RAIB
Rail Accident Investigation Branch

# Rail Accident Report

## Uncontrolled movement of a road vehicle in a Channel Tunnel passenger shuttle train in transit from the UK to France 4 April 2008

Department for Transport

Report 08/2009
March 2009

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.



Any enquiries about this publication should be sent to:

RAIB
The Wharf
Stores Road
Derby UK
DE21 4BA

Email: enquiries@raib.gov.uk
Telephone: 01332 253300
Fax: 01332 253301
Website: www.raib.gov.uk

This report is published by the Rail Accident Investigation Branch, Department for Transport.

# Uncontrolled movement of a road vehicle in a Channel Tunnel passenger shuttle train in transit from the UK to France, 4 April 2008

## Contents

# Introduction

1 The sole purpose of a Rail Accident Investigation Branch (RAIB) investigation is to prevent future accidents and incidents and improve railway safety.

2 The RAIB does not establish blame, liability or carry out prosecutions.

3 Access was freely given by *Eurotunnel* to their staff, data and records in connection with the investigation.

4 Appendices at the rear of this report contain the following glossary:

- technical terms (shown in *italics* the first time they appear in the report) are explained in Appendix A.

5 Throughout this report reference to a coach indicates a road coach and not a rail vehicle.

6 All times quoted in this report are in British Summer Time which was one hour ahead of Central European Time used by Eurotunnel on 4 April 2008.

# The Accident

## Summary of the accident

7 On 4 April 2008 as the 17:06 hrs Cheriton to Coquelles passenger shuttle departed from the UK terminal of the Channel Tunnel rail system (Figure 1), a road coach moved within the rail vehicle on which it was being conveyed, damaging the rail vehicle and a private car parked in the same vehicle.

