



Federal Ministry of Transport,  
Building and Urban Development

Management of the  
Federal Railway Accident Investigation  
Office

# Railway Accident Investigation

  
**ANNUAL REPORT*****2010***

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## Foreword

This Annual Report provides details of the activities of the Federal Railway Accident Investigation Office [Eisenbahn-Unfalluntersuchungsstelle des Bundes (EUB)] in accordance with Directive 2004/49/EC (the Railway Safety Directive).

The Annual Report only contains extensive details of investigations which were carried out by the Federal Ministry of Transport, Building and Urban Development [Bundesministerium für Verkehr, Bau und Stadtentwicklung] acting as the investigating body in accordance with Article 5(1)(f) of the General Railways Act [Allgemeines Eisenbahngesetz (AEG)].

In the year under review, sixteen accidents were investigated in accordance with Article 19 of the Railway Safety Directive.

In addition, the Annual Report contains information on the safety recommendations issued in the period under review and the measures taken by those involved on the basis of the safety recommendations issued.



## 1. Federal Railway Accident Investigation Office (EUB)

### 1.1 Statutory basis

Directive 2004/49/EC on safety on the Community's railways (the Railway Safety Directive) obliged EU Member States to set up a safety authority (Article 16) and an independent investigating body (Article 19).

The Railway Safety Directive was transposed into national law in Germany by the fifth Railway Regulations Amendment Act of 16 April 2007 and the second Regulation on the Enactment and Amendment of Railway Regulations of 5 July 2007.

The requirements for its structure and composition and the conduct of investigations were set down and fine-tuned by the Federal Ministry of Transport, Building and Urban Development's in its organisational decree 'On the creation of a "Federal Railway Accident Investigation Office" in accordance with Article 5(1)(f) of the General Railways Act'.

### 1.2 Aim and purpose of investigation

The aim and purpose of the investigations is to establish the causes of dangerous events and hence to derive ways of improving safety. Investigations by the Federal Railway Accident Investigation Office do not serve to establish fault or to clarify issues of liability or other claims in civil law. They are conducted independently of any judicial investigation.

Investigation includes collecting and evaluating information, drawing up conclusions including establishing the causes and, as appropriate, issuing safety recommendations. The Investigation Office's proposals for avoiding accidents and improving the safety of rail traffic are notified to the safety authorities and, as necessary, to other bodies and authorities and other EU Member States in the form of safety recommendations.

### 1.3 Reporting, categorising and investigating dangerous events

The obligation to report and the format for reports are specified in the 'Decision of general application on reporting dangerous events in railway operations' [Allgemeinverfügung zum Melden von gefährlichen Ereignissen im Eisenbahnbetrieb] which supplements Article 2(3) third sentence of the Railway Accident Investigation Regulation [Eisenbahn-Unfalluntersuchungsverordnung (EUV)].

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A fundamental distinction between accidents and incidents is made when considering dangerous events within the meaning of this Decision of general application.

An accident is defined as an unwanted or unintended sudden event in railway operations or a specific chain of such events which has harmful consequences for people, property or the environment. Accidents are classified into the following types of event:

- collisions;
- derailments;
- accidents involving persons;
- level crossing accidents;
- rolling stock fire: and
- other railway operating accidents.

An incident is an occurrence in railway operations which compromises the safe operation of trains, without having immediate harmful consequences for people, property or the environment. Included in these are:

- signals passed at danger;
- unauthorised entry to an occupied section of line;
- incidents at level crossings;
- incidents involving rolling stock;
- incidents involving infrastructure;
- incident caused by operational error.

These events are to be reported by daily, supplementary and immediate reports to the Federal Railway Accident Investigation Office via infrastructure managers depending on the consequences of those events.

After reception of the reports in question they are categorised. In this process, a distinction is made between three different categories:

#### Category A: 'serious accident'

These events are defined in Article 5(1)(f)(1) and (2) of the General Railways Act. Investigations are conducted exclusively in accordance with principles laid down by the direction of the Federal Railway Accident Investigation Office.



### Category B: 'other events worthy of investigation'

These are events that must be reported immediately but are not to be placed in category A, together with events for which the cause is unclear or there is a suspicion of systematic failings.

Accidents are investigated directly by the Central Investigation Office of the Federal Railway Accident Investigation Office itself. Investigation of the facts may take place on site and/or by making appropriate enquiries in accordance with Article 2(4) of the Railway Accident Investigation Regulation.

### Category C: 'other dangerous events'

These are events that must be reported but should not be placed in categories A or B.

The Central Investigation Office of the Federal Railway Accident Investigation Office does not investigate 'other dangerous events' itself. The reports received are checked for plausibility, in specific individual cases, databases are consulted and subsequently the reports received are added to the accident database for follow up.

## 1.3.1 Reports

In total, 2 517 dangerous events were reported to the Federal Railway Accident Investigation Office in 2010.

