Eisenbahn-Bundesamt

Annual Report
of the
Federal Railway Authority

on the activities of the safety authority
pursuant to Article 18 of the Directive on the safety
of the Community's railways
(Directive 2004/49/EC, ‘Safety Directive’)

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A.1. Scope of the report

The Federal Railway Authority [Eisenbahn-Bundesamt (EBA)] is the German national railway safety authority. As such, it is responsible for carrying out all the tasks assigned to it by the Fifth Amendment to the Statutory Provisions governing Railways [Fünftes Gesetz zur Änderung eisenbahnrechtlicher Vorschriften] of 16 April 2007, which transposed the Directive on safety on the Community's railways (2004/49/EC, the Railway Safety Directive) into national law. These tasks are specified in Article 16 of the Railway Safety Directive. In detail they are:

- authorising the bringing into service of the structural subsystems in accordance with the interoperability directives: for the trans-European high-speed rail system (in accordance with Directive 96/48/EC) and for the trans-European conventional rail system (in accordance with Directive 2001/16/EC),

- supervising that operation and maintenance of the subsystems of the railway system are in compliance with the essential requirements and likewise for the interoperability constituents;

- authorising the placing into service of rolling stock that is not yet covered by a Technical Specification for Interoperability (TSI);

- issuing safety certificates for railway undertakings and safety authorisations for infrastructure managers;

- monitoring and developing the safety regulatory framework including the system of national safety rules;

- registering vehicles in the National Vehicle Register.

In addition, the EBA performs other tasks, such as, for example, the planning for operating equipment for the federal railways, helping to finance construction work under the Federal Railway Development Act [Bundesschienenwegeausbaugesetz (BSWAG)], work in the field of dangerous goods, activities involved with the enforcement of Regulation (EC) No 1371/2007 on the rights and obligations of railway passengers, and planning, approving and acting as the supervisory authority for magnetic levitation railways.

In accordance with Article 18 of the Railway Safety Directive, this report is restricted to the EBA's activities as a safety authority, in particular the development of:
- railway safety, including the common safety indicators (CSI),
- the legislative and regulatory framework supporting railway safety,
- safety certification and safety authorisation as well as
- the body of knowledge obtained from the supervision of railway undertakings.

The report follows the template recommended by the European Railway Agency (ERA).

A.2. Summary in English

The overall purpose of this report is to provide information about the activities of the Federal Railway Authority [Eisenbahn-Bundesamt (EBA)] acting as the National Safety Authority in accordance with Directive 2004/49/EC on safety on the Community's railways. This report is aimed at stakeholders in the German and European railway industry and interested members of the general public.

The EBA was founded in 1994 as one element in the process of German railway reform. Sovereign tasks such as, for example, technical approval of vehicles and track and public financing of investments were allocated to the EBA when the former state railways, Deutsche Bundesbahn and Deutsche Reichsbahn, were merged into Deutsche Bahn AG, a private company. The EBA has acted as an independent authority within the German Federal Ministry of Transport, Building and Urban Affairs [Bundesministeriums für Verkehr, Bau und Stadtentwicklung (BMVBS)] since 1994. Its headquarters is located in Bonn, while most of the some 1 250 employees are out-based in twelve branch offices at fifteen locations throughout Germany.

Given the EBA's experience since 1994, it was logical to allocate the tasks of the National Safety Authority (defined in Article 16 of the Railway Safety Directive) formally to the EBA as well. This step was taken in April 2007 when the Fifth Amendment to the Statutory Provisions governing Railways came into force and that completed the task of transposing the provisions of the Railway Safety Directive into German law.

Parts A, B and C of this report, together with the annexes to which they refer, contain comprehensive information on the railway system in Germany as well as details concerning the statutory background, tasks and organisation of the EBA. Parts D to H focus on safety-related issues:

- Part D lists important safety measures taken in 2011. These are broken down into measures resulting from events such as accidents, from safety recommendations or from other prompts such as findings during supervisory activities. It also contains a trend analysis of common safety indicators (CSIs). Annex C shows a table of CSIs for 2011.

- Part F deals with safety certification and authorisation; Annex E contains figures related to this topic.

- Part G outlines how the EBA supervised railway undertakings and infrastructure managers in 2011.

- The application of common safety methods (CSM) to risk evaluation and assessment is described In Part H. Application of CSMs has been mandatory for significant changes to certain parts of the railway system since July 2010; it has become applicable to all significant changes with effect from July 2012.

B. Introductory section

1. General

This annual report provides information on the activities carried out by the EBA as the German railway safety authority in accordance with the Railway Safety Directive. It is primarily aimed at the railway community in Germany and Europe, but its target audience extends beyond that to representatives from politics, business, the press and interested members of the general public.

The EBA was set up as an independent, unitary higher federal authority within the Federal Ministry of Transport, Building and Urban Development when the railway system in Germany was restructured in 1994. It is the supervisory and licensing authority for the federal railways [Eisenbahnen des Bundes (EdB)], magnetic levitation railways and railway undertakings based in other states for the territory of the Federal Republic of Germany. In addition to network-based supervision in accordance with Section 5(1c) of the General Railways Act [Allgemeines Eisenbahngesetz (AEG)], the EBA is also responsible for supervising non-federally owned railways which require a safety certificate or safety authorisation.

2. Railway structure information

On 31 December 2011, the public railway network in Germany consisted of approximately 38 000 route km of which about 20 500 km were electrified at 15 kV, 16⅔ Hz, the standard system in Germany. This network is operated by a total of around 180 licensed public railway infrastructure managers. Just under 32 500 km of track alone are operated by DB Netz AG, the largest infrastructure manager in Germany.

At the end of 2011, more than 400 public railway undertakings were licensed under Section 6 of the General Railways Act to provide transport services by rail on Germany's public railway network. This is equivalent to a licence under Directive 95/18/EC (2001/13/EC) on the licensing of railway undertakings. In addition, railway undertakings from other states operate in Germany on the basis of a licence issued in other Member States of the European Union in accordance with Directive 95/18/EC (2001/13/EC).

Continuing the trend noted in 2010, a further part of the decline in freight traffic on the German network resulting from the economic downturn in 2009 was reversed in 2011. The pre-crisis level was almost reached, rail and road recovering more strongly than the market as a whole. In the modal split between the surface modes (road, rail and inland waterways) the share of the railways increased year on year from 17.7% to 18.0%[1]. The number of passengers carried likewise rose.

In 2011, public railways carried some 374.7 million tonnes of freight (+ 5.3 % compared to the previous year). Tonne-kilometres likewise rose by 5.6 % to 113.3

[1] Source: Federal Office for Freight Traffic, Market Research in Freight Traffic [Bundesamt für Güterverkehr, Marktbeobachtung Güterverkehr] – Annual Report 2011

billion[2]. This sustained demand suggests that the volume of traffic to be moved will continue to have a stable to slightly upward trend[3].

Passenger traffic by rail also rose significantly by comparison with the previous year. The number of passengers carried rose 6.1 % within the year to 2.51 billion passengers; passenger-kilometres increased somewhat less steeply from 83.0 to 85.0 billion (+ 2.4 %)[4].

3. General trend analysis

In 2011, a total of 285 significant railway accidents occurred on that part of the German rail network covered by the Railway Safety Directive. Thus, in the third year in a row, the number of significant accidents has fallen, in this case by 4.2 % compared with the previous year (2010: 297 significant accidents). This is mainly attributable to a decline in accidents on level crossings but also to a decline in derailments, as well as 'other accidents'. On the other hand, within the ‘collision’ category, ‘accidents involving personal injury’ and rolling stock fires increased slightly.

The total number of fatalities caused by railway accidents likewise fell, (2010: 146 fatalities, 2011: 140 fatalities). Other the other hand, the number of people seriously injured increased significantly by comparison with the previous year to 147 people seriously injured (2010: 118 seriously injured). Mention should be made of the serious accident at Hordorf on 29 January 2011 as a significant isolated event: ten people were killed and a further twenty-three were injured, some seriously.

Annexes

A map of the railway network in Germany is attached to this report as an annex (**Annex A.1**). Likewise, links to the lists of licensed railway undertakings and infrastructure managers are to be found in **Annex A.2**.

[2] Source: Federal Statistical Office [Statistisches Bundesamt], Technical series 8, Number 1.1, 07/2011
[3] Federal Office for Freight Traffic, Market Research in Freight Traffic [Bundesamt für Güterverkehr, Marktbeobachtung Güterverkehr] – Annual Report 2011
[4] Source: Federal Statistical Office [Statistisches Bundesamt], Technical series 8, Number 1.1, 07/2012

C. Organisation

As is explained in the introduction above, the EBA is an independent, unitary, federal authority within the Federal Ministry of Transport, Building and Urban Development (BMVBS) in accordance with Section 2(1) of the Federal Rail Traffic Management Act [Bundeseisenbahnverkehrsverwaltungsgesetz (BEVVG)].

Section 3 of the BEVVG defines the specific tasks of the EBA in detail. Accordingly, the EBA is responsible for the following tasks:

1. approving plans for operational facilities for the federal railways;
2. acting as the supervisory authority;
3. supervising construction of operational facilities for the federal railways;
4. issuing and revoking [operating] licences;
5. exercising sovereign powers as well as supervisory and participation rights in accordance with other laws and regulations;
6. preparing and implementing agreements in accordance with Section 9 of the Federal Railway Development Act [Bundesschienenwegausbaugesetz (BSchwAG)];
7. allocating federal funds to promote rail transport and to promote the combination of rail transport with other means of transport.

