**Report of the
Federal Railway Authority**

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

***COMPETENCE
and
RESPONSIBILITY***

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# Introduction

The Federal Railway Authority [Eisenbahn-Bundesamt] (EBA) is the safety authority for the railways in Germany and is responsible for carrying out the duties specified under Article 16 of Directive 2004/49/EC (the ‘Railway Safety Directive’):

* granting authorisations for the placing in service of structural subsystems in accordance with the Directive on the interoperability of the rail system within the Community (Directive 2008/57/EC),
* supervising compliance with the essential requirements for operation and maintenance of the subsystems of the railway system and for interoperability constituents,
* granting authorisations for the placing in service of vehicles that are not yet covered by a TSI,
* issuing safety certificates for railway undertakings and safety authorisations for infrastructure managers,
* monitoring and developing the railway safety regulatory framework, including the system of national safety rules,
* registration of vehicles in the national vehicle register.

In addition, the EBA performs other tasks such as, for example, planning the federal railways’ operating facilities, helping to finance construction work under the Federal Railway Development Act [Bundesschienenwegeausbaugesetz] (BSWAG), work in the field of dangerous goods, activities as an enforcement body for Regulation (EC) No 1371/2007 on the rights and obligations of railway passengers (the EBA is also responsible for passenger rights for ship and bus traffic), and planning, approving and acting as the supervisory authority for magnetic levitation railways. The task of coordinating research was newly added in 2015.

In accordance with Article 18 of the Railway Safety Directive, this report is limited to the EBA’s activities as a safety authority, in particular the development of:

* railway safety, including the common safety indicators (CSIs),
* the legal framework in the field of railway safety,
* safety certifications and safety authorisations, as well as
* the knowledge obtained from the supervision of railway undertakings.

The report is structured as recommended by the European Railway Agency (ERA). Its target audience is primarily the rail sector in Germany and Europe, though it is also aimed at politicians, representatives of business and the press from other sectors, as well as interested members of the general public.

# Safety Balance Sheet and Strategy

## Main conclusions for the reporting year

The form and intensity of the EBA’s supervision over the railways did not substantially change in 2015 in comparison with previous years. The number of safety-related defects found in the context of its supervision has likewise stayed at around the level of previous years, and so no critical influence on the safety level can be inferred from the results. The EBA did not identify any fundamental structural deficits in the course of its supervisory work. It was primarily in the context of cross-border transportation that the supervisory authority identified problems regarding the technical state of trains and loads. The most striking issue was freight traffic originating from Italy; see also, in this regard, B.2. ‘Enhanced import controls’ and B.3. ‘Focuses of monitoring’. Taking into account the actual trend in terms of accidents of past years, coupled with a rising trend in transport services on the German rail network, it can be noted that the safety level nevertheless remains stable and consolidated.

## National safety strategies, programmes and initiatives

The following programmes were carried out in 2015, some extending over several years:

* programme of replacement of old safety technology at level crossings for the purposes of harmonisation with the current regulatory framework;
* programme of elimination of speed restrictions (focusing more on capacity aspects than safety aspects);
* programme of logging in full of all drainage systems and producing a draft inspection and maintenance plan for these systems;
* implementation of the special programme to equip track stretches with intermittent automatic train control based on the amended requirements of the Railway Construction and Operation Order [Eisenbahn-Bau- und
Betriebsordnung - EBO];
* agreement on strengthened import controls by the railway undertakings when accepting trains coming from foreign countries, with the objective of ensuring the safe state of the trains in Germany by way of this standalone monitoring.

These programmes are largely implemented by the railways and monitored by the EBA via various procedures.

## Assessment of the reporting year

In 2015 the EBA focused its supervision on the following points, most of which had already constituted focal points in previous years:

* enhanced supervision of consignments of dangerous goods originating from foreign countries by way of joint controls by employees from operational monitoring and from dangerous goods monitoring, since trains coming from foreign countries have a higher ratio of problems;
* targeted controls in the field of technical occupational safety owing to the quality of the backup plans of building sites differing according to region;
* consideration of education and training as well as internal monitoring at relevant railway infrastructure undertakings on the basis of the frequent occurrence of events owing to incorrect operation of older signalling control systems, identification of potential improvements;
* wheelset and bogies on various types of vehicle, especially comparing rated and actual loads on bogie components and their maintenance implications in each case;
* separation and description of the responsibilities at the interface between railway undertakings and the body responsible for the maintenance of rolling stock – not recognising this interface can lead to the creation of unregulated areas and also to inconsistencies;
* consistent maintenance documentation and traceability in conjunction with corresponding IT processes;
* internal control regarding the effectiveness of the process and ensuring compliance with safety-related regulations;
* elements for implementing the EU Regulation on a common safety method for monitoring (European Commission Regulation (EU) No 1078/2012): configuration and performance of internal controls regarding the effectiveness of the processes; creation of suitable parameters and indicators as an instrument of control to guarantee process effectiveness; processes for monitoring how safety-related defects that are identified are dealt with.

When safety-related defects were identified, the EBA issued directives as necessary for the proper maintenance of track equipment and rolling stock, and for the safe running of operations pursuant to Section 2(4) EBO. In addition, measures for rectifying shortcomings were discussed and agreed in bilateral discussions at management level. The EBA regularly monitors the implementation of its directives and the elimination of shortcomings. In the infrastructure sector, the documentation of installation data (e.g. building works books and booklets for civil engineering work in the railway sector, installation data for retaining structures) still constituted an area where significant deficiencies existed, and this resulted in measures for retrospective collection.

Overall, the EBA conducted around 8 600 checks of railway undertakings and infrastructure managers in 2015 (including on-site inspections and product audits as well as process audits). Furthermore, approximately 12 500 checks were carried out in the dangerous goods sector, focusing not only on the railways, but also on other providers such as forwarding agents, loaders or fillers. The level of objections raised in relation to the checks in the dangerous goods sector was 9.2% overall, and specifically 15.2% in the case of cross-border transport.

For carrying out the supervision of railway undertakings and infrastructure managers, there are guidelines whereby the EBA implements the criteria of supervision under the EU Regulation on a common safety method for supervision (Regulation (EU) No 1077/2012).

## Priority areas for 2016

On the basis of the knowledge acquired in 2015, it can be said that the form and scope of the regular supervision has proved successful and it should therefore be retained in essentially unchanged form. The 2015 priority areas will in large part also form the essential elements of the supervision in the coming year. The supervision will focus to a greater extent on the undertakings’ measures for reducing the number of signals passed. In addition, one new topic is the promotion and supervision of the implementation of the supplementary regulation B 011 relating to braking technology which defines technical requirements for sanding equipment.

In addition, the following topics are to be worked on in the field of the supervision of railway undertakings’ safety management systems:

* Traceability of the termination of inspection tasks;
* Further development of the management of the system of rules;
* Improvement of the analysis of weak points.

# Development in the safety sector

## In-depth analysis of the trends noted in the recent past

The trend analysis relates to the categories of Common Safety Indicators (CSIs) listed in the Directive on safety on the Community’s railways (Directive 2004/49/EC).

