RAIB
Rail Accident Investigation Branch

Rail Accident Report

Collision between a train and a road vehicle, M20 overline bridge, Aylesford 5 February 2007

Department for Transport

Report 36/2007
September 2007

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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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 Network Rail, Southeastern railway, the Highways Agency, InterRoute Ltd, E.S. Access Platforms (NE) Ltd and several sub-contractors to their staff, data and records in connection with the investigation.

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

- acronyms and abbreviations are explained in appendix A; and
- technical terms (shown in *italics* the first time they appear in the report) are explained in appendix B.

Summary

5 On 5 February 2007 a bridge inspection unit working on the M20 was deployed over a railway bridge between Maidstone Barracks and Aylesford stations. The gantry on the bridge inspection unit was struck by a scheduled passenger train, causing significant damage to the leading carriage and wrecking the gantry. The train driver and the sole passenger were slightly injured. Nobody was on the gantry at the time. See Figure 1 for the location of the incident.

The Incident

6 The railway line was open for normal rail services at the time and there had been no *possession* granted to work on the railway. The operator of the inspection unit had placed the gantry in the position of danger as a result of communication failures. The RAIB has made six recommendations to improve safety. All are directed at the maintenance contractor for the M20, InterRoute, and their subcontractor E.S. Access Platforms (NE) Ltd.

7 The incident occurred at the road over rail bridge where the *coastbound M20* motorway crosses over Network Rail's 'Medway Valley' line. This bridge is located between junctions 5 and 6 on the motorway, and between Maidstone Barracks and Aylesford stations on the railway. The Highways Agency identifies this bridge as M20//55.20; structure key 20162 'Medway New (1993)'. Network Rail identifies it as number 935B. The motorway crosses the railway and the adjacent river on separate spans of the same structure. For clarity in this report it will be referred to henceforth as the River Medway Viaduct.

8 'InterRoute', the Highways Agency main contractor for inspection and repairs to main routes in Kent and parts of Sussex and Surrey (Area 4) intended to perform a bridge inspection on the River Medway span only. It did not plan to inspect the railway span that night. InterRoute had made an application to Network Rail for a possession but this had not yet been granted, and the inspection of this span was planned to be done on another night. InterRoute is a joint venture between Mott MacDonald and Balfour Beatty Infrastructure Services Ltd and has held the management contract for Area 4 since June 2003.