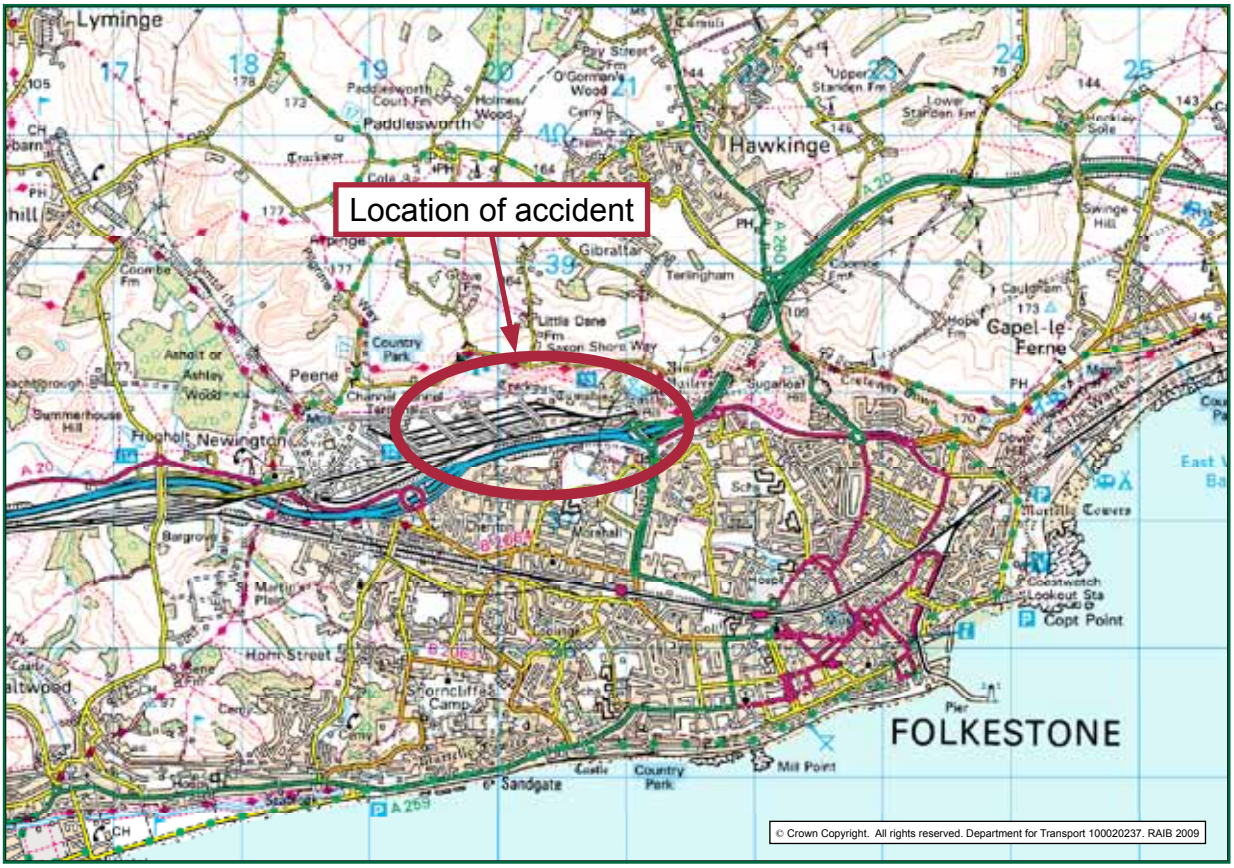


*Figure 1: Extract from Ordnance Survey map showing location of accident*

8 The driver of the coach was injured as he attempted to arrest the movement of the coach. There were no other injuries, although the position of passengers behind the coach immediately before it moved gave rise to the potential for injury.

9 There was limited disruption to Eurotunnel services while the shuttle was returned to the UK terminal.

## The parties involved

10 Eurotunnel operated the shuttle train and controlled the loading and parking of the vehicles.

11 Cars Guy Auzoux of Aubevoye, France owned and operated the road coach.


*Figure 2: The road coach and private car immediately following the accident*

## External circumstances

12 There were no circumstances external to the Eurotunnel system which had any bearing on the accident.

## Train

13 The train involved was a Eurotunnel passenger shuttle. These transport passengers who remain with the road vehicle in which they are travelling during the transit of the Channel Tunnel.

14 Two locomotives, one at each end, power Eurotunnel shuttles; they are driven from the leading locomotive.

15 Each passenger shuttle train consists of single deck carrier *wagons*, which can transport private cars, road coaches, motorcycles and vehicles over 1.85 m in height, and double deck wagons, which carry cars and motorcycles. The cars and coaches move onto and off the shuttle through loader wagons at each end of the train, and in the centre of the train between the single and double deck carriers. The wagons are identified by an operational number, wagon 2 being the leading loader wagon.

16 Fire barriers seal each carrier wagon during the transit to contain any possible outbreak of fire within that wagon. Passengers can move between wagons through separate fire doors at the sides of the fire barriers to gain access to other wagons during a normal transit and to escape from fire if necessary. The barriers are closed as part of the loading process and remain closed until the shuttle has arrived at its destination.

## Parking and securing vehicles in passenger shuttles

17 Each single deck carrier, which is 26 m long, can transport only one road coach, parked in the centre of the wagon. This ensures even weight distribution and places the passenger door of the coach adjacent to the emergency exit. However, there is space ahead of and behind a coach to park one car or other vehicle greater than 1.85 m in height.

18 Eurotunnel staff direct vehicles to the parking positions. They instruct the drivers to switch off the engines, apply the parking brake and place the gear lever in ‘first gear’ for vehicles fitted with a manual gearbox or ‘park’ for those with automatic transmissions.

19 On the single deck carrier wagons, the vehicles are also secured with chocks. Chocks are ‘small’ if they are designed for use with vehicles such as a private car and ‘large’ if for use with a road coach. Sets of chocks comprising one large and three small chocks are provided on each wagon. Eurotunnel instructions are that a small chock is to be placed in front of the front driver’s side wheel of any car parked ahead of the coach, and that a large chock is to be placed ahead of the coach’s front wheel on the driver’s side and a small chock behind the same wheel. Shuttle crews are required to report the absence of any chocks so that they can be replaced as soon as possible and no later than when the shuttle next passes through a terminal.

## Events preceding the accident

*20* *Mission* 6608, the 17:06 hrs Cheriton to Coquelles passenger shuttle started being loaded with road vehicles at 16:50 hrs. A mix of private cars and road coaches was loaded onto the single deck wagons forming the front section of the shuttle.

*Figure 3: Large (left) and small (Right) chocks*

21 A private car was parked at the front of wagon 6 and a road coach immediately behind it. No vehicle was parked behind the road coach.

22 The loading crew passed along the shuttle chocking the vehicles and instructing the drivers of all vehicles to secure them with the handbrake on, the engine turned off and first gear engaged.