*Accident victims*

The number of people seriously injured in railway accidents stood at 118 in 2015, higher than the level of the previous year (109 people seriously injured), but still below the average level for previous years. The number of train-kilometres travelled remained virtually the same, and thus the number of seriously injured people relative to train-kilometres travelled increased slightly to 0.113 seriously injured persons per million train-kilometres. The number of passengers seriously injured was up on the previous year, from 13 to 16. The proportion of level crossing users or trespassers or others in the total amount of all people seriously injured decreased slightly, but is still almost 80%. There was a significant increase in severe injuries to level crossing users. Conversely, the number of other persons seriously injured in railway accidents decreased significantly; there were only minor changes in the remaining groups of persons.

A decrease in the number of people killed in railway accidents, from 160 in 2014 to 130 in the reporting year 2015, was recorded. Relative to train-kilometres travelled, this represents a slight decrease, from 0.153 to 0.125 fatalities per million train-kilometres. Similarly to the case in previous years, around 80% of all deaths are attributable to the categories ‘level crossing users’ and ‘trespassers on railway premises’. Over half of the total fatalities are trespassers on railway premises (57%), even though there was a significant decrease in this regard in comparison with the number of victims in the previous year. A detailed examination also shows that the decrease is also attributable to the category ‘level crossing users’, while the figures in the other categories increased slightly. In 2015, three passengers were killed in railway accidents, one passenger in a level crossing accident and two further passengers in accidents with personal injuries.

*Significant accidents[[1]](#footnote-1)*

In 2015 a total of 306 significant railway accidents occurred on the rail network in Germany within the Safety Directive’s scope. Thus, the number of significant accidents decreased again, following three rises in succession. The total number is thus slightly below the average for the years 2007 to 2014. Relative to train-kilometres, the result is a decrease over the year from 0.319 serious accidents per million train-kilometres travelled on 2014 to 0.294 in 2015. A detailed examination reveals that the decrease observed mainly relates to the accident types ‘accidents with personal injury’ (30 events), after this category had also recorded the most significant increase in the previous year. For accidents at level crossings, vehicle fires and other accidents, the incidence in each case decreased slightly. The number of derailments remained the same, at a pleasingly low level. On the other hand, the number of collisions increased again. The collisions, of which there were 40 in total, can be subdivided into three collisions of trains with a railway vehicle and 37 collisions of trains with an obstruction within the clearance gauge.

*Accident precursors*

Under Directive 2004/49/EC, the following accident precursors must be recorded: broken rails, track buckles, signalling errors and signals passed at danger. Once again, the number of broken rails, at 262, is below the low value from the previous year; the causes were, as in the previous year, a mild winter as well as effects of various measures (universal testing for eddy currents, preventive grinding of rails and increased investment activity). The number of track buckles increased to 55 events. As in the previous years, there were no signalling errors. As for the number of signals passed at danger, following the significant increase in the previous year (+25%), the number of events remained at that level. Some railways have introduced internal measures in order to reduce in a sustainable manner the number of signals passed at danger. The EBA will continue to keep an eye on this issue and will make it an aspect of targeted monitoring.

*Accident costs*

Details of the economic consequences of accidents have also been included since 2010. Thus, in accordance with the requirements introduced under Directive 2009/149/EC, details are provided of the material and environmental damage as well as a calculation of the costs resulting from delays and the costs and societal losses resulting from victims of accidents. The base values used in the calculations were derived from the results of the ‘HEATCO’ Project that were recommended by the European Railway Agency (an EU-sponsored project to work out principles for the economic evaluation of infrastructure projects; for further details, see [http://heatco.ier.uni-stuttgart.de](http://heatco.ier.uni-stuttgart.de/)). In accordance with this method of calculation, when deaths and severe injuries from railway accidents increase, there is also a rise in accident costs. For 2015, accident costs amounting to EUR 413 million were recorded and/or calculated. This total can be broken down as follows: EUR 352 million of ‘societal losses’ arising from accident victims; EUR 47 million of material and environmental damage; and EUR 14 million of costs due to accident-related delays. The costs due to accident-related delays are significantly lower than the previous years because delays caused by suicides were separated out for the first time and were not taken into account for the purposes of calculating the accident costs.

[**Annex A**](AnhangA) of this report presents the safety indicators.

## Results of the safety recommendations of the Federal Railway Accident Investigation Office (EUB)

*Table 1: 2015 safety recommendations*

|  |  |  |
| --- | --- | --- |
| **Safety recommendation** | **Safety measure** | **Implementation status** |
| **Event: Train collision in Mannheim Central Station on 01.08.2014** |
| 1. Strengthen continuously the awareness and competence of traction vehicle crews when dealing with PZB (intermittent automatic train control) emergency braking of any kind by targeted training measures.
 | On the basis of the findings arising from the 2014 Mannheim accident, the EBA has put in place corresponding priorities for the purposes of risk-based supervision. Back in 2014, a focussed check was instigated in the weeks following the accident in which over 200 traction vehicle drivers were questioned regarding the correct conduct in the event of PZB emergency braking operations. This did not show up any structural shortcomings with regard to the knowledge of the operational staff.In order to achieve the greatest possible effect and an awareness of dangers in the sector, further supervision is being targeted directly at the approximately 280 railway undertakings with a safety certification. The carrying out and intensification of simulator training sessions for traction vehicle drivers is covered by the regular audits of the undertakings. A further subject of the audits is also the undertakings’ internal monitoring of the staff on the basis of targeted evaluations of the PZB travel data storage devices. In this regard, procedural consistency is also considered with regard to travel data in hired locomotives that can be used for this purpose which should still be available to the undertaking after the deployment of the vehicle. | The regular audits are currently still ongoing. The technical processing of the recommendation has been concluded. |
| 1. Check the retrofitting of the train control devices in the vehicles with the safety objective of ‘establishing an initiation of contact after PZB emergency braking operations before starting up again’, and develop it further depending on the outcome.
 | To implement this safety recommendation, in the context of a request for information, selected railway undertakings and the VDV (Association of German Transport Undertakings) were asked to state their views, including all undertakings involved in the accident as well as large railway undertakings and infrastructure managers.After classifying the responses, the EBA evaluated the results of this request for information. The result of the examination of the safety recommendation is that, against the background of the introduction of ETCS, retrofitting of the PZB for behaviour subsequent to an emergency braking operation is not sensible. | The procedure has been closed. |