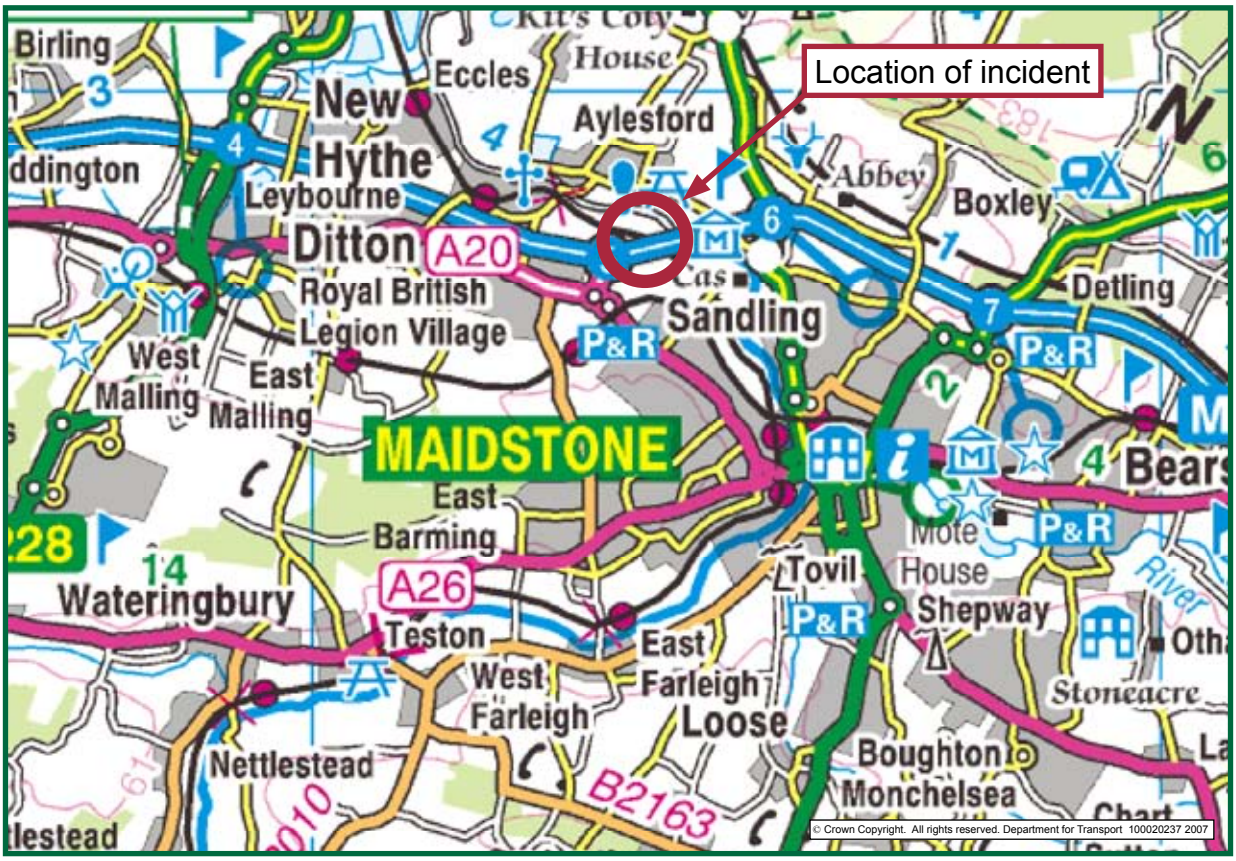

Figure 1: Extract from Ordnance Survey map showing location of incident

9 InterRoute hired in a 'Moog' 25 m long under-bridge inspection gantry from E.S. Access Platforms (NE) Ltd. This gantry is deployed from a large road vehicle (see Figure 3).

10 The Moog operator lowered the gantry from the motorway bridge span that crosses the railway when the railway line was open for normal traffic operation.

11 At 22:25 hrs on 5 February 2007 Southeastern train 2T83, the 21:57 hrs Paddock Wood to Gillingham (Kent) struck the 'Moog' gantry which was foul of the *up line*. The train was a 2 car electric unit of class 466, and was carrying a driver and one passenger.

12 The collision speed was 65 mph (105 km/h). The leading carriage suffered substantial damage to the cab and forward saloon areas. The driving cab roof was ripped open at the right hand side (see Figure 2).

Figure 2: Leading carriage 78352 of unit 466041 showing the external damage sustained

13 Debris from the gantry was scattered over a distance of over 100 m northwards along the rail line. DC *traction current* tripped out on both lines.

14 The driver of train 2T83 made an emergency call via the cab secure radio system to Aylesford signal box. The signaller there immediately arranged railway protection by placing signals to danger.

15 InterRoute staff alerted Kent Police via a 999 call from the worksite.

16 The driver and the passenger were conveyed to hospital, but both were released after minor injuries were treated. The line was closed for approximately 14 hours to allow clearance of debris and recovery of the damaged gantry.

Figure 3: 'Moog' bridge inspection gantry viewed from motorway level after the collision (Photograph courtesy of the British Transport Police)

Incident analysis

17 No defects or omissions in any of the railway systems were found to cause the incident. No significant defects had been present on the train, the signalling system or the track. The train was travelling at 65 mph (105 km/h), well within the permitted line speed of 70 mph (113 km/h).

18 The train driver did not see the obstruction prior to the collision because it was night time.

19 InterRoute had planned bridge inspection work for the river span of the River Medway Viaduct on the night of 5 February 2007. This was part of a scheduled programme of work as required in their contract with the Highways Agency.

