt;
  - the class 08 locomotive would then replace locomotive 33 108 on the east end of the train, and draw the wagons back into the loop; and
  - locomotive 33 108 would return to the headshunt, follow the wagons into the loop and reattach to their western end.
- 58 The driver had not asked for locomotive 33 108 to be uncoupled from the train. He had instructed the train guard to release the handbrake from the train's brake vans as he intended to move the whole train forward.
- 59 The brakes of locomotive 33 108 performed satisfactorily when tested after the collision.



- 60 There was no evidence of lack of adhesion on the rails in the vicinity of points nos.26 and 29.
- 61 The Swanage Railway rule book October 2005 edition was valid in November 2006. Section A deals with General Instructions and rule 9 in this section deals with 'Messages concerning safety'. It specifically covers messages given by telephone and face to face. It requires that the person giving a message must ensure that it is repeated back and fully understood (clause 9.2.c); it also requires that the person receiving a message must repeat the message to the caller and ensure that he clearly understands it (clause 9.3.b).
- 62 Section F of the October 2005 edition of rule book deals with 'Shunting'. It gives no guidance on whether drivers should be in the leading cab of a twin-cab locomotive, and gives no guidance on which of alternative routes should be selected by a signaller when controlling shunting.

### **Previous occurrences of a similar character**

- 63 The Swanage Railway has had one previous shunting collision since opening as a heritage railway, which was caused by a technical brake problem on a locomotive, and hence has no relevance to this collision.
- 64 The RAIB has investigated two other collisions between locomotives and carriages on heritage railways since it was formed:
- At Loughborough Central, on the Great Central Railway on 4 February 2006 a steam locomotive coming off shed collided with passenger carriages stabled in a platform. The RAIB's report on this was published on 10 July 2006, reference 07/2006, and made recommendations about their rule book, medical qualifications of staff, and provision of first aid kits on locomotives. None of the recommendations were relevant to the incident at Swanage.
  - At Pickering, on the North Yorkshire Moors Railway, on 5 May 2007 a steam locomotive running round its train collided with the carriages. The RAIB's report on this was published on 08 August 2007, reference 29/2007, and made recommendations about control of movements in the headshunt at Pickering and handling of evidence after an incident. None of the recommendations were relevant to the incident at Swanage.

## Analysis

### Identification of the immediate cause

- 65 The signalman set and signalled the route for the train into platform 2, which was in accordance with the instructions given by the operations manager. The driver checked signal no.25 before starting the train, but did not realise that the route aspect was displaying an M rather than an L. Not recognising the route aspect is the immediate cause of the collision.

### Identification of causal factors

#### Driving of the train

- 66 The driver's perception of the shunting movement (paragraph 57) may have led him to anticipate that signal no.25 would be set for the loop, and hence only to look at it for permission to start forward, and not to check the route indicator aspect.
- 67 The driver of locomotive 33 108 chose to drive it from the rear, western, cab. Had he been in the leading, eastern, cab he would have had much better visibility of signal no.25 (Figure 9), been able to see the lie of the points, and would have realised earlier that the train was heading into platform 2. It is likely that had anyone been in the leading cab the collision would have been avoided.



Figure 9: View of signal no 25 from rear cab of locomotive 33 108, showing 'L' aspect

- 68 All trains that operate on the national rail network are now continuously braked. Trains without continuous brakes operate on most heritage railways, and their rule books allow for such operation, as does that of the Swanage Railway. The low speed of operation of such railways, below 25 mph (40 km/h), and the small number of freight trains operated by heritage railways, means that the risk of such operation is much less than it would be on the national network. The lack of continuous brakes on the train in this incident is unlikely to have altered the likelihood of a collision given the position of the driver in the rear cab, and the consequent last minute application of the brakes.
- 69 Driving the locomotive from its rear cab was a causal factor to the collision.