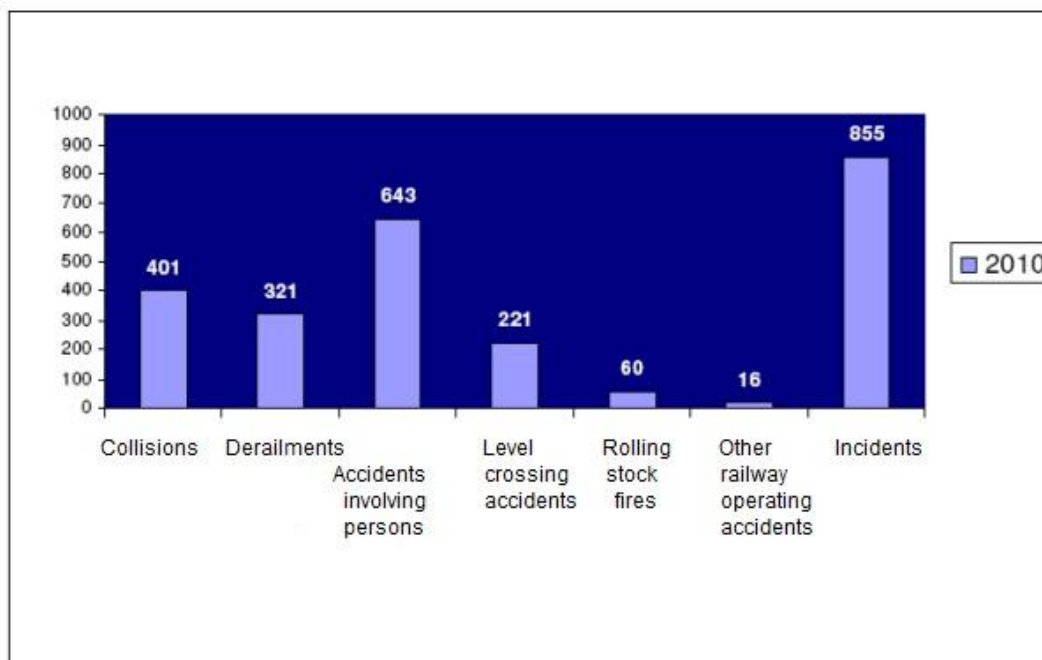


Chart 1: accidents and incidents reported in 2010



In 2010, 855 incidents were reported to the Federal Railway Accident Investigation Office.

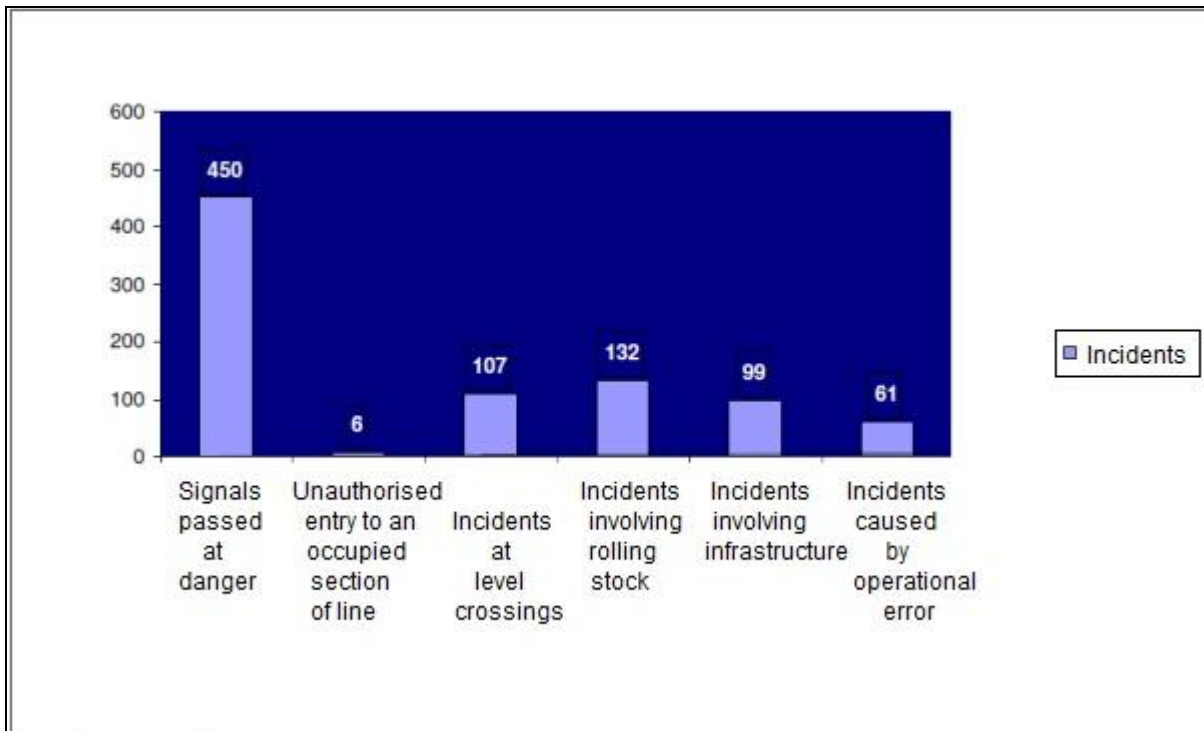


Chart 2: classification of incidents into the various types of event

### 1.3.2 Categorisation of dangerous events

After the reports were received, the dangerous events they referred to were categorised as follows:

- 16 events were placed in category A;
- 119 events were placed in category B;
- 2 382 events were placed in category C;