*Table 2: Safety recommendations from previous years where no changes have occurred in the reporting year*

|  |  |  |
| --- | --- | --- |
| **Safety recommendation** | **Safety measure** | **Implementation status** |
| **Event: Accident on level crossing between Düsseldorf-Rath and Düsseldorf-Eller on 19.12.2012** |
| In the context of the planning and licensing of level crossing safety installations, the result of a risk assessment was that the application of the technical level crossing safety devices as per Section 11(6) should be made more specific and be modified in order to minimise, as far as possible, the extent of damage caused by vehicles at a standstill in the level crossing danger zone. | In a pilot project, the infrastructure manager has equipped a number of level crossings that are operated by attendants and do not have a technical fallback level with 2000 Hz magnets (known as barrier indusis). In the event that a level-crossing attendant forgets to close the barriers (at the right time) or opens them at the wrong time, these ‘barrier indusis’ bring about emergency braking of the approaching train. This solution has not met with approval everywhere because in the pilot project, at the beginning, unnecessary emergency braking operations also occurred.The question of whether such a technology could also be used in conjunction with vehicles that have been left (and are to be detected - by whatever means) in the danger area of a level crossing will have to be discussed and assessed after the completion of the aforementioned pilot project. In addition, the possibilities of detecting vehicles or persons in the danger area by radar or an infra-red interface are currently being investigated. | The procedure has not yet been concluded. |
|  |  |  |  |
| **Event: Train derailments at Stuttgart Central Station on 24.07.2012 and 29.09.2012** |
| 1. Revise Ril 800.0110 and 800.0120 and make them more specific, in order to regulate layouts outside of basic values and target values more closely.
 | On 01.12.2015, the Guideline Ril 800.0110 ‘Line layout’ was republished following an editorial and substantive revision.In detail: In section 9(4) ‘Avoidance of overriding of buffers’, this content was emphasised and reformulated. For the layout, comparison radii for the new speed ranges 25 km/h and 30 km/h were introduced, with a distinction being made between circular curves, basket curves and s-curves The comparison radius is a geometric variable for the curvature difference in the case of a sudden discontinuity of curvature. In s-curves, in the case of a comparison radius r w < 90 m, a straight section length of greater than 8 m and, for r w <110 m, a length of greater than 6 m has to be complied with. The minimum length pursuant to TSI for newly planned stretches is likewise incorporated in the guideline. | The procedure has thus been completed as far as this point is concerned. |
| **Event: Train derailment between Gröbers and Großkugel on 11.02.2011** |
| The guideline 821.2001 does not specify any value for the standard deviation of the complete signal of the longitudinal height, the cross level and the versine calculated over 250 m with an increment of 25 m, which, when reached, indicates that maintenance work needs to be done. A revision should, therefore, take place so that for the standard deviation, SR 100 , SR lim or limit values are likewise specified. [SR A, SR 100 and SR lim are limit values for the determination of a track location error, which, when exceeded, necessitate particular measures.] | According to Ril 821.2001, 5 (10), the standard deviation merely serves as an additional aid to decision-making for the assessment of the quality of the track location. It concerns a statement about the average track location quality and is used for the purposes of the planning of maintenance works in larger sections. If the SR A value is exceeded, this must be examined on the basis of the local circumstances and maintenance measures may have to be initiated. An introduction of SR 100 or SR lim is not considered to be necessary because in Germany the maintenance measures have for a long time depended on individual values and not on average values or the standard deviation. The consideration of the individual values is more important because, even in the event of individual cases where SR 100 or SR lim is exceeded, measures have to be taken. In the calculation of the average value or of the standard deviation, such individual cases where measured values exceed the above limits can no longer be ascertained. | This safety recommendation has not been implemented. The procedure has thus been closed. |

## Measures implemented without reference to safety recommendations

No safety measures in the form of general orders were issued in 2015. To comply with the statutory railway-related provisions in individual cases, administrative proceedings which related to an organisational or technical/operational improvement in the companies’ safety organisation were also carried out in 2015. The EBA also published technical notices on various cases. These are permanently available for download from the internet: <http://www.eba.bund.de/DE/SubNavi/Veroeffentlichungen/FM/Archiv/2015/archiv_fm_2015_node.html>

By way of example, the following defects and related remedial measures can be listed:

|  |  |  |
| --- | --- | --- |
| **Area concerned** | **Trigger moment** | **Action** |
| Infrastructure: permanent way | In the context of supervisory measures, defects were found in the field of track guidance on DKW 49/54-190-1:9 double diamond crossings on old wooden sleepers. The cause was a biological degradation of the wooden sleepers and a loosening of the sleeper bolts, which resulted in fractures of coupling rods. | The infrastructure manager concerned retrofitted what are known as track-holding plates, in consultation with the EBA. This is set out in the Technical Notes TM 4-2015-10462. |
| Infrastructure: permanent way | In the case of shock absorbers of the Liakustik design, detachments occurred on the shock absorber plates on the newly built Cologne-Frankfurt line; as a consequence of this, collision of absorber parts with an ICE train. | The undertaking concerned introduced special assessment criteria for inspection/maintenance of the Liakustik shock absorbers by way of Technical Note TM 1-2015-10835. |
| Infrastructure: permanent way | On the high-speed line between Würzburg and Hanover, so-called ‘white spots’ occurred a number of times in the Hanover area on account of pulverised stone in the ballast permanent way. This led to a reduction in the resistance to lateral displacement of the sleepers as a consequence of worn ballast and hollow areas under the sleepers, and consequently to the occurrence of track deformations given the high rail temperatures in August 2015. | Approx. 20 km in total of the line was closed for the worst affected sections to be repaired. In addition, speed restrictions were established depending on the state of wear of the ballast and the continuously measured temperature of the rails; this is provided for in Technical Note TM 3-2016-10262. |
| Infrastructure: Control and safety technology: control system | Tests during the commissioning of control systems revealed a failure of the POC02 (Point Object Controller for the control and monitoring of points) by which a forced-open point was wrongly signalled as a loss of position of the point. | The type approvals issued for the two variants POC01 and POC02 on 29.06.2015 contained ancillary provisions according to which the manufacturer presents a retrofitting plan to the EBA within three months. As a consequence, in the meantime all points controllers concerned that are in use have been able to be successfully replaced with new, error-free versions within a year. |
| Infrastructure: Control and safety technology: control system | Laboratory tests for a new software version revealed an error in the system software with an effect on the layout of a level crossing at the safety distance. The level crossing safety mechanism was not switched on again, but the entry signal nevertheless came into the drive position as the level crossing was only situated in the overlap of the safety distance. This was able to lead to danger if a following train slips through on the exit signal and travels into the opened level crossing. | Nationwide, six signals were affected by the defect. In a risk assessment, the risk increased by the defect was assessed and appropriate measures were derived. Immediate operational measures were not necessary. Route logic software from which the error had been removed was approved by the EBA in October 2015. The replacement of the software in the control systems affected is taking place in accordance with a timetable agreed with the infrastructure manager concerned. |
| Infrastructure: Control and safety technology: level crossings | On a remotely monitored RBÜT (computer-controlled level crossing safety technology) installation with vehicle sensors of the FSP design, there occurred a ‘dark trip’, i.e. the level crossing was entered when the level crossing security system was switched off. The dark trip occurred after, in the preceding train journey, the vehicle sensors for the switch-on detection were driven over with the electromagnetic rail brake activated. | Immediately after the dark trip, the infrastructure manager concerned introduced securing of the level crossing by attendants.As an immediate measure, the infrastructure manager examined the condition of the permanent way, put it in an optimal condition and replaced key assemblies of the installation on a preventative basis. The error was not able to be reproduced in any of the tests on the installation that were carried out afterwards. It is currently assumed that the dark trip which occurred cannot be exclusively ascribed to one cause. In order that the monitoring of the installation can be terminated without a clear detection of the cause, the installation should be reconfigured to wheel sensors. |
| Infrastructure and rolling stock: Compatibility of the sanding of traction vehicles with the ability of the track circuit to function | Following the events in 2013 and 2014 (see also the reports of the previous years), further dangerous events occurred in Itzehoe. The analysis resulted in the following findings: Further constellations were identified which, in the event of intense sanding shortly before stopping, lead to insulation effects of the track circuits and which are not covered by the existing sets of rules. | A working group in the sector has drafted a set of technical rules (supplementary regulation B011 relating to braking technology) which reduces the amounts of sand applied by vehicles and is intended to prevent or actively signal sanding in the lower speed range. Owing to the cost of retrofitting to existing rolling stock, the introduction of this set of rules was controversial. Until the decision was taken to produce a draft with the above-described solution (this occurred in 2016), the operational measures and maintenance measures introduced that were the responsibility of the rolling stock managers for the control and limitation of the quantities of sand applied in order to ensure safety had to be retained.It also became evident that the sand quantity rules in the interface paper relating to the TSI ZZS are not sufficient for the complete avoidance of incorrectly timed indications that the track is clear. However, owing to the conflict with the TSI, a stricter set of rules as to sand quantity is problematic, with the consequence that an adjustment to the TSI is requested. |
|  |  |  |  |
|  |  |
| Rolling stock: Wheelset | In the wheelset field, various events (axle breakage, wheel distortions and displacements) occurred which indicate higher loads than were originally presumed. | The undertakings concerned were asked to check the strength verification for the axle or the press fit in relation to current rules and, where necessary, to derive appropriate measures from the results. |
| Infrastructure: Railway stations | In the course of the supervision, defects that had not been detected in relation to railway stations were identified, e.g. missing railings, tripping hazards. | The infrastructure manager has developed and introduced a binding examination protocol. In addition, external service providers were trained and the communication of information to such service providers was improved. |