## **Identification of contributory factors**

### Planning and briefing of the movement

- 70 Although running round the engineer's wagons as planned was somewhat complicated, the Swanage Railway stated that it was not an unusual move. The operations manager had planned and defined a logical sequence for the movement, and had communicated it to the signaller so that both had a similar understanding of the movement.
- 71 The operations manager had briefed the driver as to the move face to face some four hours before it took place, and again by telephone when he was briefing the signaller. Despite this no mutual understanding was reached, and the driver envisaged a different set of movements to achieve the run round movement.
- 72 The operations manager's use of the phrase 'Move the Crompton' (paragraph 38) may have confused the driver as to whether he was to move just locomotive 33 108, or the locomotive and its train.
- 73 The Swanage Railway rule book clearly states a requirement to repeat messages in order to ensure a clear understanding (paragraph 61). Neither the operations manager nor the driver ensured that this requirement was complied with, and as a result there was not a clear understanding of the movement between them.
- 74 The lack of a clear understanding between the operations manager and the driver contributed to the collision.

### Routing of the movement

- 75 The signalman was expecting the locomotive to move, as planned by the operations manager, but not the whole train. Leaving no.29 points set for platform 2 should not have been an issue: there was sufficient space for the locomotive between no.26 points, which give access to the headshunt, and the carriages in platform 2. However, the space, although sufficient, was not generous. With the alternative route to the loop available it was not desirable to route the movement onto a line where an error could result in a collision. In this case the signalman had to change no.29 points at some stage in the planned movements; had he changed them initially the collision would have been avoided.
- 76 Routing the initial movement into platform 2 contributed to the collision.

### Response of others

- 77 The response of the Swanage Railway staff in attending to their colleagues, summoning an ambulance, notifying the RAIB of the collision, and preserving evidence was exemplary.

## Conclusions

### Immediate cause

- 78 The immediate cause was the locomotive driver did not register the signalled route of the train when he checked the signal before starting the train move.

### Causal factors

- 79 A causal factor was that the driver controlled the locomotive from the rear cab (paragraph 69, **Recommendation 1**).

### Contributory factors

- 80 Contributory factors were:
- (a) the signalman selected a route into an occupied platform (paragraph 76, **Recommendation 1**); and
  - (b) the lack of a clear understanding of the shunting movements between the operations manager and the driver (paragraph 74, **Recommendation 2**);

### Additional observations

- 81 The driver was certified as medically fit to drive trains in accordance with Swanage Railway requirements. For its drivers the Swanage Railway uses the requirements of *Railway Group Standard* GE/RT3255, the standard for train operators on the national network; however, this standard specifically excludes train drivers. The national network, and many other heritage railways, require a higher standard of medical fitness for drivers than for other safety critical workers; this is laid down in *Railway Group Standard* GE/RT3251, Train Driving. The RAIB has previously recommended that the Heritage Railways Association (HRA) should issue guidance on medical fitness and standards to its members. (RAIB reports 20/2007, Recommendation 6 and 22/2007 Recommendation 6). The HRA has stated its intention to accept these recommendations and work on the production of revised guidance on medical fitness and standards is in hand (**Recommendation 3**).
- 82 No protective measures, such as a board stating 'Not to be moved' were in place to prevent the passenger train in platform 2 from being moved whilst staff were cleaning its interior. Whilst such measures would have had no effect on the particular circumstances on 16 November 2006 they are widely used on the national network, and represent best practice (**Recommendation 4**).
- 83 Rule F 22.2 (paragraph 29) rule applies at Swanage, and although a suitable light was provided on the carriages stabled in platform 2 it was not illuminated. The lack of illumination of the lamp did not contribute to the collision as the driver could not see the train or the lamp from his position in the rear cab, but it appears that the Swanage Railway's custom and practice with regard to the illumination of tail lights does not comply with the rule (**Recommendation 5**).

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

- 84 The Swanage Railway have amended Section F of their Rule Book to require that moves are made by the safest possible route, and that drivers must either control a movement from the leading cab if a twin cab locomotive is used, or ensure that a competent person who can operate the emergency brake is in the leading cab.
- 85 The Swanage Railway is reviewing their training regime for signallers to encompass routing shunting moves by the safest possible route.

## Recommendations

86 The following safety recommendations are made<sup>1</sup>:

### **Recommendations to address causal and contributory factors**

- 1 The Swanage Railway should amend their Rule Book to:
  - ensure that shunting movements are made by the safest possible route; and
  - ensure that whenever possible shunting moves are driven from the leading cab of the locomotive.(paragraphs 79 & 80(a), 84)
- 2 The Swanage Railway should review its implementation and monitoring of the rule book requirements for safety critical communication to ensure that the requirements are being complied with, and implement such changes as are found necessary (paragraph 80(b)).