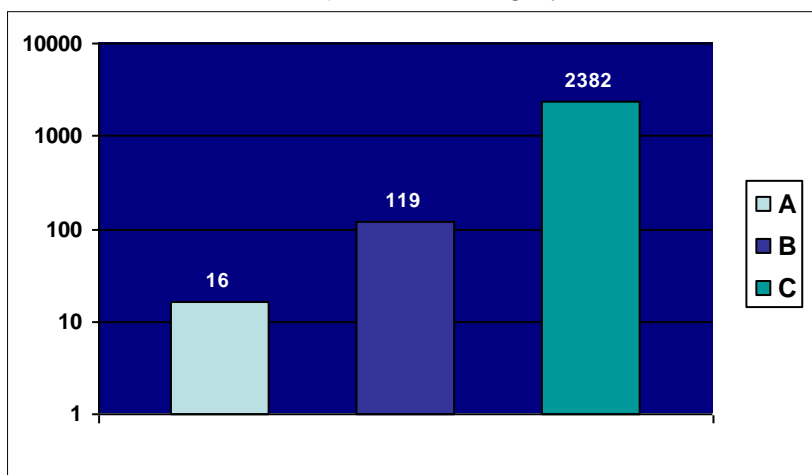


Chart 3: categorisation of dangerous events





## 2 Investigation

### 2.1 General remarks

In the period under review, sixteen events were placed in category A' and the appropriate investigations conducted by the investigating body in accordance with Article 5(1)(f)(2) of the General Railways Act. These events are described in greater detail in Sections 2.1.1-2.1.16 below.

#### 2.1.1 Collision between Leiferde and Braunschweig on 20 January 2010

##### Short description:

At 07:37 on 20 January 2010 regional train 14955 running on the line between Braunschweig central station and Bad Harzburg collided with a lorry standing on the track between Leiferde Junction and Braunschweig central station at km 4.3.

##### Consequences:

As a consequence of the collision, the leading motor coach 628 621 of the two-coach diesel multiple unit derailed and then swung diagonally across the line and slid down the embankment towards the right in the direction of travel. In the process, sixteen people were injured, three of them seriously. The damage to property is estimated at some EUR 2 264 000.



Illustration1



### **Causes:**

The driver of the lorry drove his vehicle from the level crossing at km 4.353 along the track towards Braunschweig. After some fifty metres the lorry got stuck on the track. The driver of the local train which approached a few minutes later did not see the lorry on the track in time to stop his train. Hence a collision was inevitable.

### **Safety recommendations:**

In accordance with Article 6 of the Railway Accident Investigation Regulation and Article 25(2) of Directive 2004/49/EC, a safety recommendation worded as follows was issued on 29 January 2010:

‘In order to ensure passengers can be evacuated rapidly and safely in an emergency, the functionality (labelling, operation and risk of injury) of the requirements concerning emergency entry and exit windows in component approval EBA 05 G 08A (10/05) and windows of identical design should be reviewed.’

### **Status of the investigation:**

The investigation has been completed.

## **2.1.2 Derailment in Herlasgrün station on 5 March 2010**

### **Short description:**

At 21:07 on 5 March 2010 the third wagon of freight train FIR 51649 (tank wagon number 33 80 7965 159-6 loaded with UN No 1230, methanol) derailed on the journey from Leipzig to Nuremberg because of a hot box on the third wheelset.

### **Consequences:**

As a result of the derailment, the buffers of the fourth wagon (tank wagon number 33 87 792 9 243-6, UN No 2014, hydrogen peroxide) rode over the third wagon. Dangerous goods did not escape.

The permanent way was severely damaged over some 330 m; three switches had to be completely renewed.

The extent of damage to rolling stock and the permanent way was assessed as EUR 573 000.

No-one was injured.



Illustration 2

### **Causes:**

Investigations to date show that the cause of the derailment was clearly the collapse of the bearing of the third wheel set of the third wagon through the cage breaking up and the subsequent hot box and broken axle journal.

### **Status of the investigation:**

The investigation has not yet been completed.

## **2.1.3 Derailment in Stuttgart-Untertürkheim on 15 March 2010**

### **Short description:**

At about 20:50, the second locomotive of double-headed freight train CFN 63051 (from Karlsruhe-Rheinbrücke Raffinerien to Stuttgart Hafen) derailed close to No 391 switch (which lay to the left) whilst running via track 361 to track 278 into Stuttgart-Untertürkheim station. This second locomotive became uncoupled, swung to the right and after travelling a few metres, came to rest leaning over. The first locomotive and three tank wagons derailed and rolled towards track 284. The first locomotive and the first tank wagon toppled on their sides across the direction of travel. The tank wagon was pushed by the following train and wedged against lattice mast No 2/3 supporting the catenary.

### Consequences:

The driver was slightly injured. The derailment damaged or destroyed some 250 track metres of track and switch and crossing work together with a lattice mast and the catenary. Fuel oil escaped from two places of leakage in the tank of the first tank wagon which had overturned and was wedged. Some 300 to 400 litres [of fuel oil] escaped into the ground. Three tank wagons and two locomotives of class 140 were severely damaged.



Illustration 3

### Causes:

The cause of the derailment is to be attributed to deficient tamping and alignment work carried out as part of permanent way renewal.

On the curve between No 391 and No 394 switch a cant of 40 mm was created. There was no cant at that point before the work began.

### Status of the investigation:

The investigation has been completed.