For the purposes of carrying out its tasks, the EBA has a head office in Bonn and twelve out-based offices in fifteen locations throughout Germany. The EBA's Head Office has four departments (Head Office Services, Infrastructure, Rolling Stock and Operations and the Finance Department). There are eighteen subordinate units. The local tasks are carried out by five technical departments in the twelve out-based offices. They are coordinated by the respective specialist units in the head office. An organisation chart of the EBA as well as an overview of the locations of the out-based offices is given in **Annex B**.

The EBA has been set up as a higher federal authority under auspices of the Federal Ministry for Transport, Building and Urban Development. It is therefore answerable to that ministry. In addition to the EBA, three other bodies have responsibilities for railway activities in Germany:

The **Federal Railway Accident Investigation Office (EUB)** is the investigating body for the purposes of the Railway Safety Directive 2004/49/EC. The EUB manages and is responsible for the investigation of accidents on infrastructure which the Federal Republic supervises in accordance with Chapter V of the Railway Safety Directive. The BMVBS provides the management of the EUB but its activities are

carried out by an investigation centre within the EBA which is answerable to the BMVBS for technical purposes.

The **Federal Network Agency** [Bundesnetzagentur, (BNetzA)] is a regulatory body in accordance with Directive 2001/14/EC. It monitors non-discriminatory network access in Germany. The Federal Network Agency also regulates the electricity, gas, postal and telecommunications markets and is therefore organisationally answerable to the Federal Ministry for the Economy and Technology [Bundesministerium für Wirtschaft und Technologie]. However, specialist regulation of railway activities is the responsibility of the Federal Ministry for Transport, Building and Urban Development.

Eisenbahn-Cert (EBC) is the notified body for interoperability for the trans-European conventional and high-speed rail systems in accordance with Directives 96/48/EC and 2001/16/EC. It checks and certifies compliance with the European rules for interoperability components and subsystems of the rail system.

A schematic representation of the situation as of 31 December 2011 is attached to this annual report as **Annex B.2**. An overview of the working relationship between notified bodies and the EBA for authorisation to put structural subsystems into service is given in **Annex B.3**.

D. The development of railway safety

Initiatives to maintain and improve safety

This section contains a list of the measures decided on and taken by the EBA or transposed in Germany in 2011 to maintain or improve safety on the railways. EBA measures based on specific events, such as accidents, are shown in Table D.1.1; whilst EBA measures triggered by other factors (such as findings during inspections) are shown in Table D.1.2.

Table D.1.1. Safety measures triggered by accidents and precursors to accidents

Accidents/precursors which triggered the measure			Safety measure decided
Date	**Place**	**Description of the event**	
Plan to upgrade intermittent automatic train control			
29 January 2011	Hordorf	Freight train DGS 69192 passed block signal B at Hordorf crossing at danger without authority on 29 January 2011. It collided frontally with the oncoming local train DPN 80876. In accordance with the current Railway Construction and Operation Order (Eisenbahn-Bau- und Betriebsordnung) (EBO) there is no requirement to upgrade the section of line in question with a technically effective automatic train control.	Independently of its statutory obligations, DB Netz has deposited an upgrading plan for intermittent automatic train control ([Punktförmige Zugbeeinflussung] PZB) for operating locations without the basic PZB equipment. Subsequentlyall signals will be equipped with PZB. An appropriate amendment to the upgrading regulations in the EBO is currently being drafted.

Table D.1.2. Safety measures with other triggers

Description of the area of concern	Description of the trigger	Safety measure decided
Unauthorised modifications to detector rods		
Control-command and signalling subsystem: switch machines	In the course of railway supervision, unauthorised modifications to switch detector rods were discovered. The detector rods are adjustable rods in accordance with Deutsche Reichsbahn standard drawings for WA 350 switch machines. By drilling and tapping a threaded hole on the jaw clip a bolt was fitted which prevented essential subsequent adjustment of the detector rods. The standard drawings do not permit drilling such holes in the jaw clips.	After the defect was discovered, an instruction was given to throw all the switches in question right over in both directions at least every eight hours and that all the switches in question should be inspected by a signal inspector every two days. Replacement of the detector rods by 26 August 2011 was ordered.
Split pins and rivets		
Control-command and signalling subsystem: rivets in mechanical signal boxes	When inspecting mechanical signal boxes, a high proportion of rivets used for the purpose of securing connecting pins and securing bolts were discovered to be defective in such a way that rivets had not been replaced in the essential places in accordance with the rules.	In workshops normal solid (steel) rivets are to be used in accordance with the standard drawings. Rivets that have to be replaced on site (only for securing purposes, not to transfer forces) are to be replaced by a blind rivet or pop rivet (steel/aluminium) in a procedure defined in a 'technical notice'. The 'technical notice' sets a time limit to the effect that all the signal boxes in question must be checked within twelve months and brought into conformity with the regulations.
Distance between the inner facesof wheels - locomotive classes 112, 114, 143, 155		
Subsystem rolling stock wheelset	Spread of the distance between the inner faces of the wheels (AR measurement) noted	Reduction in the inspection interval and operating tolerances for the distance between the inner faces of the wheels
Design of the axles for TRAXX locomotives (classes 145, 146)		
Subsystem rolling stock wheelset	Test runs with class 146 locomotives show that for several locomotives, the twisting moment on the axles in service exceeds that calculated in the design	Recalculation of the axles, replacement where appropriate, risk based restrictions regarding maintenance and further use of the locomotives (existing and new locomotives)
Parabolic leaf springs on type Hcceerrs wagons of class 330		
Subsystem rolling stock suspension	Cracks in supplementary leaves of the parabolic leaf springs	Replacement of the springs by a suitable assembly, until then frequent checking for cracks.

Detailed data trend analysis

Annex 1 of the Railway Safety Directive specifies the common safety indicators (CSIs) on which the safety authorities are to report in their annual reports. The various categories of CSIs include:

- number of significant accidents;
- number of fatalities;
- number of persons injured;
- number of accidents related to dangerous goods;
- number of suicides;
- number of precursors to accidents;
- consequences of accidents (costs and delays);
- technical safety of the infrastructure and its implementation together with safety management.

Since 2007, the data on which the common safety indicators are based has been taken from the safety reports made by the railways to the EBA. The data source for 2006 was the database of dangerous incidents reported to the EBA. The threshold for recording accidents is based on Directive 2009/149/EC amending Directive 2004/49/EC of the European Parliament and of the Council as regards common safety indicators and common methods to calculate accident costs. Accordingly, only those accidents are included in which at least one moving railway vehicle is involved and in which

- at least one person was killed or seriously injured or
- significant damage was caused to rolling stock, track, other installations or the environment (damage that is equivalent to € 150 000 or more) or
- extensive disruption to traffic (suspension of services on a main line for six or more hours).

As a result, the accident figures reported for 2007 et seq have fallen sharply by comparison with those for 2006; they cannot be compared in any way with the 2006 values. That becomes very clear in the collisions, derailments and rolling stock fires categories. It is therefore only be possible to use the CSIs to analyse trends since 2007. The definition to be used for broken rails also changed in 2007. From that date broken rails which did not pose an actual danger have also had to be included and that has led to an increase in the number of broken rails in 2007 and subsequently. In accordance with the definition used for the purposes of the CSI, with effect from 2009 signals passed at danger only include events linked to train running. Hence the

number of cases of signals passed at danger has fallen sharply compared with the previous years.

The CSIs for accidents, fatalities and people seriously injured were coordinated with figures from Federal Statistical Office sources. The scope of the data cannot be aligned precisely since the Federal Statistical Office considers all the public railways in Germany, whilst the common safety indicators specified in Directive 2004/49/EC for reporting purposes only include those from undertakings which require a safety certificate or safety authorisation. For that reason the number of accidents reported by the Federal Statistical Office is higher than the CSI values given in this report.

In 2011 there were a total of 285 significant railway accidents on the railway network in Germany which is subject to the Railway Safety Directive. Accordingly, the number of significant accidents has again fallen by comparison with the previous year (2010: 297 significant accidents, - 4.0 %).

In 2011, 147 people were seriously injured in railway accidents. That figure was significantly above the figure for the previous year (118 seriously injured, + 25 %). Within these figures, the number of seriously injured passengers likewise increased from eight to thirty-four year on year. The major part of this increase is attributable to the serious railway accident in Hordorf. An increase was also noted in seriously injured employees and unauthorised persons. By contrast the number of seriously injured in the ‘level crossings users’ category and in the ‘other’ category fell. Almost half (about 45 %) of all seriously injured people are level crossings users or unauthorised persons on railway premises.

The total number of the people who died in railway accidents fell once again from 146 in 2010 to 140 in 2011 (- 4.1 %). Approximately 80 % of the fatalities are in the ‘level crossing users’ and ‘unauthorised persons on railway premises' categories. Detailed consideration shows that the decrease in the number of people fatally injured in railway accidents was caused by a considerable decrease in fatalities among level crossing users. On the other hand, the number of passengers killed went from zero to nine, once again mainly attributable to the serious accident in Hordorf. More than half the total number of people killed were unauthorised persons on railway premises.

Details of the economic consequences of accidents have also been included since 2010. Thus, in accordance with Directive 2009/149/EC, details of the damage to property and environmental damage as well as a calculation of the costs resulting from delays and the costs and societal losses of victims of accidents are given. The values used in the calculations were derived from the results of the 'HEATCO' Project. This project was commissioned by the EU to work out a basis for the economic assessment of infrastructure projects and was recommended by the European Railway Agency; for further details, see http://heatco.ier.uni-stuttgart.de.