### **Recommendations to address other matters observed during the investigation**

- 3 The Swanage Railway should amend its medical standards for drivers to comply with the new guidance from the Heritage Railways Association when that guidance is issued (paragraph 81).
- 4 The Swanage Railway should implement the use of a system that informs staff that trains are not to be moved whilst work such as maintenance or interior cleaning is being carried out on them (paragraph 82).
- 5 The Swanage Railway should enforce rule F 22.2, with illuminated lights provided, when vehicles are stabled in Swanage platform (paragraph 83).

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<sup>1</sup> Responsibilities in respect of these recommendations are set out in the Railways (Accident Investigation and Reporting) Regulations 2005 and the accompanying guidance notes, which can be found on RAIB's web site at [www.raib.gov.uk](http://www.raib.gov.uk)

## **Appendices**

### **Glossary of abbreviations and acronyms**

BR

HRA

RAIB

### **Appendix A**

British Railways

Heritage Railways Association

The Rail Accident Investigation Branch

## Glossary of terms

## Appendix B

All definitions marked with an asterisk, thus (\*), have been taken from Ellis' British Railway Engineering Encyclopaedia © Iain Ellis. [www.iainellis.com](http://www.iainellis.com)

Brake van	An enclosed rail vehicle not equipped with seating for passengers but provided with controls for the automatic brake and handbrake.*
Buffer-locked	An effect produced on a Direct Reverse Curves of tight radii, with no intervening Straight Track. At the mid-point the End Throws of two adjacent vehicles are in opposite directions, which can result in the Buffers of the vehicles becoming locked together. When the vehicles later return to the straight a Derailment can occur as one vehicle wrestles the other off the Track.*
Cleared (the signal)	Operated the signal to show a proceed indication.*
Continuous brake	An automatic brake system that operates throughout a train, and applies if vehicles become uncoupled.
Engineer's train	A train used in connection with engineering works.
Ground signal	A signal mounted at or very near ground level.
Headshunt	A short length of Track provided to allow Shunting movements to take place in Sidings without those movements fouling the Running Line.*
Mark 1 (carriages)	The original British Rail (BR) Passenger Coach model design dating from the 1950's now withdrawn from service on the national network.*
Normal	For a set of points or set of switches, this is the default position, decided generally as being the position which permits the passage of trains on the most used route. The opposite is reverse.*
Prepare a locomotive	The process of ensuring a locomotive is ready for service prior to being used, including bring it to a state where it is ready for operation, and carrying out pre-operation servicing checks as laid down by the operator.
Railway Group Standard	A document mandating the technical or operating standards required of a particular system, process or procedure to ensure that it interfaces correctly with other systems, process and procedures. Network Rail (NR) produces Network Rail Company Standards (NRCS) that detail how the requirements of the Railway Group Standards are to be achieved on its system.*
Route indicator	An indicator associated with a signal that shows a driver which route is set where more than one route is available.*
Safety critical communication	A message that contains information essential for the safety of the railway and people.
Semaphore signalling	Mechanical signals generally consisting of moveable arms, the shape, disposition and attitude of which (e.g. raised or lowered) all carry meaning.*



Shut down	To close down a locomotive when it is no longer to be used – usually involving switching off the engine, ensuring that the parking brake is applied, and all keys are removed before locking the locomotive cab(s).
Sighting tests	A test of a signal to ensure the time a driver has to read and process an indicator, lineside sign or signal with aspect and indicators is adequate. This time is therefore the length of time taken to travel from the sighting point to the item being observed.*
Standard gauge	The gauge between running rails as determined by the Railway Regulation (Gauge) Act 1846. This ranges from 4' 8 $\frac{3}{8}$ " (1432 mm) to 4' 8 $\frac{1}{2}$ " (1435 mm) between running edges.*
Static brake tests	A test which is performed when a locomotive is coupled up to a train to ensure that the train brakes are working correctly.
Tail lamp	The red light carried at the rear of a train, which serves to assure staff that the entire train has passed complete and no parts have become detached.*

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