#### 2.1.4 Derailment between Voerde and Dinslaken on 25 March 2010

##### Short description:

When running on the line between Voerde and Dinslaken, one bogie of the thirteenth wagon (Falns 8180 6643 352-0) of freight train CIL 48741 derailed. The wagon re-railed itself on switch No 365 in Dinslaken station. Subsequently, the same wagon derailed a second time in the reception area of Oberhausen West station.

### **Consequences:**

The permanent way was seriously damaged. No-one was injured.



Illustration 4

### **Cause:**

The investigation to date shows that the derailment was caused by an axle bearing running hot and the axle breaking in consequence (broken axle journal).

### **Status of the investigation:**

The investigation has not yet been completed.

## **2.1.5 Derailment in Gelsenkirchen-Horst Nord on 7 April 2010**

### **Short description:**

At about 19:10 on 7 April 2010, the last two wagons of train 223422 derailed close to the No 62 entry switch at km 7.27 on line 2246 Gelsenkirchen Hugo junction – Oberhausen-Osterfeld Süd whilst arriving on track 2 of Gelsenkirchen-Horst Nord station.



### Consequences:

As a consequence of the derailment, the penultimate wagon – a tank wagon loaded with acetone (UN No 1090 RID class 3) – tipped over. This caused leaks close to the pressure relief valve and to a flange joint in a connecting pipe. Hence some 75 kg of the product leaked out. Damage to property as a result of the derailment was some EUR 285 000. No-one was injured in the accident.



Illustration 5

### Cause:

The derailment of the last two wagons was caused by switch No 62 moving from the right to the left under penultimate wagon of the train.

### Status of the investigation:

The investigation has been completed.

## 2.1.6 Level crossing accident at Marsberg – Messinghausen on 13 April 2010

### Short description:

At 08:05 on 13 April 2010, train RE 29206 of DB Regio AG, en route from Warburg to Hagen ran into the trailer (2-axle, each with twin tyres) of a tractor-trailer unit loaded with two containers of paper for recycling on the Giershagener Straße level crossing at km 261 414 between Marsberg and Bredelar.

The train was formed of a diesel motor coach and driving trailer of class 628/928 and the leading vehicle was driving trailer 928 536-1.

### **Consequences:**

As a consequence of the collision, the second wheelset of the first bogie of the leading rail vehicle (driving trailer 928 536-1) derailed.

Nineteen people were slightly injured in the collision.

The event caused some EUR 150 000 of damage to railway rolling stock and installations.



Illustration 6

### **Cause:**

The cause of the accident was slow clearance of the crossing by road users (setting back to allow other traffic to pass).

Severely reduced visibility because of the weather, the restricted layout of the roads (turning curves for the two directions overlapped) and the precedence rules for road traffic over the level crossing contributed to the accident occurring.

### **Status of the investigation:**

The investigation is complete. The draft investigation report is currently out for comments in accordance with the procedure laid down in Article 5 of the Railway Accident Investigation Regulation.



## 2.1.7 Other accident in Limburg Süd on 17 April 2010

### Short description:

Coach 403 225-6 lost door leaf 1R at 11:13 on 17 April 2010 whilst train ICE 105 (Amsterdam – Basel SBB), composed of one unit of class 406 and one of class 403 was passing ICE 612 (Munich – Dortmund) in Dickheck Tunnel (575 m in length) between Montabaur Fernbahn and Limburg (Lahn) Süd. The effects of pressure and suction pulled the door from its fastenings in the frame and tossed it in the air. It hit the catenary and the tunnel roof, scraped the following coach and then collided with the Bordbistro coach of ICE 612 on the left-hand side in the direction of travel several times.

### Consequences:

Six people travelling in ICE 612 were slightly injured as a consequence of the accident. Furthermore ICE 612 sustained considerable damage. The supporting structure for the catenary in Dickheck Tunnel and four insulators were damaged.



Illustration 7 (for missing pictures see the original version)

### Cause:

Although door 1R on coach 403 225-6 was closed, it was not properly locked because of an incorrectly installed coupling bar and was pulled out of its frame by the forces that built up when the two ICE trains met.





### **Status of the investigation:**

The investigation has not yet been completed.

### **2.1.8 Derailment in Rheydt on 26 May 2010**

#### **Short description:**

When leaving the station in Rheydt, one bogie of the fifth wagon from the rear of train CFN 47595 derailed.

#### **Consequences:**

Since train CFN 47595 ran on for about another 11 km with the bogie derailed, there was very considerable damage to the permanent way.