20 InterRoute's staff at its Coldharbour (Aylesford) office identified the requirement for specialist equipment for the bridge inspection (see Figure 4). They passed this requirement to staff at their Gillingham (Kent) office. Gillingham staff approached a regularly used subcontractor to procure an under-bridge inspection unit, but there was not one available for hire on the specified night. Gillingham staff then telephoned E.S. Access Platforms (NE) Ltd to arrange the hire.

21 A suitable unit was available and the hire was agreed orally on 29 January 2007. Neither InterRoute nor E.S. Access staff had confirmed the hire contract in writing with each other prior to the incident. There was no template or call-off written contract in place between the two companies. Neither company asked for or prepared a *method statement* for the hire.

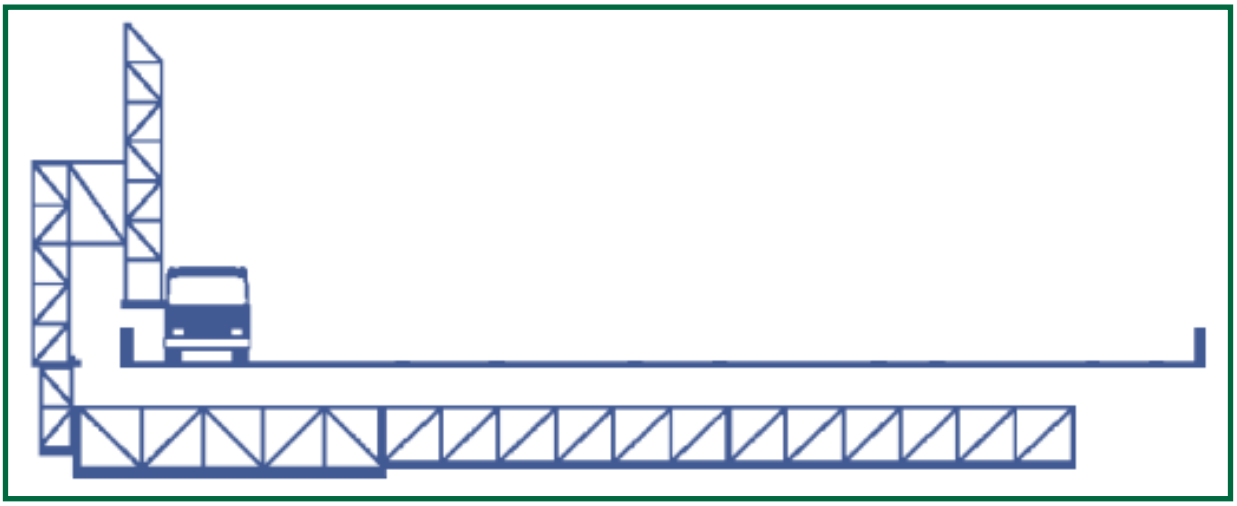

Figure 4: Sketch of how the under-bridge inspection gantry should look when deployed (courtesy of E.S. Access (NE) Ltd)

22 InterRoute appointed one of their own bridge inspectors as the person in charge of the work on the night. He had been an inspector since May 2004. He had completed an initial safety management course. However, there is no evidence of procedures or activities existing to monitor his performance or to maintain the competency.

23 InterRoute's procedures HSP001 and HSP018 require all persons including subcontractors working on the Highways Agency Area 4 routes to be briefed in basic highway safety procedures. Once InterRoute have completed this briefing, they issue an Induction Briefing card to the individual and record details on a database of personnel who have been inducted. InterRoute's staff and subcontractors are required to show their Induction Briefing cards upon demand. InterRoute's 'HSEQ' auditors make random unannounced visits to worksites to check compliance.

24 Procedure HSP018 further requires InterRoute staff to ensure the competence of subcontractors' staff is checked and that they have the certification as specified in the contract at pre-let and start-up meetings. Witnesses stated that it is not the custom and practice to check all the cards before commencing work on each occasion. It is reportedly sometimes carried out if the personnel employed are not previously known to the site supervisor. Some site supervisors have an expectation that all subcontractors hired in will have been inducted by the local depot – on this occasion by the Coldharbour depot staff.