The data for the individual CSIs for 2011 and the definitions used for calculating the CSIs are given in **Annex C** of this report.

Results of safety recommendations

The following section contains the results of and measures proposed in the safety recommendations of the Federal Railway Accident Investigation Office.

The following safety recommendation was made as a result of a collision between trains at Hordorf on 29 January 2011:

1. Upgrade all lines with automatic train control by means of which a train which passes a signal at danger without authorisation can be brought to a halt automatically. Additionally, on main lines an approach to a signal at danger without authority can be prevented automatically.
2. Until sections of line are upgraded with automatic train control in accordance with recommendation No 1, additional measures should be taken to reduce the probability of occurrence and/or extent of the consequences of passing a signal at danger without authorisation. These measures should be suited to individual circumstances.

The competent body is preparing an amendment to the Railway Construction and Operation Order [Eisenbahn-Bau- und Betriebsordnung (EBO)] which will include extended obligations to upgrade sections of line. The federal railways are already engaged in an extensive programme to upgrade their lines to reduce risks in anticipation of the changes to the EBO.

The EBA has required infrastructure managers to investigate and introduce interim measures designed to respond to the risks and operational circumstances until the upgrading has been completed. Infrastructure managers have undertaken various activities jointly with railway undertakings and introduced suitable measures.

After the investigation of another incident caused by the failure of air-conditioning, a safety recommendation was issued to the effect that technical changes should be made to air-conditioning systems so that when it was necessary to reset the heating or cooling sections of the air-conditioning or if they were defective, then circulation of fresh air and recirculation in coaches would continue. The operator gave reasons for refusing to implement the safety recommendation directly but compensated by technical and operational means. The procedure has been closed.

A further safety recommendation followed from an accident between Leiferde and Bielefeld. It was recommended that the requirements for the functionality (labelling, operation and risk of injury) of emergency entry and exit windows should be reviewed in order to ensure passengers can be evacuated rapidly and safely in an emergency. This review has taken place; an emergency window was tested without problem. The need to change the pictogram on how to operate the window was also investigated. It was established that there was no need for action.

Supplement to the safety recommendations shown in annual reports from previous years which had not been completely resolved at those times:

In 2007, a safety recommendation was made by the Investigation Office which referred to the use of hot box detectors [Heißläuferortungsanlage (HOA)]. The Federal Railway Authority has discussed with the infrastructure managers possible improvements to the spacing required, detection options and basic assumptions for the rate of heating. The draft of a new functional specification for hot box detectors and dragging brake detection equipment [Festbremsortungsanlagen (FBOA)] was prepared by the infrastructure manager concerned and submitted to the EBA in May 2010. In several technical discussions, most recently in the first quarter of 2011, the EBA supplied DB Netz AG staff with further instructions for them to take into account when they wrote the specification. A final submission to the EBA has been made so that a warranty can be issued. The specification contains improved requirements for detection (recognition of the trend in the rise of temperature), methods of assessment (diagnosis) - according to statements by the operator, in future a management system is also envisaged – and equipment stability. Also, to meet more demanding requirements (e.g. recognition and exclusion of false alarms, improved detection) for hot box and dragging brake equipment already in service, developments are currently being tested or have already been implemented. In addition, the current set of regulations is being rewritten so that in future they will take into account the requirements for lines equipped with automatic train control [Linien Zugbeeinflussung (LZB)] and ETCS.

A safety recommendation from 2009 followed from an incident in which thick smoke built up in a double deck driving trailer of a local train because the auxiliary brake had not completely released. The recommendation to investigate whether the air intake to the air conditioning should be moved to another location has been completed and the finding was that there is no other suitable location.

The second safety recommendation issued in 2009 was based on the results of the investigation of a derailment of a freight train due to an axle fracture resulting from a hot axle box. The recommendation to exchange riveted brass cages in the axle bearing by plastic bearing cages to avoid further accidents of this type was not appropriate. Nevertheless, independently of that, the issue is being followed up in European and international bodies. The second aspect, investigation of the impact of derailment detectors and sensors in detecting hot axle bearings continues to be pursued at European and international level.

After the collision of an ICE and the derailment which followed in Landrücken Tunnel on 26 April 2008 the following recommendations from 2010 were still being discussed between the BMVBS, EBA and the infrastructure manager in question:

- 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.

- revise module 123.150 ‘Rescue by Third Parties’ 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.

- 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.

In the report of the investigation of a derailment on 7 August 2009 on the line from Nürnberg-Stein to the Nuremberg marshalling yard (Nürnberg Rbf) it was recommended that 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 taken into consideration.
2. Establish a method of testing to check the tension of securing fittings and appropriate test values. The measurement of design tension by means of a torque wrench, for example, would be considered as a suitable test.

To implement this, a change to the regulations was decided; this change will probably take effect in the third quarter of 2012 in the form of a technical construction regulation. The change to the regulations although decided on, has not yet been implemented and accordingly will be reported on in the next annual report (for 2012) covering 1 January – 31 December 2012.

E. Important changes in legislation and regulations

The following changes made to the statutory framework for railways in Germany in the course of 2011had an impact on railway safety:

Fifth Regulation enacting and amending the statutory provisions governing railways [Fünfte Verordnung zum Erlass und zur Änderung eisenbahnrechtlicher Vorschriften]

This umbrella regulation, dated 29 April 2011, enacted the provisions for the issue of licences to train drivers and the accreditation of people and organisations authorised to train and examine. In addition, the Railway Safety Regulation and the Federal Railway Fees Regulation were amended.

European Directive 2007/59/EC on the certification of train drivers was transposed in 2009 by means of the Sixth Amendment to the statutory provisions governing railways. The administrative transposition with detailed regulations has now been completed with the regulation (dated 29 April 2011) on the issue of entitlements to drive to train drivers and the accreditation of people and offices to train and examine. The train driver's licence regulation governs the conditions for the issue of a complementary certificate. Based on the General Railways Act, the regulation specifies the requirements for training and examination and for the accreditation of training and examination organisations together with doctors and psychologists. In addition, the provisions include regulations for the register of drivers' licenses and complementary certification. Lastly, the regulation contains supervisory and control provisions.

The amendment to the Railway Safety Regulation was made in order to transpose Directive 2009/149/EC. The regulations concern harmonised European definitions for common safety indicators and common methods for calculating the economic effects of accidents.

An amendment has been made to the Federal Railway Fees Regulation in order to include the charges for official processing in accordance with the Train Driver's Licence Regulation. The new headings necessary for these charges have been introduced in a new section 10.

The tables in **Annex D** include an overview in tabular form of the changes made in 2011.

F. The development of safety certification and authorisation

1. National legislation – starting dates – availability

The Railway Safety Directive was transposed into national law in 2007 by the Fifth Amendment to the statutory provisions governing railways and the Second Regulation enacting and amending the statutory provisions governing railways. The start date for issuing safety certificates and safety authorisations was the date that the Fifth Amendment to the statutory provisions governing railways came into force, i.e. 21 April 2007. Up to that point, safety certificates had been issued by the Federal Railway Authority in accordance with Directive 2001/14/EC.

As national safety regulations, the provisions are applicable in accordance with the Communication of 25 January 2008 in which the Government of the Federal Republic of Germany notified the European Commission of the relevant national safety rules for the rail system in Germany as required by Article 8(2) of Directive 2004/49/EC. This communication is available on the EBA website. The annexes to the communication classify the rules in accordance with Annex II of Directive 2004/49/EC, and provide further details in accordance with the form drawn up by the ERA, including links to the individual rules. Arrangements for public access to national laws and regulations in various media ensure that they are accessible. The infrastructure managers' sets of regulations which serve as national safety regulations for access to the network are available on their websites or can be requested as a hard copy document by e-mail/web request. The fact that access to the regulations is now problem-free can in various places be seen to be due to the trend towards making access to data simpler and more customer-oriented.

2. Numerical data

Annex E contains a summary of various numerical data on safety certificates and safety authorisations.

In 2011 the EBA received the following applications:

- no applications for safety authorisations;
- four applications for a safety certificate part A;
- six applications for a safety certificate part B.

3. Procedural aspects

General

The EBA charges fees for the work it does to issue safety certificates parts A and B and safety authorisations. These fees are determined by the length of time required to handle the application. In accordance with Article 2(2) of the Federal Railway Fees Regulation (BEGebV) the rate per hour is 100 euro.

3.1. Safety certificates – part A

In 2011 no amendments or revisions were made to safety certificates part A. The processing of the applications for safety certificates part A was delayed mainly because of the need to make changes when collecting information from the applicant or due to implausibilities which were found when assessing the applications.

Within the period covered by the report there were no enquiries by safety authorities from other countries in connection with safety certificates part A which had been issued in Germany. No problems arose from the use of harmonised formats for safety certificates part A or the mutual recognition of safety certificates part A. Safety authorities still do not seem yet to have completely reached a common understanding.

Formal feedback procedures for railway undertakings to comment on the process for issuing safety certificates are not required under either the Railway Safety Directive or its transposition into national legislation. However, undertakings are free to submit their views on the procedures informally. The following problems were mentioned by undertakings:

- understanding the distinction between safety-oriented objectives of a safety management system compared with a quality management system;
- responsibility for and control of the risks arising from services and resources provided by suppliers, service providers and contractual partners.