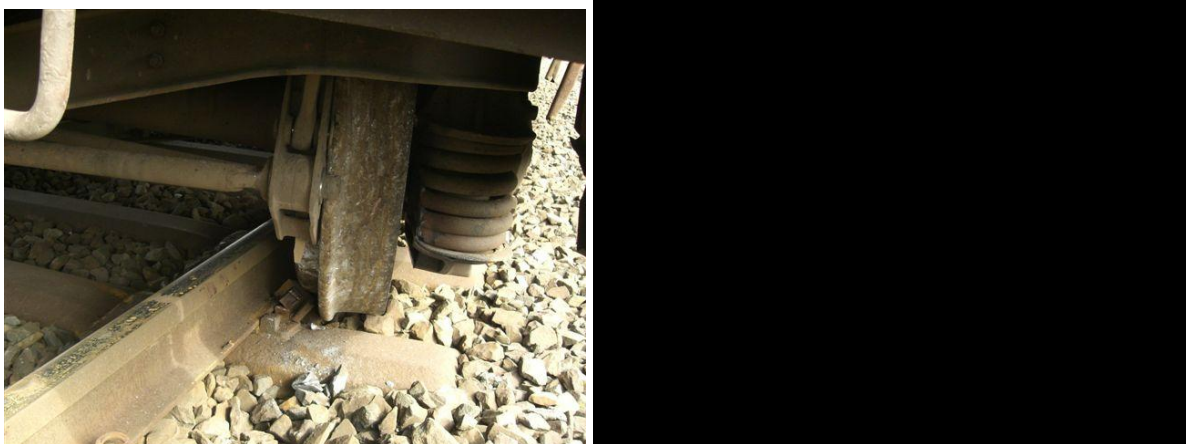


Illustration 8 (for missing pictures see the original version)

#### **Cause:**

A wheel with a loose or displaced tyre was discovered on the fifth wagon from the rear. Further technical investigations into workshop practices have been commissioned to clarify the circumstances.

### **Status of the investigation:**

The investigation has not yet been completed.



## 2.1.9 Derailment in Peine on 16 June 2010

### Short description:

Several vehicles of freight train DBS 93274 derailed whilst leaving Peine station. As a consequence, there was a collision with RE 14019 arriving on the adjacent track.

### Consequences:

The collision caused the locomotive and two coaches of the passenger train to derail. One person was seriously injured, nineteen people were slightly injured.

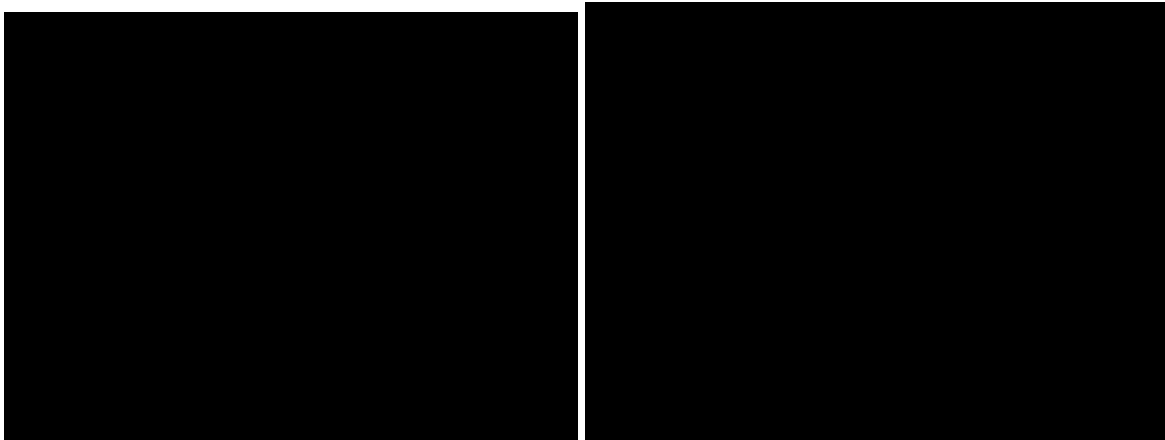


Illustration 9 (for missing pictures see the original version)

### Cause:

In the course of establishing the facts, a wheelset with a loose tyre was found. Further technical investigations into workshop practices have been commissioned to clarify the circumstances.

### Status of the investigation:

The investigation has not yet been completed.



## 2.1.10 Derailment in Augsburg central station – Augsburg-Oberhausen on 4 July 2010

### Short description:

The tenth and the next four wagons of freight train CS 49906 derailed all wheels in Augsburg central station at about 01:29 on 4 July 2010 close to switch No 559 over which it was passing in a facing direction. The train subsequently divided between the ninth and tenth wagons.

### Consequences:

No-one was injured. Damage to permanent way and rolling stock was of the order of EUR 1.4 million.

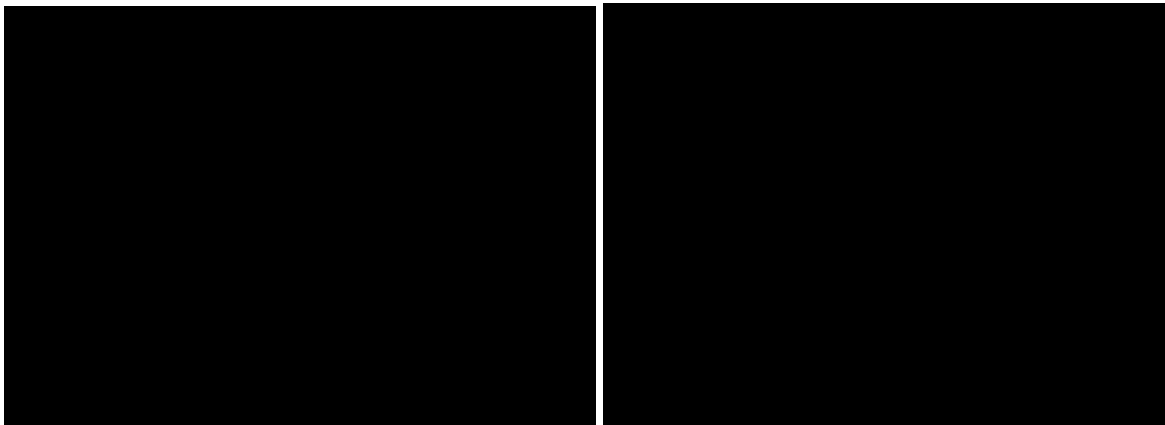


Illustration 10 (for missing pictures see the original version)

### Cause:

The cause is currently being investigated.