23 On reaching the coach in wagon 6, a crew member found that there was no large chock available to be placed in front of the leading wheel of the coach, so he placed a small chock against that wheel, intending to complete the loading of the train and then return to wagon 6 with a spare large chock. However, he did not have the opportunity to return to wagon 6 before the accident occurred.

24 The party of school pupils travelling in the coach got out to consume refreshments, many of them sitting on the floor of the carrier behind the road coach. Some of them needed access to bags in the luggage compartment of the coach, so the coach driver left his seat and went to open the luggage compartment door in the right-hand side of the coach.

25 While the driver was next to the luggage compartment, the shuttle train began the journey to France.

26 The road coach then began to roll backwards towards the rear fire door of wagon 6.

27 The passengers sitting on the floor of the carrier moved rapidly out of the way, some taking refuge in wagon 7, the adjacent carrier wagon. None were injured.

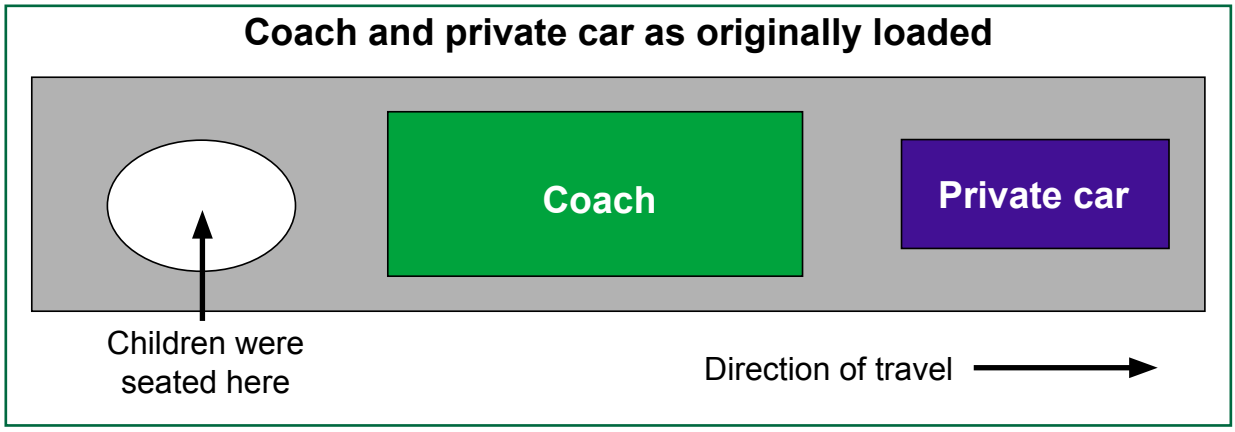


*Figure 4: Coach and private car as loaded in Wagon 6*

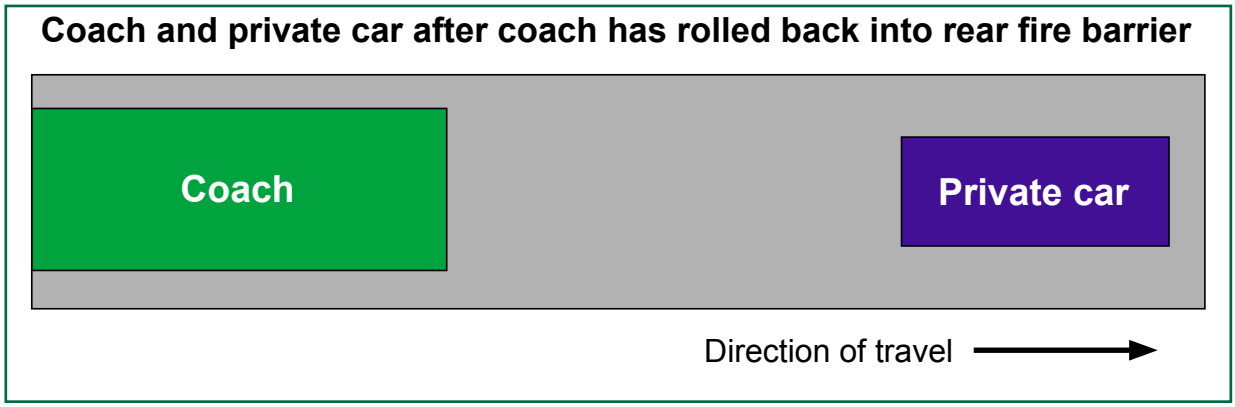


*Figure 5: Positions of coach and private car after departure but before braking*

28 The coach driver attempted to stop the coach by going behind it and leaning against it, but did not succeed and was trapped by the coach against the fire door, which stopped its movement.