3.2. Safety certificate part B

In 2011 no amendments or revisions were made to safety certificates part B. The processing of applications for safety certificates part B was delayed (as for part A) mainly because of the need to make changes when collecting information from the applicant or due to implausibilities which were found when assessing the applications.

No problems arose in the use of harmonised formats for safety certificates part B. The EBA does not consider there have been any particular difficulties with the application process.

There is no provision for a formal feedback procedure for part B safety certificates either, although undertakings can submit their views informally at any time. Railway undertakings have particular problems with the requirements for drawing up the

maintenance plan for vehicles in application of DIN 27200 et seq and in skills management (education and training of staff).

3.3. Safety authorisations

At the end of 2011 ten applications from among those received earlier [before the beginning of the year] were still being considered. It had not been possible to complete the process of checking them earlier, in particular because of missing or incomplete supporting documents. A provisional authorisation in accordance with Section 38(5c) of the General Railways Act (AEG) applied in those cases.

A safety authorisation was issued for one infrastructure manager in accordance with Section 7c AEG in April 2011. The length of time taken to issue the first safety authorisation in accordance with Section 7c AEG was greater than the target specified in Article 12(1) of Directive 2004/49/EC. The principal reason was that after the application was made and the supporting documents for a not insignificant number of processes had been submitted it was found that further documents were necessary or existing ones had to be supplemented or revised before the application could be approved.

G. Supervision of railway undertakings and infrastructure managers

The following section explains how railway undertakings and infrastructure managers in Germany were supervised by the Federal Railway Authority in 2011. In 2011, there were about 175 staff within the Federal Railway Authority available to supervise in the areas described below.

Supervision of permanent way and structural installations (Unit 21)

Monitoring of infrastructure managers to ensure that installations meet prescribed standards and that infrastructure managers comply with the regulations for the inspection and servicing of installations is carried out by Unit 21 and Area of expertise 2 from the EBA out-based offices as part of the process of supervision of permanent way and structural installations. The railway supervisory process makes use of sampling techniques to establish whether the General Railways Act, the statutory regulations associated with it as well as recognised engineering rules are complied with when approved equipment is being used. Checking that the railways observe the safety obligations laid down in Section 4(1) (now 4(3)) of the General Railways Act is a key task in railway supervision.

General monitoring during the railway supervisory process is basically limited to sampling checks. In this process, the Federal Railway Authority distinguishes between three kinds of monitoring in accordance with the Administrative Regulation on the inspection of structural installations of the Federal Railways [Verwaltungsvorschrift zur Eisenbahnaufsicht über die baulichen Anlagen der Eisenbahnen des Bundes]:
a) organisational monitoring [unternehmenbezogene Überwachung (ubÜ)];
b) object-related monitoring [objektbezogene Überwachung (obÜ)];
c) special monitoring [Sonderüberwachungen].

These types of checks are supplemented as appropriate by audits of key areas. The approach adopted when shaping the process of supervising permanent way and structural installations facilitates the systematic evaluation of the infrastructure manager's maintenance activity geared to specific types of installation. The division into three described above represents an approach to evaluating the maintenance activities of the infrastructure manager which is as flexible and reliable as possible.

The Administrative Regulation on railway supervision [Verwaltungsvorschrift zur Eisenbahnaufsicht (VV EA)] may be viewed on and downloaded from the following website:
http://www.eba.bund.de/cln_031/nn_201964/DE/Infothek/Infrastruktur/Allg__Vorschriften/VVEA/VVEA__inhalt.html?__nnn=true [in German only]

As far as the individual types of monitoring are concerned:

a. The organisational monitoring is to see to what extent existing regulations – some of them internal to the undertaking - for maintenance within the meaning of DIN 30541 (servicing, inspection, maintenance) have been implemented and observed. In consequence it assesses the operator's maintenance organisation by evaluating the offices responsible for the installations and essentially represents an audit of the maintenance organisation. This type of monitoring is carried out at regular intervals (about every two years).
b. The object-related monitoring is carried out by sampling. It enables an assessment of the condition of the installation to be made on site as well as the monitoring of the staff involved in maintenance. It is carried out by observing the inspections of the installation carried out by the operator. This monitoring is also carried out regularly for the various different types of maintenance work.
c. The EBA reserves the right to mount special inspections in those cases where the organisational and/or object-related monitoring do not permit an unambiguous assessment of an installation. Special inspections may also be carried out, inter alia, after accidents or exceptional events.

No significant deficiencies in the maintenance system of the federal railways were found in the course of monitoring permanent way and structural installations in 2011. Only for a small proportion of the individual installations monitored was it necessary to give instructions to the infrastructure managers.

An audit of a key area in the permanent way in 2010/2011 focussed on whether rail faults of the head-check type were dealt with as specified in the regulations. As a result of the focussed audit the regulations were amended in several places:

1. level 2 damaged areas may also be removed by work on the rails;
2. the periodicity of remedial maintenance is to take account of loadings and the type of steel;
3. introduction of eddy-current testing on rail testing trains.

Supervision of signalling, telecommunication and electrical installations (Unit 22)

The EBA has reorganised the process of railway supervision following lessons learned from management practice in the last few years and as a result of changes in European specifications. In doing so, it has also taken into account changes in human resources constraints.

A new administrative procedure for the inspection of signal, telecommunications and electric installations came into force at the beginning of 2010. The new supervisory procedure, set down in the 'Administrative Regulation on the supervision of signalling, telecommunication and electrical installations' [Verwaltungsvorschrift für die Eisenbahnaufsicht über Signal-, Telekommunikations- und Elektrotechnische Anlagen (VV EA-STE)], uses a risk and fault-based approach for the inspection of installations which takes into account their importance in safety terms and the frequency of faults. The procedure uses a more dependable statistical methodology

and achieves a very high 'hit rate' with representative samples to assess the quality of maintenance achieved by the operators of the installation. This allows deficiencies to be recognised in good time and then followed up. In addition to the systematic sampling test of all installations, a regional and nationwide programme of organisational and object-related inspections is carried out. This programme is flexible in terms of the topics to be concentrated on.

The combination of the statistically based core programme and the themed special focus allows the EBA to make efficient use of its resources to fulfil its remit to protect society from danger. Thus, particularly dangerous areas can be targeted, critical areas such as infrastructure managers' maintenance management systems can be investigated effectively and those faults and deficiencies which are found can be dealt with quickly throughout the country. A standard federal administrative process is ensured by specifying test content and scope in test guidelines for each topic (checklists for each topic). All data from the statistical records is captured and assessed by a newly designed databank tool. This enables a rapid identification of new critical points in the process.

The VV EA-STE may be may be viewed on and downloaded from the following website:
http://www.eba.bund.de/cln_031/nn_342570/DE/Infothek/Infrastruktur/Allg__Vorschriften/VVEASte/VVEASte__node.html [in German only]

Changes to the procedures in 2011:
After more than a year's use, the checklists are being fundamentally revised on the basis of three-way discussions among staff from the specialist areas of control and safety technology, telecommunications and electrical engineering. The principal changes in this process are that some techniques are being abandoned because of a lack of safety relevance, others added. Questions are being formulated more comprehensibly and clearly and new alternatives for answers added. In parallel, the databank is being revised and new query options added. Furthermore, DB RegioNetz Infrastruktur GmbH has been added as an infrastructure manager in its own right although the evaluation of input for the period since 2010 for it still has to be worked out.

In addition to the representative samples specified in the safety register, the priorities in the monitoring work carried out in 2011 were in the following areas:

Control command and signalling technology

1. train describer installations;
2. checking that conditions have been satisfied for
   - TM 2010-413 I.NVT 4 special inspection of the detector slide bars in switches with swing nose crossings of DB standard design (with clamp or bar locking CKA 15);
   - TM 2010-420 I.NVT 4 to Ril. 89202V21 low maintenance clamp lock WKV 12 - return to regular inspection intervals by retro-fitting of two-level securing of the eccentric pins;

- TM 2010-421 I.NVT 4 to Ril. 892.9303A06 switch machine L826H – break in the detector slide bar and spring, replacement of all covers by a modified design with an end stop.

1. checking the intermittent automatic train control (PZB) function ‘monitor run-up to a signal showing danger’, in particular when operating patterns in stations are changed;
2. checking track circuits;
3. special inspection of 10 % of level crossing safety installations of superseded designs Lo 57 and Fü 59/60, concentrating on signs of ageing.

Telecommunications:

1. checking all operating centres listed in the safety register;
2. checking the ‘3 S centres’ [service, safety and cleanliness ≈ station control point];
3. checking of all rescue-train installations;
4. GSM-R: comparison of all the gaps in coverage with those in the list reported at the relevant time.

Electrical engineering:

1. checking of overhead line equipment;
2. checking of safety lighting in all underground passenger facilities [PVA – Personenverkehrsanlagen] across Germany;
3. checking earthing of the overhead line equipment.

The monitoring of the federal railways undertaken in 2011 did not identify any systemic safety deficiencies. In cases where deficiencies did have safety implications, notices were served to restore levels of safety and order in railway installations.

Inspection of railway vehicles (Unit 32)

Unit 32 of the Federal Railway Authority carries out inspection of rolling stock. The frequency and scope of the inspections depend on the quality and the extent of undertakings’ compliance with all their technical and statutory obligations. The EBA uses a system-based approach to determine the extent to which railway undertakings meet their statutory obligations under Section 4(1) of the General Railways Act in relation to the safe construction and safe condition of rolling stock. Based on that approach, the EBA:

- checks organisation and undertaking related systems;
- checks systems for vehicle types and design series; and
- checks specific installations.