### Status of the investigation:

The investigation has not yet been completed.



### 2.1.11 Other accident in Bielefeld on 10 July 2010

#### **Short description:**

The air conditioning of ICE 846/856 en route from Berlin to Cologne on 10 July 2010 failed in several coaches.

The ICE (two units in multiple) was made up of ICE-2 units numbered 402 001-2 (leading) and 402 013-7 (trailing).

Because of the high external temperature (of up to 38° C), the failure of the air conditioning in several coaches, the absence of fresh air movement in the last three coaches of the rear part of the train and train loading of up to 200 % after Hannover central station, there was a build up of heat within individual coaches.

#### **Consequences:**

Twenty-seven passengers had circulatory problems and circulatory collapse. Of those passengers, nine passengers were taken to hospital.

#### **Cause:**

The trigger for the event was the overloading of several air conditioning units together with switching off fresh air supply and air circulation manually, in the process of resetting the unit, and not switching it on again as was necessary.

In addition, the fact that the train was loaded to its maximum in Hannover because two previous trains had been taken out of service in the station served to exacerbate the episode.

#### **Safety recommendation:**

Modify the workings of the air conditioning so that if a reset of the heating or cooling part of the air conditioning is necessary, or if they fail, then fresh air continues to be supplied and air continues to be circulated in coaches.

#### **Status of the investigation:**

The investigation has been completed.

## 2.1.12 Derailment in Falkenberg on 26 July 2010

### Short description:

The last two wagons of freight train DBV 88665 derailed on single slip No 214a whilst running through Falkenberg station on 26 July 2010.

### Consequences:

Significant damage to the permanent way, in particular switch No 221 was seriously damaged.

Wagon 23 84 6437 395-6 was derailed with all wheels and wagon 23 84 6437 389-9 tipped over.



Illustration 11

### Cause:

The cause of the derailment was a loose wheel tyre on wagon number 23 84 6437 389-9 which tipped over. Further technical investigations into workshop practices have been commissioned to clarify the circumstances.

### Status of the investigation:

The investigation has not yet been completed.

## 2.1.13 Collision in Geldern station on 7 August 2010

### Short description:

At about 05:10 on 7 August 2010 whilst running into track 1 of Geldern station, works train 92744 ran into a group of Nord-West-Bahn GmbH multiple units stabled there.

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### Consequences:

The driver of the multiple unit and the driver of the works train were slightly injured in the accident. The locomotive and the first wagon of the works train, together with the first three units of the total of ten stabled units, were derailed. There was significant damage to rolling stock and railway installations.



Illustration 12

### Cause:

The cause of the collision is attributable to unauthorised entry of the works train to No 1 track already occupied by vehicles. Mistakes in operating procedures by members of the operating staff of Geldern station were critical.

### Status of the investigation:

The investigation has not yet been completed.

## 2.1.14 Collision between Lambrecht (Pfalz) and Neustadt (Weinstr) on 17 August 2010

### Short description:

At 16:06 on 17 August 2010 the ICE W unit of train ICE 9556 collided with a refuse vehicle between Neustadt (Weinstraße) and Lambrecht (Pfalz) at km 71.828. The refuse vehicle had come off the road. The driving trailer and one coach of the class 406 unit derailed.

### **Consequences:**

Of the some 320 passengers in the train, 15 passengers, the driver and two members of the train crew were slightly injured.

Seven passengers were taken to hospital for treatment; eight passengers were able to continue their journeys after receiving first aid.



Illustration 13

### **Cause:**

A refuse vehicle came off the road, fell down the approximately 3.50 m high cutting and came to rest foul of the loading gauge.

The driver of the refuse vehicle had ignored the 'no vehicles' traffic sign [German Road Traffic Regulations (StVO) sign 250].

### **Status of the investigation:**

The investigation has not yet been completed.

## **2.1.15 Derailment in Bacharach station on 1 September 2010**

### **Short description:**

At approximately 18:29 on 1 September 2010 the trailing bogie of the second wagon of train CS 47925 (running from Neuss freight terminal – Passau frontier – Voestalpine) derailed towards the left whilst running on track 1 through Bacharach station at km 138.700. The wagon that derailed lost the left-hand axle bearing of the second wheelset of the trailing bogie when running through Bacharach station at km 138.500.

### Consequences:

Some 1 600 m of track and switch and crossing work were destroyed or damaged by the derailment.

The damage to the infrastructure, track, signal equipment, damage to rolling stock and recovery costs are estimated as some EUR 495 000.



Illustration 14

### Cause:

The cause of the derailment was the axle bearing of the second vehicle in the train, wagon 81 80 6640 706-0, shearing. The bearing was found on the left in the direction of travel and related to wheelset type: 004 and wheelset number: 939 469+90.

Most probably the fracture of a stay bolt on the wheelset pump led to the wheelset locking and hence to a broken journal.

### Status of the investigation:

The investigation has not yet been completed.