29 Several passengers then used different *Passenger Alarm Points* to alert the *Chef de Train*.

## Events during the accident

30 Very soon after the train began to move, the Chef de Train received an alarm from a passenger in wagon 7 (the wagon behind wagon 6) requesting that the train be stopped, the passenger reporting that there were people on the floor of a wagon who might be dead.

31 The Chef de Train then spoke to the driver explaining the situation and instructing him to carry out a controlled stop. The Chef de Train instructed two of the other staff in the single deck section of the shuttle to proceed to wagon 6, where an incident had occurred.

32 As the shuttle slowed down, the road coach moved forward, releasing the driver, who returned to the coach to attempt to stop its forward movement. Although he managed to enter the coach, he did not prevent it running into the car parked ahead of it. The coach and car moved onward into the fire barrier at the front of wagon 6. None of the occupants of the car was injured.

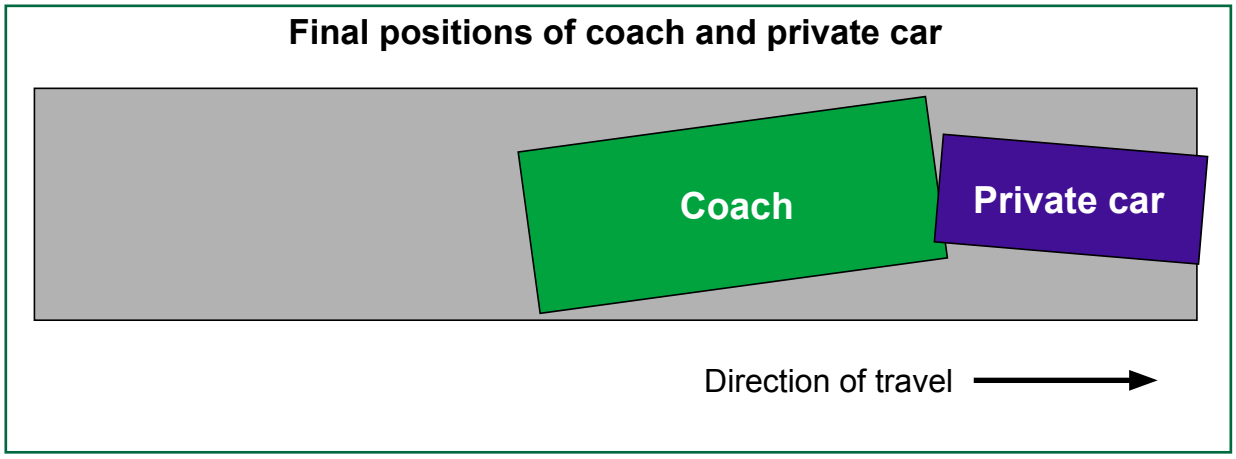


*Figure 6: Positions of the coach and private car after the accident*

33 During this time various passengers attempted to contact the Chef de Train through the Passenger Alarm Point from wagon 6.

## Events following the accident

34 The first of the crew members sent to deal with the accident did not reach wagon 7 until after the shuttle had stopped. He found most of the school children in a state of agitation in wagon 7 and the coach driver on the floor of the coach in wagon 6. He advised the Chef de Train of the situation, requesting that he make an announcement requesting any doctor on the shuttle to make themselves known to a crew member. Chocks from wagon 7 had been placed against the wheels of the coach by passengers to prevent further movement.

35 The Chef de Train made the announcement, leading to a doctor making herself known to the second crew member making her way to wagon 6. On examining the driver, the doctor decided that he required medical attention as soon as possible. This information was passed to the *Railway Control Centre* through the Chef de Train.

36 The Railway Control Centre decided that the shuttle should return to the UK terminal and instructed the shuttle driver accordingly. The driver and Chef de Train implemented this decision and the shuttle reached the terminal at 17:42 hrs. A paramedic was on hand when the train arrived back at the terminal. He attended the coach driver immediately, decided that he needed emergency hospital treatment and requested an ambulance which arrived on the scene at 17:57 hrs.

37 The car occupants moved to wagon 5 in the company of a crew member and remained there until the shuttle had returned to the terminal. The crew members were also occupied in keeping passengers who were not directly involved in the accident out of wagon 6.

38 Eurotunnel duty staff met the shuttle on its return and arranged for the transfer of undamaged road vehicles to other shuttles. The school party continued their journey later that night, crossing the Channel by ferry.