25 E.S. Access did not issue a method statement for the work to be carried out to the Moog operator, as the company presumed that one would be supplied on site. This was the first occasion that E.S. Access had provided plant and operator for use in InterRoute's Area 4 territory. They had subcontracted for other Highways Agency areas and this was the method applied elsewhere.

26 The Moog operator was despatched to the job with only a rendezvous location and time, and a mobile phone contact number for InterRoute's bridge inspector. He had not worked in the Area 4 contract area before and had not received any induction briefing for the contract.

27 The Moog operator had taken adequate rest prior to driving from an E.S. Access depot in Yorkshire, and again prior to arriving at the work site. There are no concerns about his physical fitness to work.

28 The Moog unit was reported to be functioning normally prior to the incident. The vehicle is classified as contractor's plant and under current legislation is not required to be fitted with a tachograph.

29 The Moog operator met the bridge inspector at Coldharbour depot and went into the worksite in convoy with other works vehicles. Other personnel present included a trainee bridge inspector from InterRoute, a contracted concrete tester, two lighting contractors and a 'cherry-picker' hire vehicle operator. All bar one of the others had been working on similar duties on the previous three nights; one of the lighting contractors was starting his first shift. The Moog operator was not given an InterRoute safety induction briefing prior to entering the worksite. Contrary to InterRoute's internal procedure HSP018, the bridge inspector did not carry out any check to see any of the personnel's induction briefing cards.

30 The bridge inspector intended to brief the Moog operator on his specific duties at the River Medway Viaduct prior to starting work. Before he went to the River Medway viaduct, the bridge inspector was going to work at the Allington Quarry bridge, 120 m west of it.

31 At the Allington Quarry bridge and before starting his work there, the bridge inspector spoke to the Moog operator, and told him to move forward. There is conflicting evidence from witnesses regarding the content of this conversation. The bridge inspector instructed the Moog operator to go to the 'next bridge' and either 'wait' or 'get ready'. The bridge inspector intended this to mean 'go forward and wait at the next bridge'. The Moog operator understood this as 'go to the next bridge and lower the gantry to await the bridge inspector'.

32 The bridge inspector did not mention that the first span of next bridge was over the railway line (see Figure 5) as he did not expect the Moog to deploy.