When checking organisation-related systems used by railways supervised by the Federal Railway Authority, the procedures, responsibilities and structures those railways specify and use to ensure rolling stock is safe to operate are checked to

ensure their effectiveness is plausible. When carrying out system audits of vehicle types and series, examinations are adapted to suit the vehicle type and design series.

The aim of substantive testing during physical checks is to compare the actual and desired condition of vehicles in accordance with the relevant legal provisions and recognised rules of engineering (depending on the vehicle) and the examination of process-related factors like the existence of certificates, the implementation of safety management systems in relation to the vehicle, etc. In addition to preventative vehicle inspection, inspection ‘for cause’ as a reactive inspection process forms a further part of vehicle inspection. The aim of inspection ‘for cause’ is to protect against dangers in individual cases should this prove necessary after an investigation into the facts of a case.

In 2011, locomotives from the TRAXX family, rolling stock from the Berlin S-Bahn and various electric locomotives from the former Deutsche Reichsbahn were the focus for inspection ‘for cause’. In many cases, the intensive dialogue with the participants when considering these issues made an administrative instruction unnecessary. The technical discussions on taking forces on axles from operations into account were elevated to European level with the active involvement of the Federal Railway Authority. Furthermore, the institution of a standard procedure across Europe for damage to wheelsets after the accident in Viareggio was pushed forward by the Federal Railway Authority.

Operational railway supervision (Unit 34)

Unit 34 of the Federal Railway Authority supervises railway operations. This takes the form of checking undertaking related systems (in part as an audit) and checking specific installations (physical inspection).

The check of undertaking-related systems covers
1. organisation and documentation of safety management systems;
2. organisation and delegation of functions with safety responsibilities,
3. instructions to local operations managers.

The examination of an undertaking’s systems is usually carried out in cooperation with other EBA departments by special agreement.

A further subject for railway supervision is the assessment of undertakings' compliance with their internal safety management systems (SMS). This was previously done as appropriate when safety problems became known or when there were significant new features. In this connection, the assessment also examines whether railway undertakings continue to develop their SMS to make them ever more effective and whether they react appropriately, on their own initiative, to the lessons learned from dangerous incidents. The examination of the undertaking’s systems also focuses on the railway undertakings’ procedures for risk assessment and risk control. Railway undertakings are required to demonstrate that they are able to

assess the effects of changes in their processes on the level of safety and to introduce suitable compensatory measures.

The physical checking (inspection) of installations extends, among other things, to the following areas:

1. infrastructure managers‘ and railway undertakings‘ organisational units with planning, controlling and monitoring tasks which have implications for operational safety;
2. infrastructure managers‘ and railway undertakings‘ organisational units with staff and traffic management tasks which have implications for operational safety;
3. infrastructure managers‘ and railway undertakings‘ organisational units with local operations managers;
4. organisational units with the task of investigating incidents during rail operations;
5. staffed locations for the operation of signalling equipment and safety installations on site (for example, signal boxes and barrier boxes);
6. locations with the task of train formation, handling or preparation;
7. visiting sites and travelling along sections of line on inspection journeys;
8. visual inspections of standard rolling stock and track plant and their loads;
9. accompanying the driver in the cab of rail vehicles;
10. travelling in passenger trains to investigate safety devices, external doors of passenger coaches and the departure procedure;
11. areas of work within the hazardous area on and around the track and ensuring railway operations are protected from danger.

To eliminate safety-related deficiencies, instructions were issued to railway undertakings and infrastructure managers to restore levels of safety and order in railway operations. These instructions mostly related to eliminating practices that contravened the regulations, or insisting on compliance with existing safety rules. In this connection it became evident that the railway undertakings had difficulties in some cases in ensuring that all the staff complied with the regulations in all situations. However from the safety viewpoint, the infringements noted in the operation of the railway were generally only of minor importance, so that the railway undertaking was essentially able to guarantee that it could maintain the level of safety.

H. Reporting on the application of the common safety methods (CSM) on risk evaluation and assessment

Commission Regulation (EC) No 352/2009 of 24 April 2009 on the adoption of a common safety method on risk evaluation and assessment, as referred to in Article 6(3)(a) of Directive 2004/49/EC of the European Parliament and of the Council has been mandatory since 1 July 2012. However, it has already been in use from 19 July 2010 for significant modifications to vehicles or significant modifications to structural subsystems as required by Article 15(1) of Directive 2008/57/EC or a TSI. The transitional provision defined in Article 2(4) of Regulation (EC) No 352/2009 for projects which are at an advanced stage of development continues to apply to projects being developed in 2011.

The application of Regulation (EC) No 352/2009 was discussed in workshops with representatives from the stakeholders and trade associations in the German railway community. As a result of this work, the EBA has prepared a manual. The manual was published at the beginning of July 2010 under the title 'EBA Instructions for the application of Commission Regulation (EC) No 352/2009 of 24 April 2009 on the adoption of a common safety method on risk evaluation and assessment as referred to in Article 6(3)(a) of Directive 2004/49/EC of the European Parliament and of the Council'. The document is available on the internet under the following link: http://www.eba.bund.de/cln_033/nn_201964/DE/Infothek/Infrastruktur/Allg__Vorschriften/CSM__Risiko/CSM__Risiko__inhalt.html [only in German].

The workshops with industry representatives underlined that the definition of what is a significant modification as well as how to apply this in practice was a particular problem. However, including the process of approving the placing of structural subsystems into service using CSM risk evaluation and assessment techniques as part of the process as a whole brings difficulties both for the internal processes of the applicant and for the interaction with the authority. Applicants must put these processes to a practical test and revise them as appropriate.

As regards rolling stock, the procedures defined in the ‘Administrative Regulation on authorisation for placing railway rolling stock into service’ [Verwaltungsvorschrift für die Inbetriebnahmegenehmigung von Eisenbahnfahrzeugen (VV IBG)] and the ‘Manual on CSM Risk Evaluation and Assessment’ [Leitfaden zur CSM Risikoevaluierung und –bewertung] were brought together in 2011 to form the ‘Rolling Stock Safety Regulations’ [Sicherheits-Regelwerk Fahrzeuge (SIRF)]. In addition, annexes to the VV IBG were drawn up; these annexes can serve as a template for the safety assessment report required for the CSM.

I. Conclusions – Priorities

In general, the monitoring and assessment of railway undertakings and infrastructure managers carried out by the Federal Railway Authority in 2011 showed no serious safety deficiencies. Taken over several years, the frequency with which such deficiencies are found has remained fairly constant; in consequence they do not allow us to draw any crucial conclusions on the level of safety. Considering the actual trend in accidents in recent years together with the increasing traffic flows on the German rail network, once again the level of safety in railway operations can be said to be stable.

Where deficiencies that had safety implications were discovered, the Federal Railway Authority issued instructions for the proper maintenance of railway installations and rolling stock and for operations to be run safely in accordance with Article 2(4) of the Railway Construction and Operation Order. The main initiatives and measures taken by the Federal Railway Authority to maintain and improve safety are summarised in Section D, Part 1. On the basis of the findings from 2011, no further targeted inspections were ordered for 2012 over and above the routine monitoring with the same emphasis as hitherto.

The new process-oriented supervision of permanent way and structural installations introduced at the beginning of 2010 should give the EBA a better picture in future of the condition of the infrastructure managers' maintenance organisation. It should likewise provide an assessment of the effectiveness and operation of safety management systems, and particularly on the implementation of a continuous improvement process. Initial experience and results of process-oriented railway supervision have not revealed any significant problems in the maintenance processes. Evaluation of the results of this process-oriented supervision will continue to be a crucial element in the supervisory process.

J. Annexes

ANNEX A: Railway structure information

ANNEX B: Organisation charts of the National Safety Authority

ANNEX C: Definitions used for the CSI data

ANNEX D: Important changes in legislation and regulation

ANNEX E: Development of safety certification and authorisation – numerical data

ANNEX F: List of abbreviations

ANNEX A: Railway structure information

A.1. Network map

A.2. Lists of railway undertakings and infrastructure managers

Up-to-date lists of public railway undertakings and infrastructure managers – as well as much other information – may be found on the Federal Railway Authority website:

A.2.1. List of public rail infrastructure managers in Germany

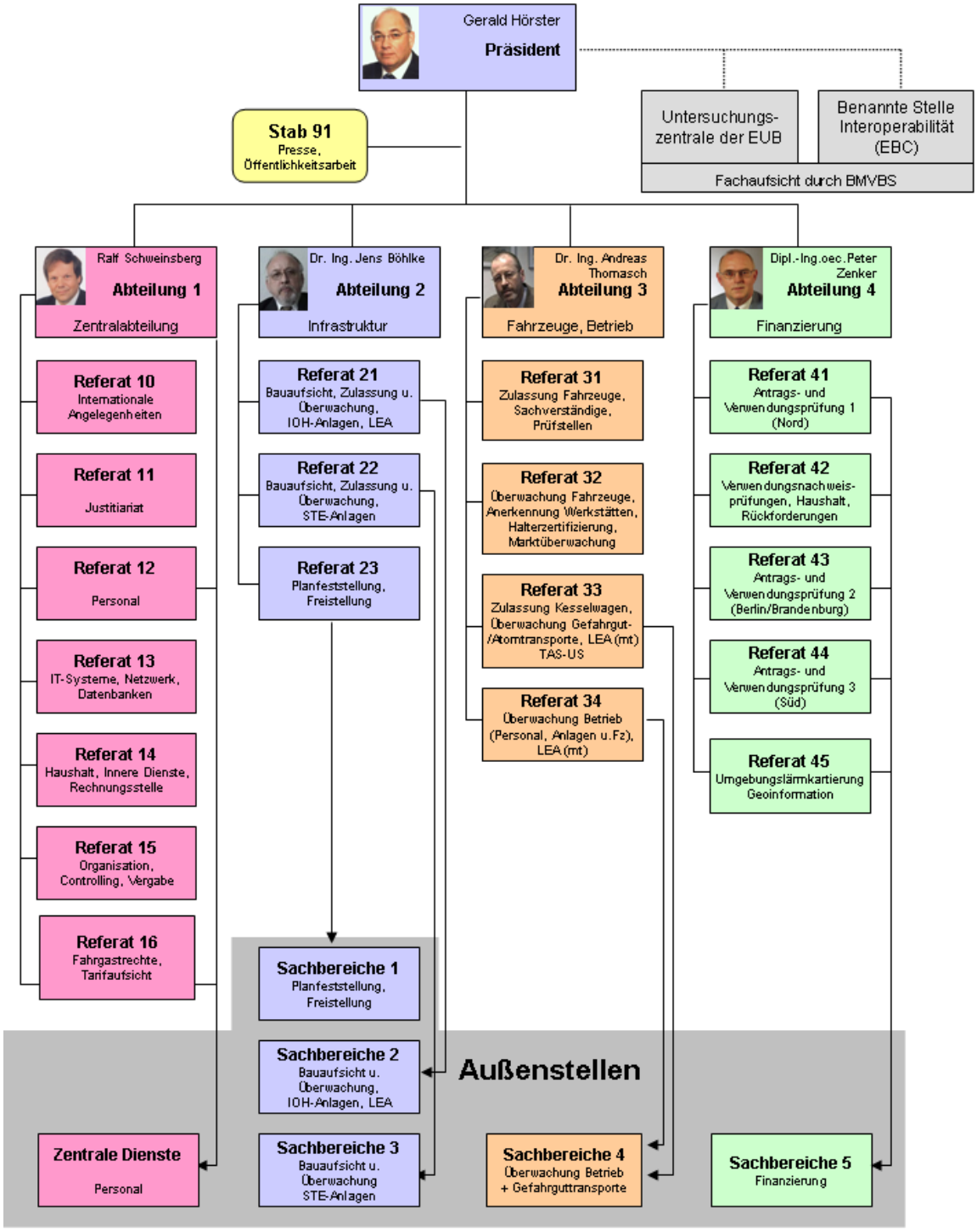
http://www.eba.bund.de/cln_007/nn_204046/DE/Infothek/Eisenbahnunternehmen/EIU/eiu__node.html

A.2.2. List of public railway undertakings in Germany

http://www.eba.bund.de/cln_007/nn_202596/DE/Infothek/Eisenbahnunternehmen/EVU/evu__node.html

ANNEX B: Organisation chart

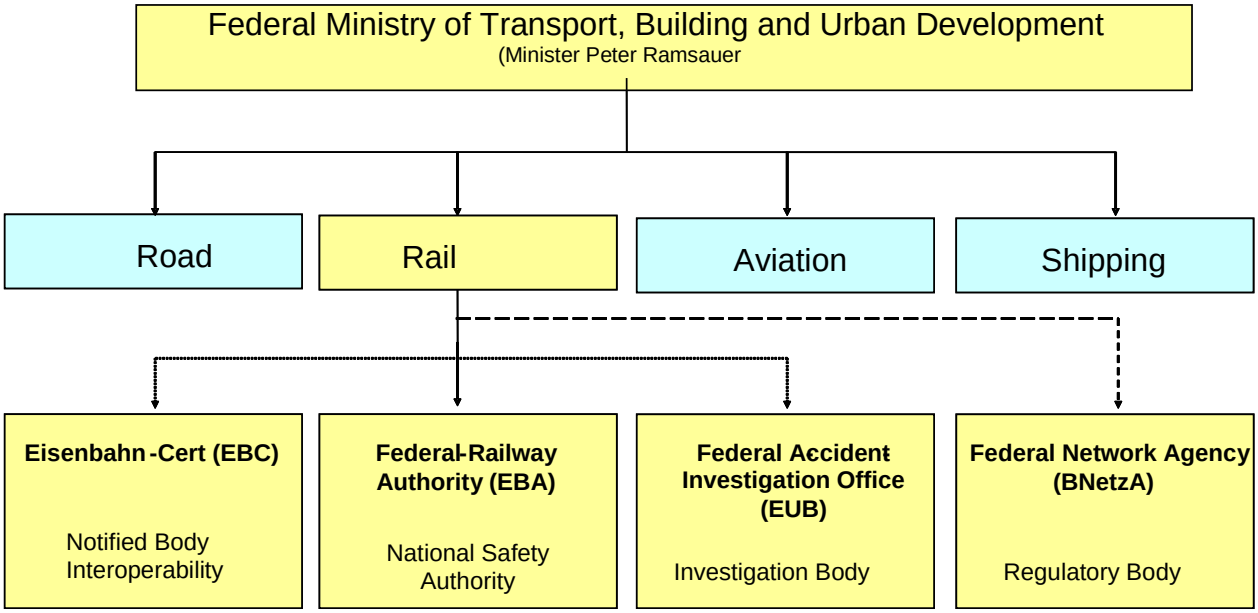
B.1.1. Figure: Internal Organisation (as of May 2012)



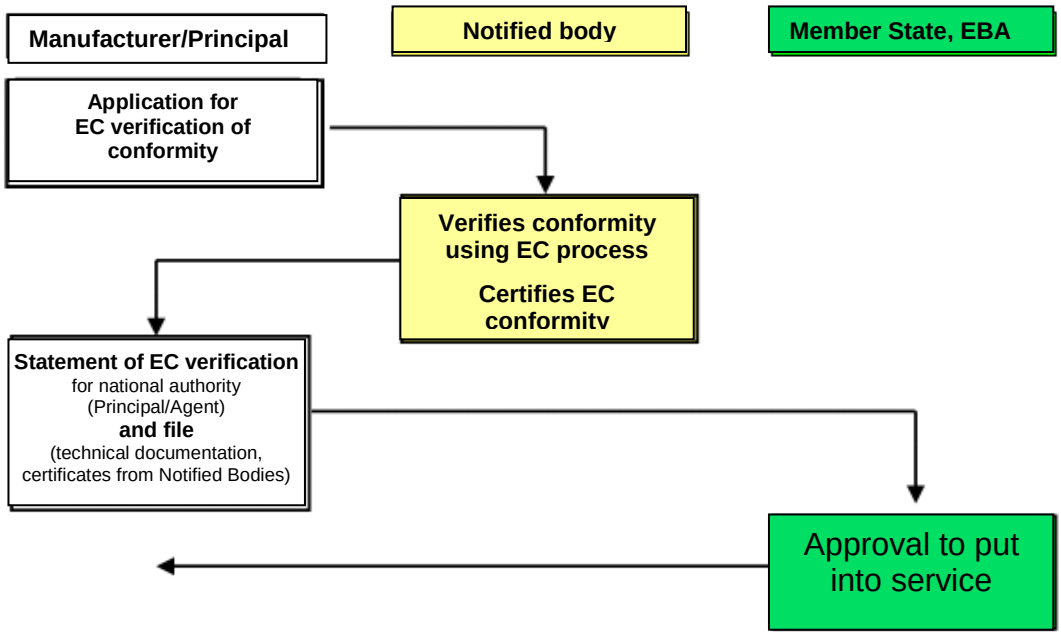
President			
Unit 91 Press Office, publicity work		Federal Accident Investigation Office (EUB)	Notified body interoperability (EBC)
		Specialist inspection by BMVBS	
Ralf Schweinsberg **Department 1** Central Department	Dr Ing. Jens Böhlke **Department 2** Infrastructure	Dr Ing. Andreas Thomasch **Department 3** Rolling stock, operations	Dipl. Ing. oec. Peter Zenker **Department 4** Finance
Unit 10 International Affairs	**Unit 21** Building inspection, approval and monitoring Infrastructure data installations, Land railway supervision	**Unit 31** Approval of rolling stock, experts, testing facilities	**Unit 41** Application for and appropriation of funds 1 (North)
Unit 11 Legal	**Unit 22** Building inspection and monitoring signal, telecommunications and electrical equipment	**Unit 32** Monitoring of rolling stock, approval of workshops, keeper certification market monitoring	**Unit 42** Scrutiny of statements of appropriation of funds, budget, recovery
Unit 12 Staff	**Unit 23** Planning approval, exemption	**Unit 33** Approval of tank wagons, monitoring of dangerous goods movement/ nuclear material, (Land railway supervision) (mt) TAS-US	**Unit 43** Application and appropriation of funds 2 (Berlin/Brandenburg)
Unit 13 IT systems, network, databases		**Unit 34** Monitoring operation (staff, equipment and vehicles), Land railway supervision (mt)	**Unit 44** Application for and appropriation of funds 3 (South)
Unit 14 Budget, Internal Services, Accounts Office			**Unit 45** Environmental noise mapping
Unit 15 Organisation, Controlling, Award			
Unit 16 Passengers' rights, tariff supervision	**Area of expertise 1** Planning approval, exemption		
	Area of expertise 2 Building inspection and monitoring Infrastructure data installations, Land railway supervision	**Out-based offices**	
Central Services Staff	**Area of expertise 3** Building inspection and monitoring signal, telecommunications and electrical equipment	**Area of expertise 4** Monitoring of operations and dangerous goods movement	**Area of expertise 5** Finance