# The Investigation

## Investigation process

39 The RAIB obtained evidence from:

- examination of wagon 6 and the road vehicles involved;
- interviews with Eurotunnel staff and passengers;
- statements made to Kent Police;
- Vehicle and Operator Services Agency report on the condition of the coach;
- data taken by the recording equipment on the train;
- observation of the loading practice for road coaches and cars onto the single deck wagons of passenger shuttles; and
- tests on the effectiveness of the chocks in use.

# Key Information

## The condition of the coach

40 The outer rear offside tyre was found to be ruptured. The cause is not known, but witness evidence does not support the rupture occurring after the coach had been berthed on the shuttle or during the accident.

41 The Vehicle and Operator Services Agency tested the coach parking brake on the day after the accident and found it to comply with UK standards.

## The position and condition of the chocks after the accident

42 Numerous chocks were found on the floor of wagon 6 and under the coach. None were observed to be damaged. Witness evidence indicates that they were placed there following the accident and it was not possible to identify whether any had been placed under the coach during the loading of the shuttle.

## Movement of Mission 6608 away from the terminal

43 The On Train Data Recording equipment fitted to all Eurotunnel locomotives provides a record of the condition of various components on the locomotive and of the distance travelled in relation to time. From this data it is possible to estimate the speeds and accelerations attained by the shuttle during the movement.

44 The data indicates an initial acceleration as the shuttle began to move along the terminal platform followed by a further acceleration. There is then a period of generally constant speed running over the tracks approaching the tunnel mouth. This is what would be expected during an uneventful departure and it is followed by a significant deceleration to a standstill corresponding to the driver making a controlled stop.

45 Calculations showed the highest speed achieved to be 14 m/s (51 km/h), the acceleration to be of the order of 0.21 – 0.26 m/s² (2.2 – 2.6 *%g*), and the deceleration during braking to be 0.68 m/s² (6.9 %g). All these results are within the ranges which would be expected to occur when a shuttle train made a normal departure from the terminal followed by a controlled stop. The maximum acceleration which a shuttle train can achieve is 4.5 %g and the maximum deceleration is 10.2 %g.

## Tests on systems to restrain coaches within a moving wagon

### Method

46 When a shuttle train accelerates a force acts on any vehicle parked in it. This force is directly proportional to the acceleration of the shuttle train. By measuring the force needed to move the coach, the equivalent acceleration it will resist can be found.

47 The RAIB carried out tests involving pulling a coach over chocks of both kinds, placed in differing orientations against the wheel under the driver's seat, to simulate the effect on a coach of a shuttle train accelerating. The parking brake was not applied and the manual gearbox was in 'neutral' during most of the tests to re-create the 'worst case conditions' to test whether the coach could thus overcome the chocks.

48 The tests also examined the effect of the parking brake alone without a chock and the effect of the diagonally opposite rear nearside outer tyre being deflated.

49 There were no tests of the effectiveness of the use of engaging first gear to restrain the coach because of the possibility of damage to the vehicle's engine during the test.

50 No attempt was made to test the combination of the chock and the parking brake because of the likelihood of damage to the coach chassis from the force required to move the coach against the combined chock and the parking brake and the adequate resistance provided by each separately as indicated in Table 1.

## Results

51 The coach did not pass over the chock when it was correctly placed, but tilted it back slightly and then forced it to slide along the steel plate, displacing, but not removing, part of the rubber pad attached to the underside of the chock. The force required to do this was deemed to be the equivalent of the acceleration that could be resisted.

52 Table 1 shows the equivalent accelerations needed to move the coach for the different orientations of chocks. These are discussed in paragraphs 53 to 57.

| **Condition** | **Equivalent acceleration resisted (paragraph 50)** |
|---|---|
| **Tests without chocks to establish the effect of the parking brake alone** | |
| Parking brake fully applied | 36 %g |
| Parking brake with the lever placed one quarter of the movement from 'released' to 'fully applied' | 25 %g |
| **Tests with parking brake released and gearbox set at neutral** | |
| Small chock correctly placed against the tyre | 11 %g |
| Small chock correctly placed with the diagonally opposite outer tyre deflated | 10.3 %g |
| Small chock placed diagonally across tread/wall corner of the tyre | 6.3 %g |
| Large chock correctly placed against the tyre | 14 %g |
| Large chock placed with half its face in contact with the tyre | 13 %g |
| Large chock placed diagonally across the tread/wall corner of the tyre | 13 %g |

*Table 1: Sustainable acceleration for various conditions of restraint*

53 These tests show that, with the exception of the small chock placed across the tread wall corner, each individual condition by itself is adequate to restrain a coach subjected to the maximum achievable acceleration and braking rates of 4.5 %g and 10.2 %g respectively.