# Supervision

## Strategy and plan(s)

The EBA carries out regular supervision of railway undertakings and infrastructure managers, and of the bodies responsible for the maintenance of other types of vehicles such as freight wagons. The purpose of this supervision is to find out information about the effectiveness of the safety management system and the fulfilment of the railways’ responsibility for safety. To this end, the EBA conducts process and product audits (inspections) and, in doing so, also uses information from other sources, such as for example the Federal Railway Accident Investigation Office. The EBA’s supervision work serves the purpose of maintaining the existing safety level within the scope of its legal responsibilities. The circle of undertakings concerned is permanently recorded, based on the legal requirements. The undertakings are informed of the scope and timing routine of the supervision, but unannounced audits by the EBA also make up a significant element of the supervision.

On the basis of Regulation (EU) No 1077/2012 on a common safety method for supervision by NSAs and of general administrative law, the EBA configures its supervisory procedures in accordance with the following basic criteria:

* proportionality,
* consistency,
* fitness for purpose,
* transparency,
* accountability and
* cooperation.

The supervision comprises systematic checking whether the railways consistently comply with the requirements that apply for the granting of a safety certificate or safety authorisation - defined in Annex II to Regulations (EU) No 1158/2010 for railway undertakings and, as applicable, 1169/2010 for infrastructure managers. Checks are also made as to whether the undertaking's processes and procedures contributing to a process of continuous improvement are being continued, if necessary, and whether the railways are applying the provisions of Regulation (EU) No 1078/2012 on a common safety method for internal monitoring to be applied by railway undertakings.

Supervision in the field of vehicles, operations and dangerous goods focuses on the provision of safe railway transport services on a permanent way safely operated for this purpose. The focus here is on safe organisation of the business activities of the railway undertakings and infrastructure undertakings in railway operations and technical matters, plus compliance with general or special legal obligations on the undertakings. The strategy of preventive supervision by process audits of the maturity of the safety management systems, and of supervision of the undertakings’ ‘safe journey’ product remains unaltered on the basis of the approaches introduced. In this context, it is evident in the case of many undertakings that a functioning safety management itself regulates itself, in the event that deviations from the targets set occur, with the aid of a corresponding control loop model.

The supervision of the permanent way operators is likewise fundamentally undertaking-based. It considers the fields of system installation, maintenance of systems and operations; generally, the general method of working and implementation of the safety management systems is checked. For this purpose, the EBA conducts process and object-related supervision and special supervision over the infrastructure managers. By these means, random checks are carried out as to whether the undertakings are in practice implementing the safety-related processes in a manner compliant with the requirements and whether, during the use of the approved systems, they are also complying with the General Railway Act (AEG) and the legal regulations based on it, as well as the recognised codes of engineering practice. A significant cornerstone of railway supervision is also the verification of the fulfilment of the railways’ safety obligations that are established in Section 4(3) AEG. The principles of implementation are further specified in the Administrative Regulation on monitoring the installation and maintenance of systems. The Administrative Regulation is available via the following link: <http://www.eba.bund.de/SharedDocs/Publikationen/DE/Infrastruktur/AllgemeineVorschriften/VVUeberwachung/21_VV_Ueberwachung.pdf>

The supervision is generally carried out by way of random sampling. In accordance with the proper exercise of its discretion, the EBA stipulates the requirement for random sampling in order to guarantee that a representative cross section is monitored, taking into account the respective potential for danger in the technical fields of infrastructure, rolling stock and operations. In all fields, there are annual/multi-year plans for supervising the railways; these are regularly reviewed and, if necessary, revised on the basis of the results of the ongoing supervision. Announced and unannounced supervision measures take place on the basis of the plans. The aim is to inspect every undertaking, irrespective of size, at least once a year. Larger railway undertakings and infrastructure managers are monitored more often, on a differential basis according to region. The specialists at Head Office establish the requirements for the supervision plans and regularly liaise on this with the divisions of the EBA external offices. If there are findings arising from dangerous events or if there is a suspicion of systematic defects, the EBA under certain circumstances conducts special and focused checks. The results of the supervisory measures are recorded on special databases and are then available as the basis of evaluations, for setting future focuses, for adaptations of the supervision plans and for recertifications of the undertakings.

## Staff

A total of 230 EBA employees are engaged in activities in the supervisory field.

## Skills

The sections of the EBA responsible for personnel and organisation implement skills management in co-operation with the respective specialist offices of the EBA. The components are as follows:

* Defining requirements

Job descriptions contain both necessary expert skills and general qualifications such as interpersonal or methodological skills. The job descriptions and specialist profiles are regularly revised.

* Establishing fulfilment of requirements

When a new person is appointed, their skills are checked by way of a structured thematic interview and possible role plays. For higher grades, a potential analysis may additionally be used in order to establish potential specifically in terms of interdisciplinary skills. Special induction courses given by the respective specialist departments prepare new employees for their future activity.