B.1.2. Internal organisation - locations of EBA offices

B.2. Figure: Relationship with other national authorities as at 12/2010



B.3. Figure: Working relationship with Notified Bodies



ANNEX C: CSI data and definitions applied

C.1. CSI Data

Safety indicators in accordance with Annex 1 to the Railway Safety Directive (2004/49/EC)

Indicators relating to accidents

1.1. Total number of significant accidents and relative (to million train-kilometres) number of significant accidents, broken down into the following types of accident

	All types of accidents	Collisions of trains including collisions with obstacles within the clearance gauge	Derailments of trains	Level crossings accidents including accidents involving pedestrians at level crossings	Accidents to persons injury caused by rolling stock in motion, with the exception of suicides	Fires in rolling stock	Others
Total	285	18	14	56	175	4	18
Relative number	0.268	0.017	0.013	0.053	0.165	0.004	0.017

1.2. Total number and relative(to million train kilometres) number of serious injuries and fatalities by type of accident, broken down into the following categories

1.2.1. Serious injuries

	All types of accidents	Collisions of trains including collisions with obstacles within the clearance gauge	Derailments of trains	Level crossings accidents including accidents involving pedestrians at level crossings	Accidents to persons injury caused by rolling stock in motion, with the exception of suicides	Fires in rolling stock	Others
Total number of seriously injured	147	26	0	34	78	0	9
Relative number of seriously injured	0.138	0.024	0.000	0.032	0.073	0.000	0.008
Of whom							
Passengers	33	23	0	6	4	0	0
Relative number of seriously injured passengers	0.031	0.022	0.000	0.006	0.004	0.000	0.000
Relative number of seriously injured passengers per billion passenger/km	0.388	0.270	0.000	0.071	0.047	0.000	0.000
Relative number of seriously injured passengers per million passenger train/km	0.042	0.029	0.000	0.008	0.005	0.000	0.000
Employees, including the staff of contractors	28	2	0	3	15	0	8
Relative number of seriously injured employees including staff of contractors	0.026	0.002	0.000	0.003	0.014	0.000	0.008
Level crossing users	25	0	0	25	0	0	0
Relative number of seriously injured level crossing users	0.024	0.000	0.000	0.024	0.000	0.000	0.000
Unauthorised persons on railway premises	41	0	0	0	41	0	0
Relative number of seriously injured unauthorised persons on railway premises	0.039	0.000	0.000	0.000	0.039	0.000	0.000
Others	20	1	0	0	18	0	1
Relative number of seriously injured others	0.019	0.001	0.000	0.000	0.017	0.000	0.001

1.2.2. Fatalities

	All types of accidents	Collisions of trains including collisions with obstacles within the loading gauge	Train derailments	Accidents at level crossings including those in which pedestrians are involved	Accidents involving personal injury caused by rolling stock in motion, with the exception of suicides	Vehicle fires	Other accidents
Total number of fatalities	140	10	0	28	102	0	0
Relative number of fatalities	0.132	0.009	0.000	0.026	0.096	0.000	0.000
Of whom							
Passengers	9	8	0	0	1	0	0
Relative number of fatalities passengers	0.008	0.008	0.000	0.000	0.001	0.000	0.000
Relative number of fatalities passengers per billion passenger/km	0.106	0.094	0.000	0.000	0.012	0.000	0.000
Relative number of fatalities passengers per million passenger train/km	0.011	0.010	0.000	0.000	0.001	0.000	0.000
Employees, including the staff of contractors	10	2	0	0	8	0	0
Relative number of fatalities employees including the staff of contractors	0.009	0.002	0.000	0.000	0.008	0.000	0.000
Level crossing users	28	0	0	28	0	0	0
Relative number of fatalities level crossing users	0.026	0.000	0.000	0.026	0.000	0.000	0.000
Unauthorised persons on railway premises	82	0	0	0	82	0	0
Relative number of fatalities unauthorised persons on railway premises	0.077	0.000	0.000	0.000	0.077	0.000	0.000
Others	11	0	0	0	11	0	0
Relative number of fatalities others	0.010	0.000	0.000	0.000	0.010	0.000	0.000

2. Indicators relating to dangerous goods

Total number and relative (based on million train kilometres) number of accidents in connection with the carriage of dangerous goods, broken down into the following categories

	Accidents in which at least one rail vehicle carrying dangerous goods was involved	Accidents in which dangerous goods were released
Total	3	2
Relative number	0.003	0.002

3. Indicators relating to suicides

Total number and relative number (based on million train kilometres) of suicides

	Suicides
Total	853
Relative number	0.802

4. Indicators relating to incidents and near misses

Total number and relative number (based on million train kilometres) of serious and incidents and near misses, broken down into the following categories

	All accidents and near misses	Broken rails (only IMs)	'Track buckles' (only IMs)	Wrong side signal failures (only IMs)	Signals passed at danger	Broken wheels	Broken axles
Total	952	452	30	0	464	3	3
Relative number	0.895	0.425	0.028	0.000	0.436	0.003	0.003
				Resulting in an accident		2	0
				Found in service		3	3
				Found during regular maintenance		0	0

5. Indicators relating to the consequences of significant accidents

Total amount in euro and relative values (based on million train kilometres) for

	Number of deaths and serious injuries multiplied by the value of avoiding accident victims	Costs of damage to rolling stock and infrastructure	Costs of environmental damage*	Costs of delay caused by accidents
Total costs	326 510 999	45 120 000	Not recorded separately	25 741 929
Relative costs	307 119	42 440	Not recorded separately	24 213

6. Indicators relating to technical safety of infrastructure and its implementation

6.1 Automatic train protection

Percentage of tracks with automatic train protection (only IMs)	94.3%
Percentage of tracks using operational train protection systems per train kilometre run	97.6%

6.2 Number of level crossings (in total, per line kilometre and track kilometre), broken down into the following eight types: **

	With user-side automatic warning	With user-side automatic protection	With user-side automatic protection and automatic warning	With user-side automatic protection and automatic warning and with rail-side protection	With user-side manual warning	With user-side manual protection	With user-side manual protection and manual warning
Actively protected level crossings	895	743	7 260	395	107	415	110
Number per line kilometre	0.027	0.022	0.215	0.012	0.003	0.012	0.003
Number per track kilometre	0.014	0.012	0.115	0.006	0.002	0.007	0.002

	Total
Passively protected level crossings	5 595
Number per line kilometre	0 166
Number per track kilometre	0 089

7. Indicators relating to the management of safety

Total number of internal checks carried out (audits)	Not available
Percentage of internal checks (audits) carried out in relation to the number of audits stipulated or planned	Not available

* The costs of environmental damage are included in the total costs of damage to property shown.
** In some cases level crossings could only be categorised approximately in terms of the new categories introduced in 2010.

C.2. Definitions used in the annual report

C.2.1. Definitions applicable in accordance with Regulation (EC) No 91/2003

Person killed
means any person killed immediately or dying within 30 days as a result of an accident, excluding suicides;

Person seriously injured
means any person injured who was hospitalised for more than 24 hours as a result of an accident, excluding attempted suicides;

Passenger-km
means the unit of measure representing the transport of one passenger by rail over a distance of one kilometre. Only the distance on the national territory of the reporting country shall be taken into account;

Rail passenger
means any person, excluding members of the train crew, who makes a trip by rail. For accident statistics, passengers trying to embark/disembark onto/ from a moving train are included;

Suicide
means an act to deliberately injure oneself resulting in death, as recorded and classified by the competent national authority;

Significant accident
means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic. Accidents in workshops, warehouses and depots are excluded;

Train
means one or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point. A light engine, i.e. a locomotive travelling on its own, is not considered to be a train;

Train-km
means the unit of measure representing the movement of a train over one kilometre. The distance used is the distance actually run, if available, otherwise the standard network distance between the origin and destination shall be used. Only the distance on the national territory of the reporting country shall be taken into account;

C.2.2 National definitions

In addition to the definitions in Regulation (EC) No 91/2003, the definitions of Annex 1 to Directive 2004/49/EC as amended by Directive 2009/149/EC amending Directive 2004/49/EC of the European Parliament and of the Council as regards common safety indicators and common methods to calculate accident costs were used for accident-related CSIs and CSIs relating to incidents and near misses. These definitions were published in the EBA's guidance note on the drafting of safety reports. The guidance note is available online under the link http://www.eba.bund.de/cln_016/nn_201964/DE/Infothek/Bahnbetrieb/Sicherheitsbericht/sicherheitsbericht__inhalt.html [German only]

If an accident leads to other types of accident (for example, a derailment leads to a fire), the accident is categorised as the type of accident that triggered the chain. This applies regardless of the severity of the consequences of the accident.

The definition used for a train is different from the definitions given in Chapter C.2.1 of Regulation (EC) No 91/2003 in that account is taken of light engines:

Train
means one or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point. A light engine, i.e. a locomotive travelling on its own, is likewise considered to be a train.