54 A parking brake one quarter applied is capable of securing a coach subjected to an acceleration more than twice that achievable in braking.

55 A small chock placed incorrectly would still be sufficient to restrain a coach during the maximum acceleration of which the train is capable, but might not be able to do so during emergency braking.

56 The diagonally opposite outer tyre being deflated had an insignificant effect on the security of the coach provided by the small chock.

57 An additional test showed that an unrestrained coach can be moved by a very gentle acceleration equivalent to 1%g.

## The effect of a chock incorrectly placed clear of the wheel

58 Tests showed that when a sufficient steady load is applied to the chock through the coach, the chock will slide backwards. A brief application of a significantly larger force owing to a momentary rapid acceleration could be expected to cause the coach and chock to move backwards for the short duration of the acceleration.

59 For a coach to pass over a chock would require it to come in contact with the chock at a sufficient speed to enable it to rise over it. This would require the chock to be displaced some distance back from the wheel to enable the coach to accelerate towards it. For example, if a chock were placed 0.1 metres clear of the wheel, an acceleration of 7.4 m/s² for 0.5 seconds would be needed to achieve this. An acceleration of this magnitude (75 %g) would have caused anyone standing up to be thrown over. Such an occurrence would have been noticed immediately by anyone in wagon 6 and no such event has been reported. It is very unlikely that this situation occurred.

## Previous occurrences of a similar character

60 Since March 1996 there have been four other instances of road coaches moving during transit.

61 In one of them the coach driver was apparently absent from the vehicle while in two others there were allegations of incorrect chocking or the removal of the chocks subsequent to parking of the vehicle. No injuries occurred in any incident.

62 The fourth concerned an allegation by a passenger that her vehicle had been hit by a coach, though she agreed that no damage had been caused. The crew maintained that the coach had been properly chocked and had not moved.

63 All occurrences were investigated by Eurotunnel train crew management, assisted in one instance by the corporate safety team, and the earliest led to the reintroduction of front and rear chocking of coaches. Consideration was also given to providing an additional crew member and introducing an additional check that the parking brakes were applied; these provisions were not adopted.

# Analysis

## Identification of the immediate cause[1]

64 Analysis of the movement of the train showed no abnormal acceleration or braking that might be expected to cause a correctly secured coach to move. This is corroborated by witness evidence. It follows that the immediate cause was that the coach was not restrained against longitudinal movement.

## Identification of causal factors[2]

65 The tests demonstrated that the forces required to overcome the restraining effect of either a correctly placed chock, or the parking brake, each acting separately, were greater than those experienced by the coach during the movement of Mission 6608.

66 There was no evidence of damage to the power train of the coach, and it was driven away from Cheriton for testing without attention to the power train. The movement of the coach was commensurate with it being unrestrained. From this it is reasonable to conclude that no gear had been engaged when the vehicle was parked.

67 It follows that at the moment when movement first occurred, the parking brake was not applied, the chock at the rear of the wheel under the driver's position was missing or not correctly positioned and first gear had not been engaged. Each of these conditions was necessary and each was a causal factor.

## Identification of contributory factors[3]

68 There is a variety of possible explanations for the coach not being in the appropriate condition. These are analysed independently. It is likely that had any one of the restraining conditions been applied, then the coach would not have moved.

The chocks were not in place

*The chocks were not placed during the parking process*

69 The witness evidence obtained is contradictory on this issue. For this reason there is doubt concerning the placing of the chock or chocks against the leading wheel on the driver's side. However, it is known that no large chock was available to be placed in front of the wheel and that this would have disturbed the normal routine of working. This could have resulted in the coach remaining without a chock behind the leading wheel on the driver's side.

---

[1] The condition, event or behaviour that directly resulted in the occurrence

[2] Any condition, event or behaviour that was necessary for the occurrence. Avoiding or eliminating any one of these factors would have prevented it happening

[3] Any condition, event or behaviour that affected or sustained the occurrence, or exacerbated the outcome. Eliminating one or more of these factors would not have prevented the occurrence but their presence made it more likely, or changed the outcome.