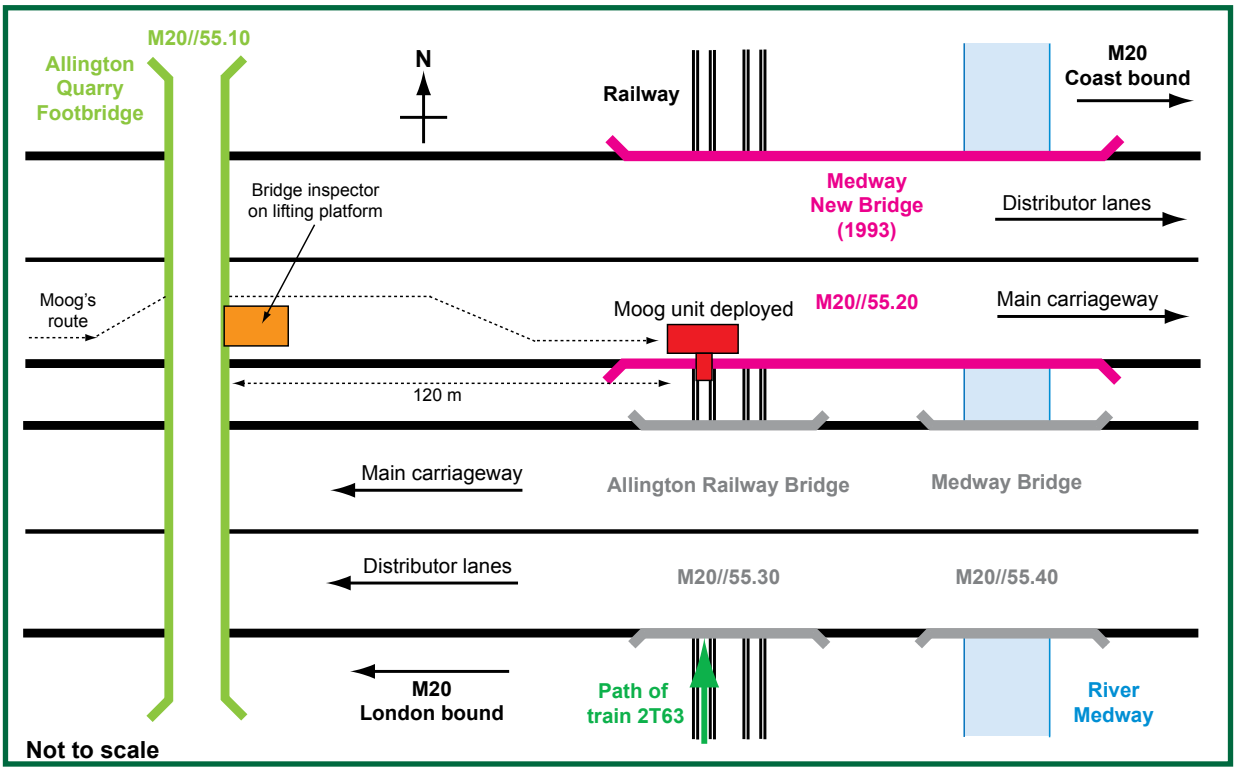

Figure 5: Layout of M20 Medway viaducts

33 The River Medway Viaduct spans both the railway and river and has the same bridge identity for all the spans. The RAIB have observed that contrary to Highways Agency standard BD 45/93, the Medway River Viaduct did not have its unique bridge number applied and visible. It is the responsibility of the 'Maintenance Agent' (InterRoute) to apply the numbers to meet the standard. This however was not significant because the bridge inspector did not refer to the bridge number when instructing the Moog operator. There is nothing in the bridge identity number (M20//55.20, structure key 20162 'Medway New (1993)') to draw attention to the bridge inspector that it crosses a railway line.

34 From his position at the Allington Quarry bridge the bridge inspector had sight of the Moog unit stopping and deploying at the Medway River Viaduct. The bridge inspector made no attempt to stop the deployment. There were no radio communications in use, but the bridge inspector did have the mobile phone number of the Moog operator. Alternatively a runner could have been sent. None of the other InterRoute or subcontractor staff on site (albeit with no involvement with the instructions) intervened either.

35 It is coincidental that the Moog operator was certified competent in railway *Personal Track Safety* (PTS). InterRoute had not specifically requested such a person. As part of his general PTS training the Moog operator was taught that a *Controller of Site Safety* (COSS) is solely responsible for arranging the safety of persons working *on or near the line*.

36 The Moog operator did not get, or seek a COSS rail safety briefing or permission to work. There are conflicting witness reports that the Moog operator may have been assured by site staff present at the Medway River Viaduct that the railway was closed whenever bridge inspection work was scheduled. He deployed the gantry over the side of the bridge and infringed the railway's *kinematic envelope*.

37 Before the Moog operator could climb down onto the inspection platform it was struck by train 2T83. The impact ripped two of the three sections off the platform and left the damaged parts strewn north along the railway line for over 100 m. The train driver did not see the obstruction before impact due to the area being in darkness and there being a left hand curve in a cutting on the approach to the M20 bridges over the railway.

38 The Moog lorry unit on the M20 rocked so severely that witnesses reported that they believed anyone who was on it would have been catapulted off it.

39 The lowest point of the Moog gantry remaining after the impact was measured at 3100 mm above rail level. The class 466 vehicles forming the train are built to 3800 mm static height above rail level. The lowest point of impact on the train was at 2915 mm above rail level.

Cause

40 Neither E.S. Access nor InterRoute prepared a worksite method statement for the Moog bridge inspection unit on the M20.

41 The InterRoute bridge inspector did not ask to see the Moog operator's Induction Briefing card or give the Moog operator a site or task briefing prior to entering the worksite.

42 The bridge inspector's instructions to the Moog operator regarding the positioning and use of the unit were possibly ambiguous and were wrongly interpreted by the Moog operator.