* Continuing further training

On the basis of training needs forms, the training needs for each employee and each organisational unit are assessed at least once a year. The EBA Further Training Office organises targeted coverage of these needs. Furthermore, there are training officers in the specialist departments, who liaise closely with the Further Training Office and hold specialist training courses annually, to keep the knowledge specific to a specialist area up to date. Every year, around 250 further training courses are held. The trend is rising. E-learning programmes are also offered, e.g. for the subject areas of occupational safety - in the office and on the track.

* Quality assurance in further training

At the end of each further training course, there is an anonymous evaluation sheet which can be completed. The Further Training Office evaluates these and passes them on to the respective event organisers, so that constant improvement of target-oriented training provision can take place.

* In-house training

The EBA offers career-oriented training courses in high-level and senior technical grades, in up to five different subjects, depending on the future field of activity. Following on from their regular studies, new employees are offered the best possible preparation, initially for one or two years, primarily in relation to their technical tasks. By observation and training courses, they can profit from the knowledge and skills of the existing experienced staff. This ensures retention of specialist knowledge at the EBA and task-specific training of new entrants. Furthermore, depending on need, dual vocational courses are offered in various disciplines, for example for employees specialising in office communication or administrative staff.

## Decision-making

The EBA’s decision-making regarding its supervision of railway undertakings and infrastructure managers is governed by the applicable statutory provisions, made specific in administrative regulations. The EBA takes into account the fundamental principles of EU Regulation 1077/2012, such as proportionality, consistency and transparency.

The EBA draws in particular on the following sources to determine the criteria of its supervision:

* information from the evaluation of the safety management system,
* results of past supervisory work, especially supervision of railways,
* accident reports and recommendations of the Federal Railway Accident
* Investigation Office,
* other reports or data on accidents or disruption,
* railway safety reports,
* information from authorisations for placing in service,
* communications from national safety authorities from other Member States,
* information from the European Railway Agency, and
* complaints from members of the public.

Those affected by the decisions of the EBA can lodge objections to them by way of administrative proceedings, and can bring an action before the administrative courts against a rejected objection.

The enforcement by the authorities of organisational improvements in the undertakings’ safety management systems has proved to be a challenge for the EBA. Specifically, the underlying administrative procedure must include enforceability of official instructions, but the undertaking’s freedom to select suitable organisational solutions runs counter to this.

## Co-ordination and co-operation

The EBA co-operates with national safety authorities of other countries. This includes information exchange and the possibility of co-ordinating aspects of supervision (primarily the monitoring of railway undertakings working across borders and in relation to rolling stock). In 2015, joint supervision operations were occasionally carried out with the supervision authorities of neighbouring countries (especially Belgium, Switzerland and the Netherlands). New contacts with the Czech authority were established, with the focus being on the monitoring of dangerous goods. For the Fehmarn Belt Fixed Link, a cross-border project between Denmark and Germany, as in previous years, agreements are regularly made on supervisory and authorisation procedures between the Danish safety authority and the EBA. The conclusion of co-operation agreements with the authorities of neighbouring countries, as envisaged in EU Directive 1077/2012, is still on the agenda. The focus of these will be cross-border railway undertakings.

## Lessons learned from measures adopted

Both the supervision strategy and the measures adopted under it have proved to be fundamentally successful. With regard to internal measures, the measures introduced in recent years and continued in 2015 to increase the use of electronic data processing in the form of databases have proved to be an effective and valuable support for the proper exercise of the supervision of the railways. Focused tests constitute a suitable means for increasing the railways’ awareness of the issues monitored.

# Safety certification and authorisation

## Guidelines

The EBA supplies applicants for safety certification parts A and B with a guideline and supplementary notes to the guideline. The guideline has been in force since 24 August 2012. The supplementary notes have been available to applicants since 5 March 2013 and 18 July 2013 respectively. In the reporting year 2015, no update was undertaken by the EBA. The guideline and notes are published on the EBA website. Link: <http://www.eba.bund.de/DE/HauptNavi/FahrzeugeBetrieb/EVU/SiBe/SiBe_neu/sibe_neu_node.html>

Since 23 September 2009, the ‘Guideline on the Issue of Safety Authorisations’ (version 1.0) has applied to the granting of safety authorisations. This guideline is available on the EBA website. Link: <http://www.eba.bund.de/SharedDocs/Publikationen/DE/Infrastruktur/SiGe/Leitfaden%20SiGe_23.04.2009.html>

## Contacts with other national safety authorities

In 2015 there were no requests from safety authorities of other Member States for information about Part A certifications for a railway undertaking certified in Germany and applying for Part B certification in another Member State.

## Procedural aspects

During the reporting year, no problems arose in connection with the evaluation of the safety management systems of railway undertakings for the issuance of safety certifications. As for safety authorisations, the situation can be presented as follows: on 31 December 2015 (end of the reporting year), a total of six infrastructure managers held a safety authorisation under Section 7(c) AEG and one infrastructure manager held a provisional safety authorisation pursuant to Section 38(5)(c) AEG.

## Feedback

The general administrative procedure in Germany allows applicants the opportunity, after a decision (regarding grant, refusal, renewal, amendment or revocation of a safety certificate or authorisation), to lodge an objection or, in the further course of the proceedings, to file an action in the courts. Applicants also have the option of submitting observations at any time during the processing of their applications No such observations were received during 2015 either.

# Changes to statutes and regulations

## Railway Safety Directive

Directive 2004/49/EC on safety on the Community’s railways has been implemented into national law in Germany. The relevant legal acts implementing Directive 2004/49/EC were as follows:

* Fifth Act Amending the Statutory Provisions Governing Railways [Fünftes Gesetz zur Änderung eisenbahnrechtlicher Vorschriften] dated 16 April 2007

(BGBl. I p. 522), containing:

* + Amendment to the General Railway Act (AEG); and
	+ Amendment to the Federal Rail Traffic Management Act (BEVVG).
* Second Regulation on the Enactment and Amendment of the Statutory Provisions Governing Railways [Zweite Verordnung zum Erlass und zur Änderung eisenbahnrechtlicher Vorschriften] dated 5 July 2007 BGBl. I p. 1305), containing:
	+ Enactment of the Trans-European Railway Interoperability Regulation (TEIV),
	+ Enactment of the Railway Safety Regulation (ESiV),
	+ Enactment of the Railway Accident Investigation Regulation (EUV),
	+ Amendment of the Railway Operations Manager Regulation (EBV),
	+ Amendment to the Railway Operations Manager Examination Regulation (EBPV),
	+ Amendment to the Regulation on Access to the Occupation of Railway Entrepreneurs (EBZugV),
	+ Amendment to the Federal Railway Charges Regulation (BEGebv).

The same applies to the 2008, 2009 and 2014 amendments to this Directive, the implementation status of which appears in [Table 1 of Annex B](Tabelle1Umsetzung).

## Changes to statutes and regulations

[Table 2 of Annex B](Tabelle2%C3%84nderungen) contains all of the amendments to the national legal framework relating to railway safety (legal acts and administrative regulations), which were made in the reporting year 2015.