*The chocks were placed correctly and moved by a third party*

70 Since the loading crew had left wagon 6 immediately after supervising the parking of the vehicles, it is possible that someone else in the wagon could have moved the chock.

71 If one of the adults had done this, it would have been a deliberate act, knowing that damage and injury were likely to result. Witness evidence indicates that the children travelling in wagon 6 were unlikely to have moved the chocks.

72 There is no evidence to support the possibility of the chocks being moved, but it cannot be absolutely excluded.

The coach's brakes were not applied

73 A competent coach driver would always secure a vehicle when parking it by applying the parking brake. This would have been the case in any parking situation and not peculiar to the shuttle.

74 Although there is no specific evidence to support this, it is possible that at the moment of parking the coach the driver was distracted, perhaps by an occupant of the coach requesting him to open the luggage compartment. Such a distraction in the process of parking the vehicle might have caused him not to apply the parking brake.


*Figure 7: The layout of the Bova Futra's driving position showing parking brake and gear lever*

75 The parking brake lever is under the steering wheel close to the corner formed by the windscreen and the side window as shown in Figure 7. It is also held in either applied or released position by a collar which fits into a recess when the lever is in either position, but not when it is between positions. It would be most unlikely that the brake would have been knocked away from the fully applied position because it is distant from the path which the driver would have taken when getting up, is protected by the steering wheel and is locked by the collar.

76 It is possible to lodge the parking brake lever away from applied or released positions and then to move it by knocking it. The protection provided by the steering wheel makes it unlikely that this happened.

77 The possibility of an adult releasing the parking brake is most unlikely for the reasons discussed in paragraph 75. Anyone would have had to reach across the driver's position and might well have been seen doing so. No witness evidence supports this scenario, but it cannot be absolutely excluded.

### First gear was not engaged

78 After parking the coach, the driver left his seat to open one of the luggage compartments. In getting up he would have had to pass the gear lever. In doing so, he might have come in contact with it and knocked it into the neutral position.

79 While one of the pupils or adults may have knocked the gear lever while getting out of the coach, any movement of the gear lever would not have been sufficient to render the coach free as the parking brake would have had to have been released as well.

### The subsequent forward movement of the coach

80 As soon as the train began to decelerate, the lack of a restraining force on the coach would cause it to tend to continue forward at the same speed while the train decelerated under it.

## Possible situation immediately prior to the departure of Mission 6608

81 It is not possible to establish the situation that had arisen prior to the accident with absolute certainty.

82 However, had the coach been parked with neither the parking brake applied nor first gear engaged, it would have been free to move in either direction. If a small chock had been applied to the front of the wheel, but none behind it, then the coach would have been free to move backwards as the shuttle started until it was stopped by the rear fire barrier. Once the shuttle began to decelerate the coach would move forward relative to the shuttle. Energy calculations show that it could achieve sufficient speed to pass over the small chock and run into the car parked ahead of it.

83 A small chock incorrectly placed, which could restrain the coach against an acceleration of 6.3 %g, would have been sufficient to restrain the coach against the maximum achievable acceleration of 4.5 %g.

84 It is probable that the coach was parked with the parking brake off, first gear not engaged and only a small chock applied to the front of the wheel. That scenario is compatible with subsequent events.

85 The absence of the chock behind the wheel suggested here was possibly caused by lack of the correct chocks being available in wagon 6 (paragraphs 23 & 69).

## Observation of the position of a road vehicle's controls by shuttle loading team

86 The shuttle loading team should ideally check that their instructions concerning the secure parking of vehicles have been understood and followed.

87 The location of the controls varies considerably between different road coaches such that it is not possible for a shuttle crew member to confirm rapidly that the parking brake has been applied. Even if crews were familiar with all types of coach, it would still require them to enter each coach to observe the position of the controls as they cannot be seen easily from the floor of the shuttle. Entering each coach would probably introduce an unacceptable delay to the loading process unless an additional member of staff was made available to do this work with the resulting increase in operational cost.

88 Not all coach drivers have a sufficient command of English or French to understand the verbal instructions and a form of sign language has been developed to supplement them and overcome the language difficulty. A very limited assessment by the RAIB indicates that it generally serves its purpose.

89 In practice, the shuttle crews have to rely on trusting coach drivers to immobilise their vehicles effectively in accordance with the instructions given.

90 The placing of chocks should ensure that a coach without its parking brake applied is still restrained safely, and the RAIB's tests indicate that, when done correctly, this is the case.