## 2.1.16 Other collision between Neustrelitz and Warnemünde on 28 November 2010

### Short description:

Civil engineering work took place on the Neustrelitz – Warnemünde line on 28 November 2010 in accordance with Advice of work in progress No F 195260 [Betriebs- und Bauanweisung (Betra)]. On track 1 a propelled shunting movement was standing in front of entry signal GG to Neustrelitz station. Whilst it stood there, a shunting movement from the Kratzburg direction ran into the shunting movement standing at the entry signal.



## Consequences:

The locomotive of the stationary shunting movement derailed and leaned over at an angle of about 30° to track 2. The locomotive of the propelled shunting movement tipped over.

Three wagons of the on-coming shunting movement tipped over and became interlocked.

Both bogies of the fourth loaded wagon became derailed; the fifth wagon was derailed one bogie.

The catenary over both tracks was torn down. The permanent way was severely damaged in the area directly around the accident.



Illustration 15

## Cause:

Since a moving shunting movement collided with a stationary shunting movement standing at entry signal GG to Neustrelitz station, it is currently assumed that the accident resulted from an operating error.

## Status of the investigation:

The investigation has not yet been completed.

## 3 Safety recommendations

In accordance with Article 6 of the Railway Accident Investigation Regulation, the body responsible for the investigation of serious accidents may issue safety recommendations at any time. These are to be addressed to the safety authorities and, as necessary, to other bodies or authorities or to other EU Member States. Those authorities are obliged to provide the investigative authorities with details of the measures they have taken or plan to take as a consequence of the safety recommendations. The investigative authorities are not required to evaluate the measures proposed and do not do so.



In Section 3.1, 'Safety recommendations 2010', the safety recommendations in respect of dangerous events in 2010 are summarised in a table and supplemented, as applicable, with information on the measures already taken. The table in Section 3.2 'Safety recommendations 2006-2009' that follows it, contains a summary of all safety recommendations together with up-to-date information on the measures taken, all arranged by year in which the dangerous event took place.

### 3.1 Safety recommendations 2010

<b>2010</b>
<b>Event: collision between Leiferde and Braunschweig on 20 January 2010</b>
<b>Safety recommendations:</b> (As at 29 January 2010) In order to ensure passengers can be evacuated rapidly and safely in an emergency, the functionality aspects (marking, operation and risk of injury) of the requirements concerning emergency entry and exit windows in component approval EBA 05 G 08A (10/05) and windows of identical design should be reviewed.
<b>Measures taken:</b> (As at 24 March 2010) According to information received, the functionality of two emergency exit windows from a series produced by the Scholl company was tested by the safety authorities on 24 March 2010 on a class 628 diesel multiple unit. The impact test using the emergency hammer on both windows was without problem and in both cases the window could be smashed and pushed out in 15-20 seconds. Consultation on the need for a new or amended design (as appropriate) for the pictogram showing how to use the emergency entry/exit window has not yet been completed.
<b>Event: other accident in Bielefeld on 10 July 2010</b>
<b>Safety recommendations:</b> (As at 20 October 2011) Addressed to: railway undertakings Modify the workings of the air conditioning so that if a reset of the heating or cooling part of the air conditioning is necessary or if they fail then fresh air continues to be supplied and air continues to be circulated in coaches.
<b>Measures taken:</b> Safety recommendation issued following the instruction deadline of 31 August 2011. .

### 3.2 Safety recommendations 2006-2009

<b>2009</b>
<b>Event: derailment on the line between Nuremburg Stein and Nuremburg marshalling yard on 7 August 2009</b>
<b>Safety recommendations:</b> (As at 10 February 2011) The design tension for the securing fittings is an important criterion for keeping permanent



way to gauge and thus ensures freedom from derailments. It is recommended that DB Netz AG's permanent way regulations for the inspection of track and switch installations of type K- 54-B58 are updated and supplemented in the short term.

1. Lay down a graduated inspection frequency for testing the tension of securing fittings on track and switches. In deciding the categories, line speed, traffic density and sensitive locations (for example, such as tight curves, track on timber sleepers that have been there a long time, permanent way with 'indirect fastenings' and other constraints) should be considered.
2. Lay down a method of testing to check the tension of securing fittings and appropriate benchmarks. The measurement of design tension by means of a torque wrench, for example, would be considered as a suitable test.

**Measures taken:** (As at 18 August 2011)

There is still ongoing consultation between the safety authority and the infrastructure manager in question on the recommended updating of the regulations. The procedure is not yet closed.

**Event: derailment on the Bünde (Westphalia) to Bruchmühlen line on 17 July 2009**

**Safety recommendations:** (As at 8 February 2010)

The following rolling stock-related measures are currently recommended to avoid further axle failures caused by hot boxes.

1. Replace riveted brass cages by plastic bearing cages.
2. Investigate whether fitting further derailment detectors and/or hot box detectors could contribute to preventing derailments.
- 3.

**Measures taken:**

1. Evaluation of the measures recommended has revealed that the replacement of riveted brass cages by plastic bearing cages to avoid further axle failures from hot boxes is inappropriate because it is only one of several causes. Independently of that, the issue has been raised in the European Union and at international level.
  2. The investigation of the effects of derailment detectors and/or hot box detectors is being carried out at European Union and international level.
- The procedure has been closed.