# The application of CSM to risk evaluation and ‑assessment

## Experience of the safety authority

Commission Regulation (EC) No 352/2009 of 24 April 2009 on the adoption of a common safety method for 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 had binding effect since 1 July 2012. This Regulation was repealed as of 21 May 2015 and replaced by Regulation (EU) No 402/2013. From the point of view of the EBA, in general uncertainties continue to arise in the following areas:

* interpretation of the terms ‘change’ and ‘significance’, meaning in particular assessment criteria for examining significance and relevance to safety;
* requirement for a reference system, possibly an explicit one, for risks identified in the simplified procedure.

Infrastructure

In 2015, the federal railways applied and continued to develop their processes for CSM risk evaluation and assessment. The infrastructure managers submitted documentation to the EBA regarding their application of the CSM process, for the purposes of the granting of authorisations in individual cases or in the context of the performance of structural works. In several cases, the CSM process

* was not applied on the basis of the exemption under Article 2(4) of the CSM Regulation (one case) or
* was applied, specifically with the outcome that the change in question was one that was safety-related but not significant (inter alia 14 cases in the field of earthworks and tunnel building as well as fire and disaster prevention).

Thus, in almost all cases of which the EBA has become aware in the infrastructure field, the CSM process ended with a finding that they were not significant. Only one comprehensive risk management procedure has been carried out and completed in connection with the verification process for a slab track system for a new stretch of railway in the context of an authorisation for placing in service. A full review of all significance checks of the federal railways is not carried out, as a notification or submission obligation does not exist in all cases. As part of its supervision, the EBA monitors the application of the CSM risk assessment and evaluation by random sampling, including significance checks carried out.

Operations

It must be noted generally that the criteria of ‘significance’ and ‘safety relevance,’ which are not specified more precisely in the CSM risk evaluation, leave the undertakings considerable leeway in their handling of the process. For the many smaller undertakings, in particular, the availability of resources for applying this method poses a challenge. In the 2015 reporting period, although technical, organisational or operational changes were identified by some undertakings, as far as the assessment of the significance was concerned, that majority were not classified as significant. Furthermore, a number of reports give rise to the supposition that the difference between CSM ‘risk assessment’ and CSM ‘monitoring’ (EU Regulation 1078/2012) has not yet been assimilated.

Rolling stock

Applications of the CSM ‘risk assessment’ that have come to light in the context of supervision measures in the rolling stock field have in individual cases shown up uncertainties as to the correct approach to be adopted. A number of providers have not been able to underpin the fundamental duty to apply this by way of corresponding processes.

In respect of vehicle licensing, the Rolling Stock Safety Regulations (SIRF) were added to the Administrative Regulation on Authorisation for Placing Railway Rolling Stock in Service (VV IBG) and the Manual on CSM Risk Evaluation and Assessment in 2011 and were updated in 2012. Annexes to the VV IBG were also drawn up; these annexes may serve as a template for the safety assessment report in accordance with the CSM. The procedure outlined therein is used for authorisations to place new vehicles in service and for notifications/authorisations for placing in service of modifications to existing vehicles. In addition to the use of the risk assessment when placing vehicles into service (IBG) within the framework of the VV IBG, the ‘Sector Agreement MoU on Vehicle Licensing’ of mid-2013 also stipulates the use of the CSM risk assessment when licensing vehicles. As a rule, the documents envisaged in the "MoU on Vehicle Licensing" are submitted (result of safety assessment report and related declaration): for all significant changes, a risk management procedure must be applied and a declaration must be given that the result of the safety assessment report confirms that the relevant risks have been identified by all suitable methods and the implemented measures for verification sufficiently cover all risks arising from the significant change. Where Regulation (EU) No 402/2013 is applied, this is done in the proposer’s written declaration under Article 16 of that Regulation.

## Feedback from providers

No formal feedback procedure has been introduced (e.g. use of questionnaires). The undertakings concerned have not forwarded directly to the EBA any experiences regarding the application of CSM to evaluate and assess risks. Differing assessments are given in the undertakings’ safety reports. Some undertakings consider that the CSM ‘risk assessment’ is helpful, others criticise the rules for being unnecessary and formalistic. In some cases, the significant amount of work necessitated is cited.

## Revision of national safety regulations to take account of the Commission Regulation on CSM for risk evaluation and assessment

No special national safety regulations to take account of the Commission Regulation on CSM for risk evaluation and assessment have been enacted in Germany. This was not necessary. Instead, the current EU Regulation is being directly applied.

# Application of CSM monitoring

Regulation (EU) No 1078/2012 of 16 November 2012 on a common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and by entities in charge of maintenance (‘CSM Monitoring’) entered into force on 7 June 2013. The Regulation describes the requirements for the internal monitoring of the safety management system by the undertakings themselves.

Infrastructure

The EBA monitors the establishment and effectiveness of internal monitoring procedures which are generally a component of the SMS by, on the basis of random sampling,

* comparing the results of internal audits which the railway operations managers (EBL) carry out with the findings from the supervision activities of the EBA pursuant to Regulation (EU) No 1077/2012;
* participating in the EBLs’ audits at the bodies performing the maintenance.

In this context, it has to date been possible to conclude that the findings of the EBA in principle correspond to those of the EBLs. Accordingly, there are no negative findings as regards the manner of functioning of the monitoring procedures of the EIUs. An undertaking has adopted further measures implementing Regulation (EU) 1078/2012 for example by introducing managerial supervision following a supervision procedure.

As the internal monitoring procedure generally forms part of the SMS, a check also takes place on the basis of the criteria set out in Regulation (EU) No 1169/2011 in the context of the granting of the safety authorisation pursuant to Section 7(c) AEG. The implementation of the Regulation was indeed also a particular point focussed on in the context of the first grant of a safety authorisation in 2015. Where deficits are identified, the EBA addresses these to the undertaking concerned in the context of the authorisation procedure. However, a complete substantive review of all processes does not take place, since the examination is generally limited to the existence of processes and, in certain cases, fundamental plausibility. Reasons for the configuration of the SMS that are internal to the undertaking are not generally the subject of the authorisation procedures of public authorities.

Rolling stock / Operations

As has already been stated in Chapter G, there are indications that the difference between CSM ‘risk assessment’ and CSM monitoring has not yet been completely assimilated. As perceived in the undertakings, CSM monitoring appears to be very abstract. Its functional relationship with the undertakings’ safety management system throws up a number of difficulties in terms of practical handling with regard to the improvement and review of one’s own organisation. Therefore, efforts geared towards better interconnecting the CSM monitoring with the criteria required of safety management systems or rethinking the parallel nature of the Regulations are to be recommended.

# Exceptions to the ECM certification system

In the 2015 reporting year, the EBA has issued no exceptions pursuant to Article 14(a)(8) of Directive 2004/49/EC regarding the method for certifying the entity in charge of maintenance (ECM). Therefore, nor was there any need to lay down alternative measures.