C.3. Abbreviations

CSI	common safety indicator
ERA	European Railway Agency
BÜ	Bahnübergang (Level crossing)
Million	10^6
Billion	10^9

ANNEX D: Important changes in legislation and regulation

	Legislation	Date legislation comes into force	Reason for introduction (details of the new law or amendment to existing legislation)	Description
General national railway safety legislation				
Legislation concerning the national safety authority				
Legislation concerning notified bodies, assessors, third party bodies for registration, examination, etc.				
National rules concerning railway safety				
Rules concerning national safety targets and methods				
Rules concerning requirements for safety management systems and safety certification of railway undertakings				
Rules concerning requirements for safety management systems and safety authorisation of infrastructure managers				
Rules concerning requirements for wagon keepers				
Rules concerning requirements for maintenance workshops				
Rules concerning requirements for the authorisation of placing in service and maintenance of new and substantially altered rolling stock, including rules for exchange of rolling stock between railway undertakings, registration systems and requirements on testing procedures				
Common operating rules for the railway network, including rules relating to signalling and traffic procedures				
Rules laying down requirements for additional internal operating rules that must be established by the infrastructure managers and railway undertakings				

Rules concerning requirements for staff executing safety critical tasks, including selection criteria, medical fitness and vocational training and certification	**Regulation concerning the issue of driving permits to train drivers and the accreditation of persons and bodies for training and examination (Train Driver's Licence Regulation [Triebfahrzeugführerschein verordnung (TfV)]) of 29 April 2011 (BGBl. I S. 705)**	7 May 2011	Transposition of Directive 2007/59/EC	Content: Conditions for the issue of a train driver's licence together with the issue of a complementary certificate. Requirements for training and examination and the accreditation of training and examination organisations and doctors and psychologists. Provision for monitoring and checking
Rules concerning the investigation of accidents and incidents including recommendations				
Rules concerning requirements for national safety indicators including how to collect and analyse the indicators	**Amendment of the regulation concerning safety of the railway system (Railway Safety Regulation [Eisenbahn-Sicherheitsverordnung (ESiV)]) by the Fifth Regulation enacting and amending the statutory provisions governing railways of 29 April 2011 (BGBl. I S. 705)**	7 May 2011	Transposition of Directive 2009/149/EC	Harmonised European definitions for common safety indicators and common safety methods for calculating the economic effects of accidents
Rules concerning requirements for authorisation for placing infrastructure in service (tracks, bridges, tunnels, energy, ATC, radio, signalling, interlocking, level crossings, platforms, etc.)				

ANNEX E: The development of safety certification and authorisation – numerical data

E.1 Safety certificates in accordance with Directive 2004/49/EC

	Total number of certificates part A	Number of certificates part A in ERADIS
E.1.1. Number of safety certificates part A issued in the reporting year and previous years that remain valid at the end of 2011	16	15

		Total number of certificates part B	Number of certificates part B in ERADIS
E.1.2. Number of safety certificates part B issued in Germany in the reporting year and previous years that remain valid at the end of 2011	Number of certificates part B for which the part A has been issued in Germany	16	15
	Number of safety part B for which the part A has been issued in another Member State	9	7

		A	R	P
E.1.3. Number of new applications for safety certificates **part A** submitted by railway undertakings in 2011	New certificates	0	0	4
	Updated/amended certificates	0	0	0
	Renewed certificates	0	0	1

			A	R	P
E.1.4. Number of new applications for safety certificates **part B** submitted by railway undertakings in 2011	Where the part A has been issued in Germany	New certificates	1	0	3
		Updated/amended certificates	0	0	0
		Renewed certificates	0	0	3
	Where the part A has been issued in another Member State	New certificates	1	0	1
		Updated/amended certificates	0	0	0
		Renewed certificates	0	0	0

A = *accepted*: application accepted, certificate has already been issued
R = *rejected*: application rejected, no certificate has been issued
P = *pending*: case is still pending, no certificate has been issued so far

	Total number of revoked certificates in 2011	Number of certificates revoked in 2011 in ERADIS
E.1.5. Number of certificates part A revoked in the current reporting year	0	0
E.1.6. Number of certificates part B revoked in the current reporting year	0	0

E.1.7. List of states from which railway undertakings applying for a safety certificate part B in Germany have obtained their safety certificate part A.

Name of the railway undertaking	Member State in which the safety certificate part A was issued
Kombi Rail Europe BV	Netherlands
SNCB Logistics N.A.	Belgium

E.2. Safety authorisations in accordance with Directive 2004/49/EC

	New	Updated/ amended	Renewed
E.2.1. Number of valid safety authorisations issued to infrastructure managers in the reporting year and previous years that remain valid at the end of 2011	1	0	0

		A	R	P
E.2.2. Number of applications for safety authorisations submitted by infrastructure managers in 2011	New authorisations	0	0	0
	Updated/amended authorisations	0	0	0
	Renewed authorisations	0	0	0

A = *accepted*: application accepted, authorisation has already been issued
R = *rejected*: application rejected, no authorisation has been issued
P = *pending*: case is still pending, no authorisation has been issued so far

E.2.3. Number of safety authorisations revoked in the current reporting year	0

E.3. Procedural aspects – Safety Certificates (part A)

	New	Updated/amended	Renewed
The average time between receiving an application with the information required and the final delivery of a safety certificate **part A** in year 2011 for railway undertakings	20 months*	/	/

E.4. Procedural aspects – Safety Certificates (part B)

		New	Updated/amended	Renewed
The average time between receiving an application with the information required and the final delivery of a safety certificate **part B** in year 2011 for railway undertakings	Where the part A has been issued in your Member State	20 months*	/	/
	Where the part A has been issued in another Member State	16 months*	/	/

* These figures include the total time from receipt of application to the issuing of the certificate, including waiting time for the delivery of documents and certificates. This should not just be seen as processing time. For German undertakings the processing of the applications for part A and part B is done together and so the times are identical.

E.5. Procedural aspects – Safety Authorisations

	New	Updated/amended	Renewed
The average time between receiving an application with the information required and the final delivery of a safety authorisation in year 2011 for infrastructure managers.	15 months*	/	/
	/	/	/

* Time period for the actual processing of the authorisation: time from the first deposit of documents for assessment until the formal decision on issue of the safety authorisation

ANNEX F – List of abbreviations

AEG	General Railways Act [Allgemeines Eisenbahngesetz]
BEGebV	Regulation on Fees and Charges of the Federal Railway Administrations (Federal Railway Fees Regulation) [Verordnung über die Gebühren und Auslagen der Eisenbahnverkehrsverwaltungen des Bundes (Bundeseisenbahngebührenverordnung)]
BEVVG	Federal Rail Traffic Management Act [Gesetz über die Eisenbahnverkehrsverwaltung des Bundes] (Bundeseisenbahnverkehrsverwaltungsgesetz)
BGBl.	Official Journal reference [Bundesgesetzblatt]
BMVBS	Federal Ministry of Transport, Building and Urban Development [Bundesministerium für Verkehr, Bau und Stadtentwicklung]
BNetzA	Federal Network Agency [Bundesnetzagentur]
BSWAG	Federal Railway Development Act [Gesetz über den Ausbau der Schienenwege des Bundes (Bundesschienenwegeausbaugesetz)]
COTIF	Convention concerning International Carriage by Rail [Convention relative aux transports internationaux Ferroviaires]
CSI	Common safety Indicator
EBA	Federal Railway Authority [Eisenbahn-Bundesamt]
EBC	Eisenbahn-Cert
EBO	Railway Construction and Operation Order [Eisenbahn-Bau- und Betriebsordnung]
ERA	European Railway Agency
ESiV	Railway Safety Regulation [Verordnung über die Sicherheit des Eisenbahnwesens (Eisenbahn-Sicherheitsverordnung)]
EUB	Federal Railway Accident Investigation Office [Eisenbahn-Unfalluntersuchungsstelle des Bundes]
GSM-R	Global System for Mobile Communications – Rail
HOA	Hot box detector [Heißläuferortungsanlage]
IOH	Permanent way and structural equipment [Ingenieur-, Ober- und Hochbau]
LST	Control and Safety Equipment [Leit- und Sicherungstechnik]
LZB	Automatic train control [Linienzugbeeinflussung]
ObÜ	Monitoring of Installations [Objektbezogene Überwachung]
RID	Regulation concerning the International Carriage of Dangerous Goods by Rail (Appendix C to COTIF) [Règlement concernant le transport international ferroviaire de marchandises Dangereuses]
SMS	Safety management system
STE	Signalling, telecommunication and electrical equipment [Signaltechnik, Telekommunikation und Elektrotechnik]
TEIV	Trans-European Railway Interoperability Regulation [Verordnung über die Interoperabilität des transeuropäischen Eisenbahnsystems (Transeuropäische-Eisenbahn-Interoperabilitätsverordnung)]
TSI	Technical specification for interoperability
UbÜ	Monitoring of undertakings [Unternehmensbezogene Überwachung]
VV EA	Administrative Regulation on the Supervision of Railway Structures [Verwaltungsvorschrift zur Eisenbahnaufsicht über bauliche Anlagen]
VV EA-STE	Administrative Regulation on the Supervision of Signalling, Telecommunication and Electrical Installations [Verwaltungsvorschrift für die Eisenbahnaufsicht über Signal-, Telekommunikations- und Elektrotechnische Anlagen]
VV IBG	Administrative Regulation on Authorisation for Placing Rolling Stock into Service [Verwaltungsvorschrift über die Inbetriebnahmegenehmigung von Eisenbahnfahrzeugen]