**Event: other railway operating accident between Lövenich and Horrem on 27 June 2009**

**Safety recommendations:** (As at 30 June 2009)

At least investigate the following:

1. Whether it is necessary to retrofit warning lights within the driver's field of vision which would indicate to him that the straight air brake on the driving trailer had been applied or that it had not been completely released.
2. Whether operational measures going as far as prohibiting the use of straight air brakes when running with a driving trailer leading are to be initiated.
3. Whether the air intake for the air conditioning should be moved to another suitable site, away from the braking equipment.

**Measures taken:** (As at 30 August 2010)

On 1: The rebuild described in the safety recommendation has been in hand since 2007. The retrofitting of warning lights has not yet been completed.

On 3: The study on whether the air intake for the air conditioning should be moved to another site is still not finished.



### **Event: collision in Berlin-Karow station on 16 April 2009**

#### **Safety recommendations:** (As at 8 December 2010)

Addressed to: DB Netz AG

1. Clarify the rules for return of signals to danger in (old) signal boxes without automatic means of indicating the track is clear to make signals return to danger as soon as possible.
2. Investigate how the return of signals to danger is organised in similar signal boxes on the existing network.
3. Investigate whether automatic means of indicating the track is clear should be provided in comparable stations.

#### **Measures taken:** (As at 30 August 2011)

The infrastructure manager in question has drawn up a technical notice entitled 'Rules for returning starting signals to danger and for equipping with means of indicating the track is clear'. This document contains clear guidelines for automatic return of signals to danger in good time. The technical notice has been made valid with immediate effect.

The complete network of the infrastructure manager in question is being examined to identify similar cases on the network with the same potential risks. For this, the infrastructure manager in question has assembled comprehensive data and used it to make appropriate risk assessments. Local shortcomings are being remedied.

### **2008**

### **Event: derailment in Cologne central station [Köln Hbf] on 9 July 2008**

#### **Safety recommendations:** (As at 4 March 2009)

Safety recommendation for ICE-3 multiple units with axles of 34CrNiMo6 material is as follows:

Examine incoming data for the materials for evidence of its fatigue strength when designing axles to take account of the structural inhomogeneity discovered in the course of the tests done by the Federal Institute for Materials Research and Testing [Bundesanstalt für Materialforschung und Prüfung (BAM)].

#### **Measures taken:**

All axles have been and are being tested for internal flaws by non-destructive methods.

A start has been made on considering the speed of crack propagation, techniques include calculations and tests and the results will be used to confirm the test intervals. Neither approach has been carried through completely.

### **Event: collision with subsequent derailment of ICE 885 in the Landrücken Tunnel on 26 April 2008**

#### **Safety recommendations:** (As at 14 May 2010)

1. Consider whether it is possible to continue to do without fencing of the line or parts of the line, or whether similar events can in future be prevented by other methods so as to improve the margin of safety against derailment for high speed trains.
2. Investigate and improve the visibility of escape routes and emergency equipment in the coaches.
3. Revise module 123.150 'Rescue of non-railway staff' of DB Group Guideline (Ril) 123. In particular, there should be a clear separation of the responsibilities of the



Emergency Manager/Emergency Management Office/Incident Officer.

4. Investigate the operating regulations regarding the behaviour of operating staff in the event of a collision with herd animals.

5. Refresh induction training and provide regular instruction of the staff responsible for rescue on local features and safety equipment, in addition, plan and carry out tunnel rescue practice.

6.

**Measures taken:** (As at 30 August 2011)

Safety recommendations Nos 1, 3 and 5 were issued at this point in time. To that extent, the procedure is not yet finished.

On recommendation No 2: when requested, the operator of the rolling stock demonstrated that the train in question was equipped in accordance with the rules and furthermore showed that there was no requirement for improvement on account of the accident.

On recommendation No 4: when examined, there was no need to change the operating regulations in question.

## 2007

### **Event: derailment in Rotenburg/Wümme on 28 February 2007**

**Safety recommendations:** (As at 7 January 2008)

Ask specialist groups to consider to whether and to what extent the distance between hot box detection installations can or must be improved to be able to respond more effectively to a hot box which is developing relatively quickly; take the findings of the accident investigation and the results of the report on the metallurgical tests into account.

**Measures taken:** (As at 30 August 2011)

Potential improvements relating to the spacing required, options for detection and basic assumptions on the rate of heating have been discussed with the infrastructure manager. A draft for a new functional specification is being drawn up in conjunction with the infrastructure manager. The functional specification contains improved requirements for detection, options for evaluation and stability. When updating hot box and binding brake detectors already in service, revised requirements are currently being tested or have already been implemented.

## 2006

### **Event: collision in Berlin Südkreuz on 20 November 2006**

**Safety recommendations:** (As at 29 March 2007)

Send the expert's report to S-Bahn Berlin GmbH.

Issue a notice to the S-Bahn Berlin GmbH containing the requirement to ensure that the sanding equipment on class 480 and 481 S-Bahn trains works reliably and it always contains enough sand.

Check the design of the brake system of vehicles of classes 480 and 481 in conjunction with the manufacturer and operator taking the points made by the expert into account.

Prepare a hazard analysis to combat the probable cause of this accident, the combination of 'dirty rail head and slight dampness' or to limit their effects by appropriate operational measures.

**Measures taken:** (As at 30 August 2011)

The railway undertaking has not yet completed the process of providing evidence of changes to the braking system. In the meantime, speed restrictions apply to operations.