ANNEX A: Common Safety Indicators

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

1. **Indicators relating to accidents**
2. **Total number of significant accidents and average number of significant accidents (per million train-kilometres), broken down into the following types of accident**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | All types of accident | Collisions of trains with a rail vehicle | Collisions of trains with an obstacle within theclearance gauge | Train derailments | Level crossing accidents including accidents involving pedestrians | Accidents leading to personal injury involving a moving railway vehicle, excluding suicide and suicide attempts | Vehicle fires | Other accidents |
| Total | 306 | 3 | 37 | 9 | 61 | 157 | 3 | 36 |
| Average number | 0.294 | 0.003 | 0.036 | 0.009 | 0.059 | 0.151 | 0.003 | 0.035 |

**Level crossing accidents including accidents involving pedestrians and average number of these accidents (per million train-kilometres), broken down into the following types of accident**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | passively protected level crossing [6.2 a)] | actively protected level crossing, manual [6.2 b) i)] | actively protected level crossing, automatic with user warning [6.2 b) ii)] | actively protected level crossing, automatic with user protection [6.2 b) iii)] | actively protected level crossing with trackside protection [6.2 b) iv)] |
| Total | 14 | 5 | 8 | 30 | 4 |
| Average number | 0.013 | 0.005 | 0.008 | 0.029 | 0.004 |

1. **Total number and average number (per million train-kilometres) of serious injuries and fatalities by type of accident, broken down into the following categories**
2. Seriously injured persons

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | All types of accident | Collisions of trains with a rail vehicle | Collisions of trains with an obstacle within theclearance gauge | Train derailments | Level crossing accidents including accidents involving pedestrians | Accidents leading to personal injury involving a moving railway vehicle, excluding suicide and suicide attempts | Vehicle fires | Other accidents |
| Total number of seriously injured persons  | 118 | 0 | 2 | 0 | 45 | 68 | 0 | 3 |
| Average number of seriously injured persons  | 0.113 | 0.000 | 0.002 | 0.000 | 0.043 | 0.065 | 0.000 | 0.003 |

Of which:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Passengers | 16 | 0 | 1 | 0 | 6 | 8 | 0 | 1 |
| Average number of seriously injured passengers  | 0.015 | 0.000 | 0.001 | 0.000 | 0.006 | 0.008 | 0.000 | 0.001 |
| Average number of seriously injured passengers per billion passenger-kilometres | 0.179 | 0.000 | 0.011 | 0.000 | 0.067 | 0.089 | 0.000 | 0.011 |
| Average number of seriously injured passengers per million passenger train-kilometres | 0.020 | 0.000 | 0.001 | 0.000 | 0.008 | 0.010 | 0.000 | 0.001 |
| Employees or contractors | 8 | 0 | 0 | 0 | 0 | 6 | 0 | 2 |
| Average number of seriously injured employees, including contractors | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.002 |
| Level crossing users | 39 | 0 | 0 | 0 | 39 | 0 | 0 | 0 |
| Average number of seriously injured level crossing users | 0.037 | 0.000 | 0.000 | 0.000 | 0.037 | 0.000 | 0.000 | 0.000 |
| Trespassers | 36 | 0 | 1 | 0 | 0 | 35 | 0 | 0 |
| Average number of seriously injured trespassers on railway premises | 0.035 | 0.000 | 0.001 | 0.000 | 0.000 | 0.034 | 0.000 | 0.000 |
| Other persons on platforms | 19 | 0 | 0 | 0 | 0 | 19 | 0 | 0 |
| Average number of seriously injured other persons on platforms | 0.018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 | 0.000 | 0.000 |
| Other persons not on platforms | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average number of seriously injured other persons not on platforms | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total number of fatalities | 130 | 1 | 1 | 0 | 35 | 91 | 0 | 2 |
| Average number of fatalities | 0.125 | 0.001 | 0.001 | 0.000 | 0.034 | 0.087 | 0.000 | 0.002 |

Of which:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Passengers | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| Average number of passengers killed | 0.003 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.000 |
| Average number of passengers killed per billion passenger-kilometres | 0.033 | 0.000 | 0.000 | 0.000 | 0.011 | 0.022 | 0.000 | 0.000 |
| Average number of passengers killed per million passenger train-kilometres | 0.004 | 0.000 | 0.000 | 0.000 | 0.001 | 0.003 | 0.000 | 0.000 |
| Employees or contractors | 11 | 1 | 0 | 0 | 2 | 6 | 0 | 2 |
| Average number of employees, including contractors, killed | 0.011 | 0.001 | 0.000 | 0.000 | 0.002 | 0.006 | 0.000 | 0.002 |
| Level crossing users | 32 | 0 | 0 | 0 | 32 | 0 | 0 | 0 |
| Average number of level crossing users killed | 0.031 | 0.000 | 0.000 | 0.000 | 0.031 | 0.000 | 0.000 | 0.000 |
| Trespassers on railway premises | 74 | 0 | 1 | 0 | 0 | 73 | 0 | 0 |
| Average number of trespassers on railway premises killed | 0.071 | 0.000 | 0.001 | 0.000 | 0.000 | 0.070 | 0.000 | 0.000 |
| Other persons on platforms | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Average number of other persons on platforms killed | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.000 |
| Other persons not on platforms | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average number of other persons not on platforms killed | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

1. **Indicators relating to dangerous goods**

**Total and average number (per million train-kilometres) 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 | 6 | 5 |
| Average number | 0.006 | 0.005 |

1. **Indicators relating to suicides**

**Total and average number (per million train-kilometres) of suicides**

|  |  |  |
| --- | --- | --- |
|  | Suicides | Suicide attempts |
| Total | 806 | 101 |
| Averagenumber | 0.774 | 0.097 |

1. **Indicators relating to incidents and near misses**

**Total number and average number (per million train-kilometres) of incidents and near misses, broken down into the following categories**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | All incidents and near misses | Broken rails | Buckled rails and other track layout failures | Signalling failures | Signals passed at danger with the danger point being reached | Signals passed at danger without the danger point being reached | Broken wheels | Broken axles or wheelset axles |
| Total | 805 | 262 | 55 | 0 | 71 | 411 | 2 | 4 |
| Average number | 0.773 | 0.252 | 0.053 | 0.000 | 0.068 | 0.395 | 0.002 | 0.004 |

1. **Indicators relating to the consequences of accidents**

**Total amount in Euro and average delay in minutes and average values (per million train-kilometres) for**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Number of deaths and serious injuries multiplied by the value of preventing accident casualties | Costs of damage to the environment | Costs of damage to rolling stock and infrastructure | Costs of delay caused by accidents |
| Total costs | 351,836,366 | 176,000 | 46,411,117 | 13,810,870 |
| Average costs | 390,634.988 | 168.967 | 44,556.560 | 8,132.238 |

1. **Indicators relating to technical safety of infrastructure and its implementation**
2. **Train protection systems**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | warning | warning and automatic stopping | warning and automatic stopping as well as speed monitoring in sections | warning and automatic stopping as well as continuous speed monitoring |
| Percentage of lines with automatic train protection (EIUs only) | 1.8% | 1.7% | 88.7% | 7.6% |
| Percentage of train-kilometres travelled for which on-board train protection systems are used\* | 0.0% | 1.0% | 86.0% | 13.0% |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | manual | automatic with user warning | automatic with user protection | with trackside protection |
| Actively protected level crossings | 1,078 | 784 | 6,967 | 1,018 |
| Average number per line kilometre | 0.032 | 0.024 | 0.209 | 0.031 |
| Average number per track kilometre | 0.018 | 0.013 | 0.115 | 0.017 |

|  |  |
| --- | --- |
|  | Total |
| Passively protected level crossings | 4,357 |
| Average number per line kilometre | 0.131 |
| Average number per track kilometre | 0.072 |

\* The train-kilometres travelled using on-board train protection systems are available for only some of the railway undertakings. These undertakings together provide approximately 70% of train-kilometres.