91 Actions such as alterations to the berthing process (entry into vehicles to check on parking brakes) would have implications disproportionate to the overall risk.

92 The boarding ticket given to drivers, which is displayed to identify the shuttle on which they are to travel, contains pictograms and written instructions that hand brakes are to be applied and first gear or park engaged. Until the end of 2007 coach drivers were also given written safety instruction leaflets. This practice was discontinued once the stock was exhausted as it was decided that they were of little safety value since drivers tended to put them aside or refuse them.

## Presence of coach passengers behind the parked coach

93 Sitting down in the roadway behind the coach to eat their food put the school children in a potentially hazardous situation. No injuries resulted as they were able to move away quickly to the adjacent wagon.

94 While shuttle staff patrolling the train firmly request anyone they find on the roadway to move, it would be impractical to prevent passengers from remaining in the shuttle roadway during the transit.

95 Including an instruction to passengers not to remain in the roadway during the transit in the announcements prior to the departure of the shuttle would assist in drawing passengers' attention to the hazards of so doing.

# Conclusions

## Immediate cause

96 The immediate cause of the accident was that the coach was not sufficiently restrained against backward movement (paragraph 64).

## Causal factors

97 The causal factors resulting in the coach not being restrained were:

a. the parking brake was not applied;

b. first gear was not engaged; and

c. the chock at the rear of the wheel under the driver's position was not present or was incorrectly positioned (paragraph 67).

## Contributory factors

98 While the immediate cause of the accident has been established and likely specific issues leading to the incorrect restraining of the coach have been identified, it has not been possible to establish with certainty the circumstances which led to them occurring, but the following factors are possibly contributory:

a. the non-availability of the correct chocks (paragraph 85);

b. the difficulty of confirming the state of the controls of a road vehicle by the shuttle crew (paragraphs 86-89);

c. although it is unlikely, the possibility of interference with the chocks or the controls of the coach (paragraphs 72 and 77); and

d. the possibility of the driver being distracted at the moment of parking the coach (paragraph 74).

## Additional observation

99 The presence of the passengers sitting in the roadway behind the coach could have led to further casualties resulting from the accident (paragraph 93).

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

100 Following the accident, Eurotunnel immediately briefed shuttle crews on the accident. Eurotunnel also issued notices to shuttle crews reminding them of the method of ensuring that road vehicles are correctly parked and that coach passengers are to be reminded to stay clear of the area behind coaches during the transit and repeated it in a commercial bulletin issued during the summer of 2008.

# Recommendations

101 The following safety recommendations are made[4]:

**Recommendations to address causal and contributory factors**

1 Eurotunnel should review its operating and maintenance procedures to ensure the availability of the correct chocks in each wagon so far as is reasonably practicable (paragraph 97).

2 Eurotunnel should review, and improve if appropriate, the communications procedures for drivers of coaches aimed at ensuring their vehicles are correctly secured (paragraph 98).

3 Eurotunnel should review the announcements made prior to the departure of shuttles to ensure they include a warning to passengers not to remain in the vehicle roadway during the transit (paragraph 99).

[4] 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 Inter Governmental Commission 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 167 to 171) can be found on RAIB's web site at www.RAIB.gov.uk.

# Appendices

## Appendix A - Glossary of terms

| | |
|---|---|
| %g | The value of an acceleration expressed as a percentage of that achieved by a freely falling object, which is taken to be 9.81 m/s². |
| Chef de Train | The Eurotunnel member of staff aboard in overall charge of the train. |
| Eurotunnel | The company holding the concession to operate the Channel Tunnel. |
| Mission | The Eurotunnel term for a specific transit working from the UK to France, or vice versa, identified by a four digit number. |
| Passenger Alarm Point | Call points from which passengers can make voice contact with the Chef de Train and, when in use, cause the Chef de Train's CCTV monitor to display a view of the wagon from which they are calling. |
| Railway Control Centre | The office in overall control of the operation of Eurotunnel's railway, including the tunnel and terminals. |
| Wagon | The Eurotunnel term for a rail vehicle used to transport or load/unload road vehicles. |

This report is published by the Rail Accident Investigation Branch,
Department for Transport.



Any enquiries about this publication should be sent to:

RAIB
The Wharf
Stores Road
Derby UK
DE21 4BA

Telephone: 01332 253300
Fax: 01332 253301
Email: enquiries@raib.gov.uk
Website: www.raib.gov.uk