43 Although certified in railway PTS the Moog operator did not seek confirmation from a COSS that it was safe to work on or near the line.

44 Worksite personnel saw the Moog being deployed but did not intervene to correct the error.

Conclusion

45 This incident was caused by a misunderstanding between the bridge inspector and the Moog operator which resulted in unauthorised entry onto Network Rail infrastructure.

46 InterRoute's staffs' lack of adherence to their own procedures resulted in the Moog operator being allowed to enter the worksite without a briefing, safety induction or a method statement.

47 E.S. Access' hire staff did not clarify the safety aspects of the hire and allowed their operator to go to the site without adequate briefing or ensuring that a method statement would need to be provided.

48 Although certified in railway PTS the Moog operator did not seek confirmation from a COSS that it was safe to work on or near the line.

49 The bridge inspector's awareness and supervision of the situation was inadequate to prevent the incident happening.

Observation

50 InterRoute's Safety Induction Briefing cards do not display an expiry date.

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

51 InterRoute quickly commissioned an independent internal health and safety investigation into the incident. They have already taken some positive actions and are introducing a number of changes to working practices that address the recommendations made in this report. These include:

a. formal site safety management training for bridge inspectors and similar worksite supervisory personnel;

b. strengthening of the subcontractor and plant hire procurement process to ensure method statements are incorporated and understood;

c. strengthening and enforcement of the competence checks and pre-site briefings for all personnel; and

d. a full review of the safety procedures and systems originating from the parent companies, Balfour Beatty Infrastructure Services and Mott MacDonald, and where these vary the best practice is to be recommended.

52 E.S. Access Platforms (NE) Ltd have arranged additional railway awareness training for all their operators and management staff. In addition, operators are now issued with a templated job briefing letter before travelling to work sites. The contents confirm the identity of the site safety person, and where the bridge to be worked at is over a railway line, reminds the operator to wait for COSS confirmation before deploying.

Recommendations

53 The following safety recommendations are made[1]:

Recommendations to address causal and contributory factors

1 InterRoute should review the briefing process for their staff and contractors to ensure that all concerned are adequately aware of any railway that crosses or adjoins the highway worksite. Procedures should be amended where necessary (paragraph 51a, 51b).

2 InterRoute should rebrief the bridge inspector on the processes for managing safety at a worksite.

3 InterRoute should review their systems in order to ensure site supervisory competence is effective for the duties required (paragraph 51c).

4 E.S. Access Platforms (NE) Ltd. should ensure that the Moog operator is retrained in railway Personal Track Safety.

5 E.S. Access Platforms (NE) Ltd. should ensure their staff know to receive a site safety briefing prior to entering a worksite, and ask for one if it is not provided by the person in charge at the site (paragraph 52).

Recommendations to address other issues observed during the investigation

6 InterRoute should review their Safety Induction system so that the cards issued have an expiry date, and that there is a robust method of rebriefing personnel when changes are made to working practices.

[1] 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 the RAIB's website at www.raib.gov.uk

Appendices

Glossary of abbreviations and acronyms — Appendix A

COSS	Controller of Site Safety
HSEQ	Health, Safety, Environment and Quality
PTS	Personal track safety
RAIB	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

Coastbound M20	Eastbound carriageway conveying traffic from junction 5 towards junction 6.
Controller of Site Safety	A railway safety critical qualification demonstrating the holder's competency to arrange a Safe System of Work.
Kinematic envelope	The maximum sectional outline that a rail vehicle occupies.*
Method statement	A document that details the way a work task or process is to be completed. The method statement should outline the hazards involved and include a step by step guide on how to do the job safely.
On or near the line	Being within a specified distance of a defined part of a track.*
Personal Track Safety	The minimum training required before being allowed 'on or near the line'.*
Possession	A period of time when one or more tracks are blocked to trains to permit work to be safely carried out 'on or near the line'.*
Traction current	(in this context) The 750 v dc power supply through a 3rd rail used for powering electric trains.
Up line	(in this context) Northbound line from Maidstone West towards Strood.

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