ANNEX B: Amended legal provisions

Table 1: Implementation of the amendments to Directive 2004/49/EC

|  |  |  |  |
| --- | --- | --- | --- |
| **Amendments to Directive****2004/49/EC** | **Implemented (Yes/No)** | **Main legislative act** | **Date of entry into force** |
| Directive 2008/57/EC | Yes | Eighth Act Amending the Statutory Provisions Governing Railways of 12 September 2012 (BGBl. I p. 1421) | 18.09.2012 |
| Seventh Act Amending the Statutory Provisions Governing Railways of 10 December 2012 (BGBl. I p. 2632) | 20.12.2012 |
| Eighth Act Amending the Statutory Provisions Governing Railways of 22 November 2013 (BGBl. I p. 4008) | 29.11.2013 |
| Directive 2008/110/EC | Yes | Eighth Act Amending the Statutory Provisions Governing Railways of 12 September 2012 (BGBl. I p. 1421) | 18.09.2012 |
| Directive 2009/149/EC | Yes | Fifth Regulation on the Enactment and Amendment of the Statutory Provisions Governing Railways dated 29.04.2011 (BGBl. I p. 705) | 07.05.2011 |
| Directive 2014/88/EU | Yes | Ninth Regulation on the Amendment of the Statutory Provisions Governing Railways dated 19.11.2015 (BGBl. I p. 2105) | 01.01.2016 |

Table 2: Changes to the national legal framework during 2015

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Laws and administrative provisions** | **Provision** | **Date of entry into force** | **Description of the main change** | **Reasons for the change** |
| Concerns national safety authority | Ninth Act Amending the Statutory Provisions Governing Railways of 28/05/2015 (BGBl. I, p. 825) | 06.06.2015 | Possibility for private bodies to take over essential examination tasks in the context of procedures for the granting of authorisations for placing in service;Recognition of by the EBA of Notified Bodies, Designated Bodies and Assessment Bodies. | Amendment necessary for the application of Directive 2008/57/EC and Regulation (EU) No 402/2013 |
| Concerns NoBo, DeBo, AsBo, third parties with regard to registration, examination etc. | Ninth Act Amending the Statutory Provisions Governing Railways of 28/05/2015 (BGBl. I, p. 825) | 06.06.2015 | Possibility for private bodies to take over essential examination tasks in the context of procedures for the granting of authorisations for placing in service;Recognition of by the EBA of Notified Bodies, Designated Bodies and Assessment Bodies. | Amendment necessary for the application of Directive 2008/57/EC and Regulation (EU) No 402/2013 |
| Concerns railway undertakings / infrastructure managers / ECMs | Ninth Regulation on the Amendment of the Statutory Provisions Governing Railways dated 19.11.2015 (BGBl. I p. 2105) | 03.12.2015 and 01.01.2016 | Traction Vehicle Driver's Licence Checking Regulation (TfV):* Change to the requirement as regards vision
* Provision of greater detail regarding general technical knowledge, revised version of the rules in terms of linguistic knowledge
* Rules regarding language on border operations and through-lines
* Rules for the participation of doctors and psychologists in the further training sessions of the EBA following their recognition.

Railway Construction and Operations Order (EBO):* Permissibility of a further operational language alongside German for communication on border operations and through-lines

Railway Safety Regulation (ESiV):* Application of the new Annex I to Directive 2004/49/EC in the version amended by Directive 2014/88/EU for safety reports
 | Implementation of Directive 2014/82/EU and Directive 2014/88/EU |

ANNEX C – Abbreviations

|  |  |
| --- | --- |
| AEG | General Railway Act [*Allgemeines Eisenbahngesetz*] |
| AsBo | Assessment Body |
| 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 (Federal Railway Administration Act) [*Gesetz über die* *Eisenbahnverkehrsverwaltung des Bundes (Bundeseisenbahnverkehrsverwaltungsgesetz)]*  |
| BGBl | Federal Gazette [*Bundesgesetzblatt*] |
| CSI | Common Safety Indicators |
| CSM | Common Safety Methods |
| DeBo | Designated Body  |
| EBA | Federal Railway Authority [*Eisenbahn-Bundesamt*] |
| EBO | Railway Construction and Operations Order [*Eisenbahn-Bau und Betriebsordnung*] |
| EBPV | Regulation on the Examination for Railway Operations Managers [*Verordnung über die Prüfung zum Betriebsleiter für Eisenbahnen*] |
| EBV | Regulation on the Appointment, Confirmation, Tasks and Powers of Railway Operations Managers [*Verordnung über die Bestellung und Bestätigung sowie die Aufgaben und Befugnisse von Betriebsleitern für Eisenbahnen*] |
| EBZugV | Regulation on Access to the Profession of Railway Entrepreneur [*Eisenbahnunternehmer-Berufszugangsverordnung*] |
| ECM  | Entity in charge of maintenance |
| EC | European Community |
| ESiV  | Railway Safety Regulation [*Verordnung über die Sicherheit des Eisenbahnwesens (Eisenbahn-Sicherheitsverordnung)*] |
| EU | European Union |
| EUB | Federal Railway Accident Investigation Office [*Eisenbahn-Unfalluntersuchungsstelle des Bundes*] |
| EUV | Regulation on the Investigation of Dangerous Occurrences in Railway Operations [*Verordnung über die Untersuchung gefährlicher Ereignisse im Eisenbahnbetrieb*] |
| ICE | Intercity-Express |
| MoU | Memorandum of Understanding |
| NoBo | Notified Body Interoperability |
| PZB | Intermittent automatic train control |
|   |   |
| Ril | Deutsche Bahn Group Guideline |
| SIRF | Rolling Stock Safety Regulations [*Sicherheits-Regelwerk Fahrzeuge*] |
| STE | Signalling, telecommunication and electrical engineering [*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 |
| VDV | Verband Deutscher Verkehrsunternehmen e. V. (Association of German Transport Undertakings) |
|   |   |
| VV IBG | Administrative Regulation on Authorisation for Placing Rolling Stock in Service [*Verwaltungsvorschrift über die Inbetriebnahmegenehmigung von Eisenbahnfahrzeugen*] |

1. Accidents are deemed ‘significant’ under Directive 2004/49/EC if they involve at least one rail vehicle in motion and at least one person is killed or seriously injured, or significant material damage is done (at least EUR 150 000) to rail vehicles, rails, other installations or the environment, or significant operational disruption occurs (suspension of service on a mainline route for at least six hours). [↑](#footnote-ref-1)